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Telephone Troubles and Their Remedy.

In the practical work of installing and caring for telephones it is important to know just how to remedy the troubles that occur in the operation of telephone apparatus and systems. Mr. W. A. Gibson, in his book, "Manual of Telephone Troubles," covers this phase of telephone work very thoroughly, and every telephone man should have a copy at hand, as it will help him out of many difficulties. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.50. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

WESTERN UNION DUPLEX AND QUADRUPLEX ARTICLES.—The Western Union duplex was described and illustrated in our issues dated December 1 and 16, 1912; January 1 and 16 and February 1, 1913, and the quadruplex in the issues of June 16, July 1 and 16 and August 1, 1913. We can supply these numbers at 25 cents per copy. These descriptions are official.

Mr. C. E. Thatcher, of San Francisco, Cal., in remitting to cover his subscription for another year, writes: "The AGE is a splendid publication. I enjoy reading every page."

Mr. F. T. Iddings, of Baltimore, Md., writes: "TELEGRAPH AND TELEPHONE AGE is a very interesting and useful publication and I should be sorry to miss a single number."

Telegraph and Telephone Age

No. 1. NEW YORK, JANUARY 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Earth's Polarity.

Judging by the number of requests this journal receives to settle disputed questions arising among students of electricity, it is quite evident that many of our telegraph employes are destined to succeed through the highly commendable habit of refusing to leave in doubt any point which may possibly be settled by additional information gained from another source.

Among the questions in dispute are these:

"Is the 'north' pole of the earth's magnetism located in the northern or the southern hemisphere?"

"Does a north pole mean a + polarity, and — a negative polarity?"

"Are the geographical and the magnetic poles of the earth situated in different localities?"

The confusion which frequently arises when the words "north" and "south" are used as terms to indicate polarity is, no doubt, due to the different ways in which different persons formerly applied them to the respective ends of the mariner's needle in order to denote the two polarities thereof. For sailors, the words north and south are fittingly appropriate to express the geographical direction in which the needle points. In order to identify the two ends of the needle, that end which pointed north was marked N, and often wrongly called the north pole of the needle, while the opposite end was likewise miscalled the south pole. Later, to avoid ambiguity, the marked ends of the needle were called north-seeking and south-seeking poles, respectively. As opposite polarities attract and like polarities repel each other, it is obvious that if the polarity of the earth's magnetism in the extreme north is, say, positive, and that at the opposite point of the earth is negative, then that end of the magnetized needle which points to the north, and is marked N, is really the south or negative pole of the needle, and the end pointing south the north, or positive pole.

It is evident, therefore, that in order to properly associate the words "north" and "south" with positive and negative polarities, respectively, it only remains to understand what the terms positive and negative represent in electricity, and then ascertain which of these polarities (positive or negative) exist at the respective magnetic poles of the earth itself.

Now that end of every magnet from which the so-called magnetic lines of force emanate, or that terminal of each cell of battery, or the brush of a generator from which the current flows, constitutes the positive pole, and the other end of the magnet, and the companion brush of the generator into which the returning magnetic lines of force, or the current flows, is the negative pole. As this rule applies alike to the poles of all magnets, the earth itself being a magnet, it follows that as the negative end of our artificially made magnets all point to the north, the earth's magnetic north pole must be positive, and located in the northern hemisphere, and the negative, or south pole, in the southern hemisphere. Hence, when reference is made to polarities the words "north," "positive" and the symbol + mean one and the same thing, as do "south," "negative" and symbol — for the opposite polarity.

To ascertain the polarity of an unmarked steel magnet in the absence of another with its polarities indicated, suspend it by a small string or thread attached to the helix, or center of the bend, so that the magnet will be free to move. If there is no wind or other interfering influence present, the magnet will behave in the same manner, although not quite so strongly, as would a needle or a straight bar magnet when similarly suspended, viz., turn in such a direction that the magnetic lines of force in the steel, which flow across the air gap from one pole to the other, will set themselves in line with the earth's magnetic lines of force, which flow from north to south.

The limb of the horseshoe that turns toward the north will be the south pole of that magnet and may be marked with the negative symbol —. Or the negative pole of a magnetized needle may be marked N, as is quite generally done, as a simple indication to laymen that the direction in which that end of the needle points is north.

To be more accurate, we should have said "approximately" north, because the magnetic north

and the geographical north are not situated in the same locality, the former being a few degrees west of the latter in this hemisphere. However, they are sufficiently close to each other to depend upon the needle to correctly indicate geographical directions for all general purposes except that for navigation at sea, when allowance must be made for the discrepancy.

Telegraph and Telephone Patents.

ISSUED DECEMBER 2.

1,079,931. Microphone. To J. J. Comer, Chicago, Ill.

1,080,260. Intercommunicating Telephone System. To P. G. Burgess, Jamaica, N. Y.

1,080,271. Art of Signaling by Electromagnetic Waves. To R. A. Fessenden, Brant Rock, Mass.

ISSUED DECEMBER 9.

1,080,544. Wireless Signaling System. To C. D. Ehret, Ardmore, Pa.

1,081,128. Switching Mechanism for Telephone Exchanges. To F. A. Lundquist, Chicago, Ill.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, December 29, 1913:

American Telephone and Telegraph Co.	123⅜
Mackay Companies	76¾
Mackay Companies, preferred	65
Marconi Wireless Tel. Co. of Am.	3⅞
Western Union Telegraph Co.	57¾

PERSONAL.

MR. FRANK KANE, of Washington, D. C., a well-known old-time telegrapher, was a New York visitor during the holidays.

MR. H. O. RUGH, general manager, Railway Electric Manufacturing Company, Chicago, Ill., was a recent New York visitor.

MR. MAX LEVY, of Chicago, formerly identified with the telegraph service, now in the electrical business, was a business visitor in New York during the holidays.

MR. G. R. CALVERT, formerly manager of the Western Union office at Birmingham, Ala., was in New York during the holidays, visiting friends. Mr. Calvert is now a student in the law department of the University of Virginia.

MR. JOHN BELLAMY TAYLOR, a well-known authority on telegraph matters and formerly with the General Electric Company as consulting engineer, and as engineer of the foreign department of that company, announces that his services are available as consulting engineer on technical investigations, tests, inspections, reports, telephone and telegraph relations to electric light and power systems, earth-current surveys, etc. His office and laboratory are at 23 Lowell Road, Schenectady, N. Y. Mr. Taylor also maintains an office at 100 Broadway, New York.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, who is president of the Men's Club, New Rochelle, N. Y., where he resides, has arranged for an address before the club by Dr. Thomas Darlington, secretary of the Welfare Committee of the American Iron and Steel Institute on January 6. Dr. Darlington will describe the welfare work in the iron, steel and allied industry, and the address will be illustrated.

MR. C. C. ADAMS, vice-president, New York, has returned from an extensive business trip to South Carolina and Georgia. He reports business conditions in those States as excellent.

MR. W. I. CAPEN, vice-president, has returned from a business trip to Florida. As a result of this visit considerable line rebuilding will follow, and some extensions of existing lines will probably be made.

MR. THEO. L. CUYLER, JR., formerly assistant treasurer of this company, New York, was married on December 25, 1913, to Miss Mary Sidney Proal, of Brooklyn, N. Y.

MESSRS. HENRY SCRIVENS and C. A. RICHARDSON, superintendents at Pittsburgh, Pa., and Boston, Mass., respectively, spent the holidays in New York.

MESSRS. J. F. SKIRROW, associate electrical engineer, and C. F. LEONARD, superintendent, New York, have been elected president and vice-president, respectively, of the Postal Telegraph Library Association of New York.

MANAGERS APPOINTED.—Managers have been appointed as follows: T. G. Backus, at "MA" branch office, Dallas, Tex.; T. Hokenson, Indiana Harbor, Ind.; F. Hickman, Marquette, Mich.; W. R. Phillips, Ft. Dodge, Ia.; Mrs. Ethel F. Williams, Rochester, Minn.; G. B. Ivey, Tuskegee, Ala.; C. W. Mathany, Columbus, Ohio, vice G. H. Hawkins, resigned; Miss E. A. Schubert, Bloomington, Ill.; R. Smith, Sioux Falls, S. D.; Chas. A. Ebert, Hastings, Neb.; E. H. Miller, Leavenworth, Kan.; R. H. Young, Hendersonville, N. C.; C. R. Perkins, Attalla, Ala.; C. W. Gardner, Culpeper, Va.; J. H. Humphreys, Youngstown, Ohio.

Mr. Mackay on Government Ownership.

Mr. Clarence H. Mackay, president of the Mackay Companies, being asked what he thought of Postmaster-General Burleson's report that the Government take over the telephone and telegraph lines, said:

"The Postmaster-General is mistaken in his idea that telephone companies are subject to the Post Road Act of Congress of 1866. The Supreme Court of the United States in the Richmond case (174 U. S. 761) held that they are not.

"In denominating the telegraph business as being 'monopolistic in its nature' he is also mistaken. If there ever has been more continuous, keen and even

bitter competition than that between the Postal and the Western Union I would be pleased to know when and where.

"The money question, however, is the main question. Nine hundred million dollars would not be a 'look-in.' The Bell Telephone Companies alone would demand more than that. Then there are the thousands of independent telephone companies and farmers' lines scattered all over the country. The entire bill, including telegraph lines, would be about $2,000,000,000, which is about two-thirds of the national debt at the close of the Civil War, when many intelligent men despaired of the solvency of the Republic.

"Nor is this the worst. Judging from English experience, that vast sum would be entirely lost, because under Government management the operating expenses year by year would exceed the income.

"One of the worst complications that would arise would be in regard to the contracts between the telegraph companies and the railroads. England found this out when it took over the telegraph lines and then had to pay the railroads an enormous sum to get full control of the telegraph lines which were built on the railroads, and in which the railroads had an interest, the same as in this country. The English railroads were not modest in their demands, and the result was that a perfectly enormous and unexpected sum had to be paid by the Government to the railroads to get rid of those contracts.

"And as to service—Government service would be a joke as compared with present service. If you don't believe it, just try the Government service—telegraph and telephone—in Europe."

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. A. G. SAYLOR, general manager of the Eastern Division, New York, in a letter to all employes of the division, expresses his appreciation of their success in maintaining the domestic and cable revenues of the division during the past year. "The commercial forces in the Eastern Division responsible for the revenues are, in my judgment," says Mr. Saylor, "unequalled, and deserve the greatest credit, and it is a pleasure to me at this time to make just and suitable acknowledgment for the results accomplished."

MR. W. W. RYDER, manager of the Railway Department of this company, at New York, has been appointed general manager of the Western Division, with headquarters at Chicago, vice Mr. Theo. P. Cook, retired.

MR. C. H. GAUNT, general manager, Pacific Division, San Francisco, Cal., who was a recent New York visitor on business, returned to San Francisco December 14.

CONFERENCE OF SUPERINTENDENTS.—Superintendents A. C. Terry, of Pittsburgh; J. W. Reed, Philadelphia; C. F. Ames, Boston; E. P. Griffith, Jersey City; W. A. Sawyer, J. F. Nathan, together with General Manager A. G. Saylor, of New York, held a conference for the benefit of the service in New York on December 17 and 18.

MR. C. A. CRANE, manager of the St. Paul, Minn., office of this company, was recently chosen a director of the Commercial Club of St. Paul.

EDWARD E. BRANNIN, aged fifty-nine years, traffic chief at 195 Broadway, New York, died December 24, 1913, in Brooklyn, N. Y. Deceased was a native of New York City. He took active interest in all insurance and social and other organizations of the telegraph fraternity and was a director of the Serial Building Loan and Savings Institution. He was widely known. The funeral was held December 27, and was attended by the directors and officers of the Serial Building Loan and Savings Institution and many telegraph officials and operators.

ERRORS IN TELEPHONING TELEGRAMS.—An interesting question has arisen in connection with the practice of transmitting telegrams over the telephone. In a case for damages against one of the telegraph companies in Greenville, S. C., the jury awarded $500 damages for an error in the transmission of a telegram from Charleston to Greenville, in which the word "here" was changed to read dead when it reached Greenville. The testimony showed that the error was made in telephoning the telegram from the sender to the Charleston telegraph office.

W. W. Ryder Appointed General Manager Western Division, Western Union Telegraph Company.

Mr. W. W. Ryder, manager of the Railway Department of the Western Union Telegraph Company, New York, whose appointment as general manager, Western Division, of the same company, with headquarters at Chicago, is announced in another column of this issue, was born in Aurora, Ill., on April 6, 1865. He entered the service of the Chicago, Burlington & Quincy Railroad in 1883,

W. W. RYDER, GENERAL MANAGER, CHICAGO, ILL.

and in 1887 became stenographer in the office of the Superintendent of Telegraphs of the Burlington System in Chicago. In 1893 he was appointed superintendent of telegraph for that road. He held this position until January 1, 1910, when he was appointed general superintendent of telegraph, New York Central Lines West of Buffalo, which position he resigned on October 1, 1912, to accept the then newly created position of manager of the Railway Department of the Western Union Telegraph Company, with headquarters in New York. During his connection with the railway service Mr. Ryder was one of the most active members of the Association of Railway Telegraph Superintendents. He has a wide knowledge of technical and practical railroad telegraph and telephone affairs and is eminently fitted for his new position. He is a gentleman of high character, and with his large experience he no doubt will prove an excellent official.

THE CABLE.

MESSRS. FREDERICK HARDING and Robert Watson, operators at the Rye Beach, N. H., cable office of the Western Union Telegraph Company, have been transferred to Halifax, N. S., on account of the reduction of force at the first-named point.

RED SEA CABLE.—The cableship "Colonia" has laid 700 miles of cable in the Red Sea, and left Aden on November 23. On her voyage to Colombo she let down cable at the record rate of nine and one-half miles per hour. She will proceed to Malabar.—London *Electrical Review*.

TRIPOLI-MALTA CABLE.—The Italian Government has made a contract with the Eastern Telegraph Cable Company regarding its cable line between Tripoli and Malta. Since the laying of the Italian cables between Sicily and Tripoli the traffic of the Eastern has been greatly reduced, and the company has accepted an offer from the Italian Government to guarantee a certain sum annually during the continuance of the old Turkish concession.

CANADIAN NOTES.

CHRISTMAS GENEROSITY OF CANADIAN PACIFIC CHECK BOYS.—The check boys in the main office of the Canadian Pacific Railway Company's telegraph, Montreal, Que., circulated a subscription list among the operators for Christmas. From the amount collected the boys donated the sum of $20 in gold to one of their mates, Philip Torry, whose leg had been so badly burned by coming in contact with a broken electric light wire that it had to be amputated. The little fellows only had a dollar each left to themselves, but were happy with the knowledge that they helped their comrade to spend a happier Christmas than he otherwise might have done.

Presentation to Mr. B. S. Jenkins.

Mr. B. S. Jenkins, former general superintendent of the Canadian Pacific Railways' telegraph, at Winnipeg, Man., recently retired, was the guest of honor at a gathering in that city on December 10, 1913, of representatives of the telegraph service from various points on the company's system, extending from Quebec to Vancouver. The meeting was called to give expression of their esteem for their former chief. An elaborate illuminated testimonial and a silver tea set subscribed to by over 500 officers and employes in the service, from the Atlantic to the Pacific, were presented to Mr. Jenkins. The presentation speech by Mr. M. E. McKittrick referred to Mr. Jenkins' unselfishness, tact and ability in creating and retaining the spirit of loyalty among those who worked under him. He expressed the unanimous regret of the telegraphers at the loss of an official who had been not only a superintendent, but a friend.

Mr. Jenkins, in reply, thanked the speaker. He referred to his experiences in the early days of the development of the country. In 1881 he entered the service of the Canadian Pacific Railway, and his first employment was as an operator at Winnipeg Junction, his office being in a box car. The office furniture consisted of a slab for the instruments and a soap box for a seat. He had to cut his own wood to keep warm.

When Mr. Jenkins joined the Canadian Pacific forces there was practically no telegraph service in the West, while to-day the territory between the Great Lakes and the Pacific Coast is gridironed with the company's telegraph lines, with a wire mileage exceeding that of the system in older eastern Canada, and with copper wires, telephone service for movement of trains, modern methods of construction, maintenance and operation, and with equipment up to date in every respect.

The ceremonies, which were conducted by Mr. Henry Lynch, included an excellent musical and vocal programme.

THE TELEPHONE.

MR. ARTHUR ALLEN MARSTERS, secretary of the American Telephone and Telegraph Company, New York, was married on December 17, 1913, to Miss Katherine Louise Vail, niece of Mr. and Mrs. Theo. N. Vail. Miss Vail was a daughter of the late William A. Vail, a brother of Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, and of the Western Union Telegraph Company.

FIRE DRILLS IN TELEPHONE BUILDINGS.—The Pacific Telephone and Telegraph Company has issued orders requiring a monthly fire drill in its buildings where ten or more persons are employed.

GERMAN UNDERGROUND TELEPHONE LINES.—An underground telephone line has recently been completed between Berlin and Magdeburg, Germany. One is also being laid between Berlin and Hamburg.

TELEPHONE EXTENSIONS IN AUSTRIA.—The Austrian government is said to be preparing a vast telephone programme which will take four or five years to realize, and involve an expenditure of $18,750,000.

INDEPENDENT TELEPHONE ASSOCIATION MEETING.—The seventeenth annual meeting of the National Independent Telephone Association will be

held at the Hotel La Salle, Chicago, from January 13 to 15. A programme of special interest to telephone men is being arranged. Mr. J. B. Earle, Waco, Tex., is secretary.

ANGLO-SWISS TELEPHONY. — Experiments that have been carried out show that telephonic communication between London and Switzerland can be carried on successfully, and the service, via Paris, will shortly be opened to the public. The charges at first will be 7*s*. ($1.68) for three minutes in the daytime and 4*s*. (96 cents) at night.—London *Electrical Review*.

COURSE IN TELEPHONY.—The University of Arkansas, Fayetteville, Ark., is giving a course in telephony, and has been presented with several pieces of telephone apparatus by the Southwestern Telegraph and Telephone Company. The donation consists of a chief operator's switchboard, series telephones, one railroad train dispatching set, a coin collector and various other instruments and appliances.

MUNICIPALLY OPERATED TELEPHONES IN ENGLAND.—It is proposed in Hull, England, to take over from the Government the old National Telephone system in the Hull area at a cost of $960,000, subject to the condition that a clause be inserted in the terms of arrangement giving power to the Government to ensure that the system at Hull be efficiently maintained in keeping with the telephone system of the country.

COMPULSORY BELL-INDEPENDENT CONNECTIONS IN CALIFORNIA HELD TO BE VIOLATION OF CONSTITUTION.—The Supreme Court of California on December 20 handed down a decision that the order of the State Railroad Commission compelling the Pacific Telephone and Telegraph Company to make connections with independent telephone companies was a violation of the Constitution of the United States, inasmuch as it was confiscatory. The Railroad Commission had directed the telephone company to make long-distance connections with two independent telephone companies operating in Butte and Tehama counties. The company appealed and has won after a long delay.

TELEPHONE DIVIDEND.—The directors of the American Telephone and Telegraph Company, on December 16, 1913, declared the usual quarterly dividend of 2 per cent, payable on January 15. Regarding the rumors of Government ownership, President Theo. N. Vail said: "If it were not for the feeling of uncertainty among our stockholders because of talk of Government ownership, I would not be at all concerned over the possibility of such a development. If the Government takes over the telephone property there will have to be an appraisement, in which event, I am confident, the value of our property will be shown to be greater than that at which we carry it on our books."

Mr. John Fitzpatrick, district commercial superintendent, Western Union Telegraph Company, Chicago, Ill., writes: "Thanks for the renewal of my subscription. Keep on doing it."

Boston Plant Chapter Entertainment.

The Boston Plant Chapter of the Telephone and Telegraph Society of New England gave a Christmas supper and entertainment at the American House, Boston, on the evening of December 22. After the supper, entertainment and music were provided.

There were 580 persons present, about 570 of them being members of the Boston Plant Chapter. Among those present were: E. W. Pierce, executive clerk of the New England Telephone and Telegraph Company; Henry F. Mosses, secretary-treasurer of the Telephone and Telegraph Society of New England; Philip Harvey, president of the Telephone and Telegraph Society of New England; Hon. Joseph A. Parks, member of the Massachusetts Industrial Accident Board; E. C. Upton, president of the Commercial Chapter; F. W. Barth, president of the Western Union Chapter; M. B. Clark, president of the Accounting Chapter; E. M. Stannard, president of the Traffic Chapter.

The arrangements were in charge of Edward P. Histen, chairman; William L. Broder, DeWitt S. Adler, George B. Joslin and Charles E. Ames. Mr. Gordon S. Wallace is secretary of the Chapter.

RADIO TELEGRAPHY.

WIRELESS BETWEEN RUSSIA AND AMERICA.—It is reported from Vienna, Austria, that the Russian Government has decided to establish direct wireless communication with America. Negotiations are being made with a Norwegian wireless company.

WIRELESS FROM GERMANY.—The Telefunken wireless telegraph station at Sayville, L. I., exchanged Christmas greetings with the wireless station at Nauen, Germany, and sent Christmas greetings to the American warships in the harbor of Naples.

RADIO OPERATOR SUSPENDED FOR SLEEPING ON DUTY.—The Department of Commerce, Radio Service, New York, recently suspended for thirty days the license of a radio operator who had been found asleep at his post three times during the voyage of the steamer on which he was employed.

LAKE VESSELS SAVED BY WIRELESS.—Nineteen American vessels were lost in the storm which swept the Great Lakes in November last, and not one of them was equipped with wireless apparatus. Those which were outfitted with wireless received the warning of the approaching storm and sought safety. It is stated that fifty vessels are now preparing to install wireless equipment as a result of this lesson.

EXPLORING EARTH'S INTERIOR BY WIRELESS.—A company has been formed in Hanover, Germany, under the title of "Erforschung des Erdinnen," for the exploration of the interior of the earth by means of wireless telegraphy, according to a process devised by Drs. Löwy and Leimbach. The electric waves will be used to locate reservoirs of water, beds of ore, oil and gas accumulations, etc., with a view to turning them to profitable account.

Wireless on New York Fire Boats.—A demonstration of wireless telegraphy between fire headquarters in New York and one of the city fire boats was made December 23. The fire boat "James Duane" was in complete control from headquarters. Her equipment has a radius of 25 miles. All of the eleven fire boats will be equipped with wireless. It is stated that a great saving in coal and time will be effected by in direct communication with the boats, as they can be called back to their stations at any moment in case a fire is not serious enough to require their services.

Marconi Christmas Festivities.

On December 24, the Marconi Wireless Telegraph Company of America, of which Mr. E. J. Nally is vice-president and general manager, entertained many invited guests and its officials and employes at a Christmas celebration at its offices in the Woolworth Building, New York. There were about 100 persons present, and an enjoyable hour was spent. A luncheon was served, after which "Santa Claus" came in by wireless, and distributed presents to many of those in attendance. Miss T. N. Brown, secretary to Mr. Nally, managed the affair with considerable skill and success.

Marconi Company Not in Contempt of Court.

Judge John Rellstab, of the United States Court, Trenton, N. J., on December 15 dismissed the application of the National Wireless Signaling Company to have the Marconi Wireless Telegraph Company held in contempt of court for infringement of the Fessenden wireless patents.

The court held that evidence was not sufficient to warrant action. Judge Rellstab named Kenneth W. Lanning, of Trenton, as Special Master to take testimony in the infringement suit.

As noted in our issue of December 1, Judge Rellstab on November 17 granted a preliminary injunction restraining the Marconi Wireless Telegraph Company from further alleged infringement of the Fessenden patents controlled by the National Wireless Signaling Company.

Miami, Fla., Wireless Station.

Active work on the erection of the new Marconi station at Miami, Fla., will be commenced within the next few days. Mr. J. C. Lewis, formerly manager at the Marconi South Wellfleet station will have charge of the construction work. The towers, of which there will be two, each 200 feet high, have been shipped and the five-kilowatt set to be installed will shortly follow. The towers are to be of the self-supporting type. A comfortable cottage for the operating staff, containing a living room, dining room, kitchen and three bedrooms, will be erected.

It is expected that the station will be completed during January or early in February, and will control a large share of the business which has been formerly routed through the Government station at Key West. Besides breaking up the long stretch between Jacksonville and Key West, thereby greatly facilitating the handling of messages, it is expected that connection will be made between Nassau and the new Miami station to supplement ship to shore business.

The Part Played by Wireless in Reuniting Families Broken Up by Sea Disasters.

The great value of wireless telegraphy at sea has been abundantly demonstrated, and by its use many lives and much property have been saved, but its possibilities are not yet known. An interesting feature was developed in connection with the "Volturno" disaster at sea, some weeks ago, on which occasion many lives were saved from the burning steamer under the most difficult circumstances, and had it not been for the prompt response to the distress call from the "Volturno," the loss of life would undoubtedly have been much greater than it was.

Among the steamers which answered the "S. O. S." call of the "Volturno" was the "Czar," of the Russia-American Line. This steamer rescued about 150 persons, and the others saved were taken on board of the other steamers which came to the rescue. Under the circumstances, such a thing as keeping families intact and bringing the members together on one steamer was simply impossible. The result was that families were broken up and scattered; parents having been rescued by one ship, children by another, and, in some cases, fathers, mothers and children were rescued by separate steamers. This was one of the saddest features of the disaster. How to reunite the scattered members of families became a problem of the first importance. Mr. Charles Hogger, senior operator on the "Czar," hit upon a plan that calls for the gratitude of shipping interests and private individuals the world over. After the rescues had been made, and all of the steamers had resumed their respective journeys, Mr. Hogger kept in communication with them by wireless in an endeavor to learn from them whether they had on board members of the families which had been rescued in part by the "Czar." In this way, parents on his vessel found their children on other vessels bound for different ports, and children found their parents. This much accomplished, it was an easy matter to arrange for their final reuniting. In some instances, however, this was not possible, on account of the different languages spoken by those saved, and the difficulty of learning from them the actual situation as to their missing ones. This was one of the most distressing features of the disaster, as it meant that families were thus broken up and scattered, probably never to be reunited.

Mr. Hogger was employed night and day in this work for humanity, and he succeeded in bringing joy to many families.

This use of wireless places the system among the most beneficent agencies ever devised for the benefit of mankind.

Chinese Proverb.—If you know how, a thing is not hard; if it is hard, then you do not know how.

The Year 1913.

In reviewing the events of the year just closed, one is impressed with the vitality displayed in every branch of electrical communication of intelligence. Activity and progress is noted all along the line, and even the telegraph, which was thought by many to have reached its dotage, has surprised these pessimists and shown that it is not the decadent institution they thought it was. In no particular line, however, have any striking inventions been made, effort having been concentrated chiefly on making the best use of present knowledge and appliances. Nevertheless, many new things have been disclosed and the record is one of steady progress in ways and means of securing the highest efficiency.

The most important event of the year in telegraph and telephone circles was the decision in the middle of December to divorce the Western Union Telegraph Company and the American Telephone and Telegraph Company. The news came as a great surprise, as no one seems to have been prepared for it, and up to the present time no plan for the restoration of the two companies to their former status has been made public. There seems to be a general feeling that the new order of things will prove beneficial to all concerned, and while the act of separation and readjustment of the two interests may involve considerable labor, there is no reason to believe that the result will be otherwise. For a long time the telegraph and telephone atmosphere has been under a strain and much dissatisfaction was expressed in some quarters at the close relations between the two companies named. The cause for these complaints having been removed, there is every reason now to believe that harmony will be restored, and that all the interests concerned will perform their respective duties toward the public solely upon their own merits.

In telegraphy much attention has been given to the testing of high-speed systems, thus showing the necessity for a more efficient utilization of the present line facilities. The telegraph business has increased very materially during the year, and one of the problems confronting the companies is to dispose of it with the least possible delay. The engineering staffs of the companies have been hard pressed to meet the demands and necessities of the commercial departments. Much progress has been made along the line of multiplex telegraphy, and an octoplex system has been devised by one of the companies that is said to be full of promise. It is now being practically tested. In wireless telegraphy, which is the youngest of the electrical arts, much has been accomplished in the way of refinement of methods and apparatus. Greater ranges of operations are now practicable, and the business has been reduced to a more systematic basis. In the development of a new art, more or less confusion and discord exist in the first stages, but through better understanding between the conflicting interests, harmony is brought out of chaos. The friction between the English Government and the Marconi Company over the establishment of the so-called Imperial wireless chain of stations has been removed and work is now progressing toward the completion of the project. During the investigation into the original contract, some personal reputations were brought into question, but these were saved officially. One of the most important developments in wireless during the year is the method of duplexing. This is rendered possible by establishing separate sending and receiving stations at the shore ends of the route of communication. The stations are located several miles apart in order to avoid wave interference, but by means of wire connection between them the work of sending and receiving is performed in one operating room. Large duplex stations are being erected on the Atlantic and Pacific coasts and in the insular possessions, which, when completed, will give a service that will mark an epoch in the art of electrical communication of intelligence. Wireless telephony is receiving some attention, but as yet nothing definite as to results has been announced. Toward the end of the year Mr. Marconi made a test of trans-Atlantic telephony, but with what success has not been made public. In this country wireless has made much progress, and the business has been placed on a substantial basis. Some legal complications arose toward the close of the year, but these are being adjusted without any disturbance to the existing conditions. During the year the value of wireless in safeguarding lives and property at sea has been signally demonstrated. Two prominent instances were the burning of the steamers "Volturno" and "Balmes." Distress signals from these vessels brought prompt aid, and in the first instance many lives were saved which undoubtedly would have been lost had it not been for the wireless. The governments of the world have done much to systematize the service, and the wireless situation has been much clarified thereby. Many instances of wireless signals having been received over extraordinarily long distances have been recorded, which show that the surface of the possibilities of radio-telegraphy have merely been scratched. The field of investigation seems to be limitless, and no one dare predict what the result will be or where it will lead to.

In telephony no inventions of a startling character have been made. All the efforts have been applied along the lines of improvement of existing methods and apparatus and extension of service. Direct communication between New York and San Francisco by telephone has been the dream of telephone engineers for some years, and there is every indication that it will be realized in 1915, coincident with the formal opening of the Panama Canal. These events will mark two of the greatest achievements of man, and demonstrate his power over material obstacles, however great they may seem to be at first. The marvelous extension of the use of the telephone stands out prominently in the year's record. Its wide application means much to the people of this or any country. It is hastening the day, together with the telegraph, the railroad and the steamship, in binding mankind into one brotherhood, and bringing widely separated communities into closer touch with one another, thus unifying their divergent interests and making the world happier.

An innovation in railway operation, which was developed during the last few weeks of the old year, is the application of wireless telegraphy to train movements on a portion of the Lackawanna Railroad. The tests have been so successful that it may safely be said that they have passed beyond the experimental stage. They have been carefully watched by railroad interests in general, and there seems now to be no question as to the practicability of the system. From what has been accomplished in this direction on this road it is not too radical to assert that the public will demand that all first-class trains on other roads be similarly equipped. The times demand it. Truly, modern invention is making the world smaller and bringing all peoples into closer relations. The control of train movement by telephone has rapidly extended, and the method has become so systematized and made so reliable that it is safe to state that it is only a question of time when all railroads will be similarly equipped. The chief advantage of the system is that it does not require expert operators to manipulate it; in emergencies any trainman can do the work and receive orders direct from headquarters.

In submarine cable service improvement has kept apace. One of the latest developments is the practical utilization of a cable relay, whereby submarine cables and land lines may be interconnected and worked as one continuous circuit, without the intervention of human hands except at the terminal points. By reason of the introduction of new classes of service, such as cable letters, deferred service, etc., the cable business has been largely increased, and yet the possibilities are far from being exhausted.

The Telegraph of Modern Times.

Mr. A. C. Kaufman, manager Commercial News Department, Western Union Telegraph Company, New York, made an interesting address before the Telephone Society of Baltimore, Md., December 10, 1913, on "The Telegraph of Modern Times."

Mr. Kaufman referred to Professor Morse's early struggles and the results of his work, and also gave a brief historical sketch of submarine cable telegraphy. He spoke of the skepticism as a result of the failure of the first Atlantic cable, which was overcome by the successes of Cyrus W. Field.

Coming up to present-day conditions, Mr. Kaufman gave some interesting facts and figures.

"The land line telegraphs," he said, "have, through a proper adjustment of conditions, finally merged until at this time two large systems compete for the business in the United States, namely, the Western Union Telegraph Company, with approximately 1,500,000 miles of wire and 25,000 offices, and the Postal Telegraph-Cable Company, with 390,000 miles of wire and 5,000 offices. The cable systems between America and Europe are either owned or controlled as follows:

"Anglo-American Cable Company, four cables; Direct United States Cable Company, one; American Cable Company, two; Western Union Telegraph Company, one to England; total, eight cables owned and controlled by the Western Union. Commercial Cable Company, five to England by the Mackay (Postal) Companies. The German Atlantic Company, with two cables to Germany, and the French Cable Company, with two lines to France, operate independently and connect with both the Western Union and Postal Companies for the handling of traffic, making in all fifteen duplexed cables operated daily between America and Europe, all doing a lucrative and dividend-paying business. It is interesting to note in this connection that the total number of cables owned and operated by private companies throughout the world is 412, with a mileage of 223,769 miles, and the cables owned by nations throughout the world is 2,140 with 48,990 miles, a total of 2,552 cables and a mileage of 272,759 miles."

Mr. Kaufman presented some interesting statistics regarding the main office of the Western Union Telegraph Company at New York, as follows:

Number of wires passing through office, 967; total number of employes on payroll, 1,600; number of operators employed days, 750; number of operators employed nights, 450; number of operators employed extra, 200; single Morse wire sets worked, 498; duplexes worked, 149; quadruplexes worked, 54; automatic printers worked, 27.

He spoke of the complimentary relations between the American Telephone and Telegraph Company and the Western Union Telegraph Company, and said, in conclusion:

"Ours is the creative thought; we have nothing to do with picayune methods; we have no idea of crushing competition—there is enough for all—the telegraph and telephone field is so wide and long as to take the biggest efforts of big men to cover it, and our only thought is to popularize the service and double our revenue within a five-year period."

Electrical Circuits and Diagrams.

A new edition of Norman H. Schneider's "Electrical Circuits and Diagrams," Part I, has just been issued. It illustrates and explains wire connections for alarms, annunciators, automobiles, bells, generators, gas lighting, motors, storage batteries, street railways, telephone, telegraph, wireless telegraphy, wiring and testing. The explanatory matter is brief, and the diagrams are very clear. Several minor errors appear in the book, but these do not affect the value of the work, and are self-evident.

The book should prove of wide utility for ready reference. It is bound in paper and contains 92 pages and 220 diagrams. The price is 25 cents per copy. Copies can be had of TELEGRAPH AND TELEGRAPH AGE, 253 Broadway, New York.

EXHIBITS AT PHYSICAL SOCIETY, LONDON.—At an exhibition of the Physical Society in London, Major G. O. Squier, U. S. A., military attache of the American Embassy, showed a field apparatus in which a single wire was used simultaneously for telephony, telegraphy and aerography. Another instrument exhibited was a Marconi direction-finder which shows the exact direction from which a wireless message is received. This will enable observers on ships to locate lightships and lighthouses during fogs.

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NEW YORK, JANUARY 1, 1914.

Our Season's Greetings.

We wish our many friends a happy and prosperous New Year. The close of 1913 was marked by an extraordinary upheaval in telegraph and telephone circles, and the situation is such that no one can foresee what the result will be, but it is certain that when affairs are adjusted good will come to all concerned. Naturally, it will not be a very easy task to segregate the equities of both interests, but there has never been a crisis in the world's history when men were not found capable of handling such emergencies. The situation will be met, and it will not be long before everyone affected will be able to breathe more freely.

Man's designs are constantly being revised in the light of experience, which does not retrograde, but is always progressive. Every change in existing conditions is in the direction of improvement; it is necessary to try them all to find out the good in them. We therefore look upon the situation with optimism and believe that all will be right in the end.

What has recently taken place need not cause any alarm, and after sober thought all will look to the New Year to pave the way to prosperity and contentment. We all cross the threshold of the New Year with much greater and enlightened experience, and we are better prepared to meet the problems that time will develop. It is every man's duty to fit himself for the responsibilities of the future, however great or small they may be, and by so doing every individual can look into the future full of hope and assurance that things will turn out all right.

The New Year will bring opportunities to all, and while they may seem at times to be slow in coming, and evanescent, yet they are constantly presenting themselves, and do not tarry. It rests with the individual to discern and seize them when they do come, and this can be done best by improving our knowledge. TELEGRAPH AND TELEPHONE AGE will do its share in the good work, and we hope that all of our readers will be better equipped for life's work as time progresses. Again, we wish all a Happy New Year and many more of them.

Woes of Telegraph Companies.

Representative Curry, of California, has introduced a bill in the House of Representatives at Washington requiring telegraph companies to "capitalize and punctuate" all telegrams, under penalty for failure.

Representative Curry is to be congratulated on his enterprise, but he is too modest and too lenient with the companies. He should have required them to spell correctly, and see that good grammar is used, as well. It is well known that the average sender of a telegram can neither spell, punctuate or capitalize properly, so why limit the requirements to two of the four primary essentials of an education? From an æsthetic point of view, what a sorry figure a properly capitalized and punctuated, but badly spelled, message would make!

Representative Curry should also require the companies to adopt a particular style of handwriting—say the vertical or Spencerian—and, besides, establish a "Punctuation and Capitalization Bureau." The latter subdivision could be made a branch of the accounting department.

While these innovations are being proposed, why not have simplified spelling? The extra time that would be consumed in sending punctuation marks would be offset by the contraction of the words.

In this connection arises the question of standards. It is well known that the best authorities differ as to spelling, punctuation and capitalization. Why not require the companies to establish a Bureau of Standards, otherwise, a Bureau of Etymology, Syntax or Prosody. This latter title would, perhaps, be more dignified and impressive. To this bureau could be referred all questions involving grammar, spelling, punctuation, etc., and any operator failing to meet the standard requirements should be exiled for life, besides being fined ten per cent of his stipend for the year preceding, after deducting the income tax.

Mr. Curry, it seems to us, has missed his opportunity. He should compel the companies to do these and many other things which they now fail to do. After all the years they have been in business they have not yet learned the first principles, and it is high time they should be brought to a realization of their duty to a long-suffering public.

MR. G. W. E. ATKINS, vice-president of the Western Union Telegraph Company, New York, writes: "I thank you for renewing my subscription. You will find my check for $2.00 herewith, with best wishes for the continued prosperity and success of your valuable paper."

Western Union Telegraph Company and American Telephone and Telegraph Company to be Separated.

Announcement was made from Washington on December 19 that the American Telephone and Telegraph Company had agreed to relinquish its control over the Western Union Telegraph Company and to make other changes in harmony with the Sherman Law, at the suggestion of the Department of Justice. The telephone company voluntarily agreed to adjust its business to the conditions of competition, an important feature of which will be to throw open its toll lines to independent companies. The reorganization plan has been accepted by Attorney-General McReynolds, with the assent of President Wilson.

The offer of the American Telephone and Telegraph Company to take this action was made in the following letter from Mr. N. C. Kingsbury, vice-president of the company, to Attorney-General McReynolds:

"15 Dey Street, New York,
"December 19, 1913.

"SIR:

"Wishing to put their affairs beyond fair criticism, and in compliance with your suggestions formulated as a result of a number of interviews between us during the last sixty days, the American Telephone and Telegraph Company, and the other companies in what is known as the Bell System, have determined upon the following course of action:

"First—The American Telephone and Telegraph Company will dispose promptly of its entire holdings of stock of the Western Union Telegraph Company in such way that the control and management of the latter will be entirely independent of the former and of any other company in the Bell System.

"Second—Neither the American Telephone and Telegraph Company nor any other company in the Bell System will hereafter acquire, directly or indirectly, through purchase of its physical property or of its securities, or otherwise, dominion or control over any other telephone company owning, controlling or operating any exchange or line which is or may be operated in competition with any exchange or line included in the Bell System, or which constitutes or may constitute a link or portion of any system so operated or which may be so operated in competition with any exchange of line included in the Bell System.

"Provided, however, that where control of the properties or securities of any other telephone company heretofore has been acquired and is now held by or in the interest of any company in the Bell System, and no physical union or consolidation has been effected, or where binding obligations for the acquisition of the properties or securities or any other telephone company heretofore have been entered into by or in the interest of any company in the Bell System, and no physical union or consolidation has been effected, the question as to the course to be pursued in such cases will be submitted to your department and to the Interstate Commerce Commission for such advice and directions, if any, as either may think proper to give, due regard being had to public convenience and to the rulings of the local tribunals.

"Arrangements will be made promptly under which all other telephone companies may secure for their subscribers tolls service over the lines of the companies in the Bell System in the ways and under the conditions following:

"First—Where an independent company desires connection with the toll lines of the Bell System, it may secure such connection by supplying standard trunk lines between its exchanges and the toll board of the nearest exchange of the Bell operating company.

"Second—When the physical connection has been made by means of standard trunk lines, the employes of the Bell System will make the toll-line connections desired, but in order to render efficient service it will be necessary that the entire toll circuit involved in establishing the connections should be operated by and under the control of the employes of the Bell System.

"Third—Under the conditions outlined above, any subscriber or any independent company will be given connection with any subscriber of any company in the Bell System, or with any subscriber of any independent company with which the Bell System is connected, who is served by an exchange which is more than fifty miles distant from the exchange in which the call originates.

"Fourth—The subscribers of the independent company having toll connections described above shall pay for such connections the regular toll charge of the Bell Company, and in addition thereto, except as hereinafter provided, a connection charge of 10 cents for each message which originates on its lines and is carried, in whole or in part, over the lines of the Bell System.

"The charges incident to such service shall be made by the Bell Company against the independent company whose subscriber makes the call, and such charges shall be accepted by the independent company as legal and just claims.

"Fifth—Under this arrangement the lines of the Bell System should be used for the entire distance between the two exchanges thus connected, provided the Bell System has lines connecting the two exchanges. Where the Bell System has no such lines, arrangements can be made for connecting the lines of the Bell System with the lines of some independent company in order to make up the circuit, but such connections will not be made where the Bell System has a through circuit through the two exchanges.

"Sixth—Any business of the kind commonly known and described as "long lines" business offered for transmission over the lines of the American Telephone and Telegraph Company, shall be accepted for any distance, that is, on such "long lines" business calls shall be accepted where the point of destination is less than fifty miles from the exchange where the call originates, as well as where the point of destination is greater than fifty miles therefrom.

"Seventh—Any business of the kind commonly known and described as "long lines" business offered

for transmission over the lines of the American Telephone and Telegraph Company shall be accepted at the regular toll rate, and no connecting charge shall be required. But such calls shall be handled under the same operating rules and conditions as apply to calls over the local toll lines.

"Very respectfully yours,

"AMERICAN TELEPHONE AND TELEGRAPH CO.,

"By N. C. Kingsbury, Vice-President.

"To the Attorney-General, Washington, D. C."

The reply of Attorney-General McReynolds is as follows:

"OFFICE OF THE ATTORNEY-GENERAL,

"WASHINGTON, D. C., December 19.

"MR. N. C. KINGSBURY, Vice-President. American Telephone and Telegraph Company, 15 Dey Street, New York:

DEAR SIR: Permit me to acknowledge, with expressions of appreciation, your letter of December 19, outlining the course of action which the telephone companies comprising the Bell System obligate themselves to follow in the future.

"Your frank negotiations in respect to these matters compel the belief that what you propose will be carried out in good faith, and it seems to me clear that such action on your part will establish conditions under which there will be full opportunity throughout the country for competition in the transmission of intelligence by wire.

"May I take this occasion to say that the Administration earnestly desires to co-operate with and to promote all business conducted in harmony with law and that, without abating the insistence that the statutes must be obeyed, it will always welcome opportunity to aid in bringing about whatever adjustments are necessary for the re-establishment of lawful conditions without litigation.

"Very truly yours,

"J. C. MCREYNOLDS, Attorney-General."

President Wilson expressed his gratification over the situation in the following letter:

"THE WHITE HOUSE.

"WASHINGTON, D. C., December 19, 1913.

"MY DEAR MR. ATTORNEY-GENERAL:

"Thank you for letting me see the letter from the American Telephone and Telegraph Company. It is very gratifying that that company should thus volunteer to adjust its business to the conditions of competition.

"I gain the impression more and more from week to week that the business men of the country are sincerely desirous of conforming with the law, and it is very gratifying, indeed, to have occasion, as in this instance, to deal with them in complete frankness, and to be able to show them that all that we desire is an opportunity to co-operate with them. So long as we are dealt with in this spirit we can help to build up the business of the country upon sound and permanent lines.

"Cordially and sincerely yours,

"WOODROW WILSON.

"Hon. James C. McReynolds, the Attorney-General."

Mr. Theo. N. Vail, president of both companies, gave out a statement at his home in Lyndonville, Vt., on December 19. He said:

"The correspondence published was the result of a protracted and exhaustive discussion between the Attorney-General and our company, and it speaks for itself. We are complying with the wishes of the Government because we desire that our operations shall continue to be as we have always believed them to be, in strict conformity to the law, and for that reason we are now adjusting them to the law as understood and interpreted by the Attorney-General.

"We are confident that under the proposed changes neither the Bell System nor the Western Union will suffer, and that both will continue to give the same and increasing efficient service to the public.

"Some economies and some services which were contemplated under the complementary operation of the two companies cannot now be realized, but it is hoped that all now in operation will, after thorough consideration, be found to be within the law.

"In relinquishing the Western Union, while we do so with great regret, we have the satisfaction of knowing that it is in better physical and financial condition than it was when we took it over, and that the shareholders will soon be benefited in some measure by what has been done.

"We can only speak in the highest terms of the consideration with which we were treated by the Attorney-General throughout the whole negotiations."

President Vail stated that the separation of the two companies will not affect the pension plan now in operation for the benefit of the officials and employes of the various companies concerned.

He also stated from Lyndonville, Vt., that the separation will be an easy matter, and that extensive reorganization of the Western Union Company would not have to be made in order to place it upon its own feet as a separate and independent organization. "We were careful to avoid having any such crisis forced upon us," said Mr. Vail. "In fact," he continued, "we built up the mutual interests of the American Telephone and Telegraph Company and the Western Union in such a way that we did not encumber ourselves with an organization that would have to be broken up in case the companies should withdraw from the arrangement. In other words, the organization of each concern was rigidly maintained and preserved, and, when they draw apart, each will carry with it as perfect an organization as when the two entered into mutual relations. The statement that the Western Union organization has been broken down and is now called upon to meet new responsibilties in a crippled condition is without basis in fact," he said.

Mr. Vail denied that the telephone company had been thriving at the expense of the Western Union by leasing wires to the telegraph company for use at night for night letter service. He said that there had been no oppressive rates between the two companies.

In regard to the cable situation, Mr. Vail stated that the Western Union had leased the Anglo-American cables on its own account, and that the

telephone company had nothing to do with it. For this reason the ownership of the lease will rest entirely with the Western Union.

"No such thing as dissolution has occurred," Mr. Vail further stated, "for the reason that no such thing as a merger ever occurred in the past. The relations between the American Telephone and Telegraph Company and the Western Union have never been in the nature of a merger. The development of the mutual relations has been of a complementary character, or an extension by each of the other's facilities.

"Care has always been taken that nothing be done which would affect whatever competition might be considered to exist. The two services are, in fact, not competitive; if there is, in theory, any competition, it is because, in some instances, the use of one service may be an alternative for the use of the other.

"If a real merger were made and time given to complete the merger, some economies and additional new services of advantage to the public might be introduced. Whatever has been done already it is believed will be allowed to stand, and it is probable that some of the additional co-operative work may yet be accomplished.

"There is no set-back in this separation to the material interests of either company, but, on the contrary, now that there is some understanding of what can be done and what cannot be done, greater progress along the lines defined can be expected.

"The Attorney-General has been very considerate of the material interests of the companies, so far as consistent with his public duty, and this attitude was clearly reflected by the President, and, we think, the problem has been worked out to the best interests of the public and of the companies."

Vice-president Newcomb Carlton, in commenting on the situation, said: "We are entirely satisfied with the way in which all the innovations that dated from the alliance with the telephone company have worked out. The introduction of reduced cable rates on a portion of the business, the day and night cable letters and week-end cable letters have greatly increased the business and the returns are satisfactory."

Mr. Belvidere Brooks, vice-president of the company, on December 22 sent the following communication to all of the general managers of the Western Union System:

"The recent decision of the telephone company to dispose of its stock in the telegraph company in order that the two properties might be entirely independent of one another in their management, should occasion no misgivings on the part of you or your organization. There is no reason, that we can see, why such plant and traffic relations as have proved beneficial should not be continued. The telegraph property is, as you know, in a much improved condition. Large sums have been devoted to rebuilding lines and rejuvenating property and plant. The future is bright, the organization effective and loyal, and, in my opinion, the company is better qualified to stand upon its own feet than ever before in its existence."

Acknowledgment of Holiday Greetings.

We extend our appreciative acknowledgment of holiday season greetings from the Commercial Cable Company, New York; J. F. Skirrow, associate electrical engineer, Postal Telegraph-Cable Company, New York; James Kent, manager, Canadian Pacific Railway Company's Telegraph, Montreal, Que.; E. W. Collins, general superintendent, Postal Telegraph-Cable Company, Chicago; A. C. Kaufman, manager, Commercial News Department, Western Union Telegraph Company, New York; G. C. Maynard, Curator, National Museum, Smithsonian Institution, Washington, D. C.; James Kempster, New York; Charles H. Murphy, general supervisor, time service, Western Union Telegraph Company, New York; W. H. Baker, secretary, Western Union Telegraph Company, New York; I. W. Reed, district commercial superintendent, Western Union Telegraph Company, Philadelphia, Pa.; W. P. Cline, superintendent of telegraph, Atlantic Coast Line, Wilmington, N. C.; G. M. Myers, president Old Time Telegraphers and Historical Association, Kansas City, Mo.; G. H. Corse, jr., general passenger agent, San Francisco Overland Routes, Yokohoma, Japan, and Hong Kong, China; Clarence R. George, secretary, International Association of Municipal Electricians, Houston, Tex.; T. F. Clohesey, Langdon & Hughes Electric Company, Utica, N. Y.; H. A. Tuttle, president and general manager, North American Telegraph Company, Minneapolis, Minn.; John Egan, San Francisco, Cal.; J. A. McNichol, manager, Postal Telegraph Cable Company, Philadelphia, Pa.; R. W. Gray, division superintendent of plant, Western Union Telegraph Company, San Francisco, Cal.; J. D. McClelland, manager, Postal Telegraph-Cable Company of Texas, Houston, Tex.; R. W. A. Horner, Western Union Telegraph Company, Lynchburg, Va.; J. A. Cahoe, Postal Telegraph-Cable Company, Louisville, Ky.; J. McMillan, general superintendent, Canadian Pacific Railway Company's Telegraph, Winnipeg, Man.; C. F. Hutchinson, stock broker, Washington, D. C.; Louis Caspar, Western Union Telegraph Company, Dallas, Tex.; Oscar Moll, general manager, German Atlantic Cable Company, Cologne, Germany; D. F. Ingold, chief operator, Western Union Telegraph Company, Los Angeles, Cal.; W. F. Williams, superintendent of telegraph, Seaboard Air Line, Portsmouth, Va.; H. C. Worthen, general manager, Southern Division, Western Union Telegraph Company, Atlanta, Ga.; J. B. Dillon, wire chief, Western Union Telegraph Company, Dallas, Tex.

Arabian Proverb.—He who knows not, and knows not that he knows not, is a fool; avoid him. He who knows not, and knows that he knows not, is simple; teach him. He who knows, and knows not that he knows, is asleep; wake him. He who knows, and knows that he knows, is a wise man; follow him.

Back Numbers of This Journal.—We desire to announce that copies of this journal three months or more old will be charged for at the rate of 25 cents per copy.

Course of Instruction in the Elements of Technical Telegraphy—LIV.

(Continued from page 737, December 16, 1913.)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

The Quadruplex *(Continued).*

The proportion of current in the relay coils is clearly shown in Fig. 74, which shows the apparatus at both stations.

T and T¹ are transmitters; P C and P C¹ pole-changers; N R and N R¹, neutral relays; P R and P R¹, polar relays. R S and R S¹ are repeating sounders whose functions will be explained later.

In the figure the transmitter at X is closed, and the full battery put in connection with the pole-changer springs. The pole-changer is also closed, which places the negative pole of M B to line and the positive pole to earth. At station, Y, the positive pole of the short end is to line via the open transmitter T¹ and P C¹, and the direction of current is, therefore, from Y to X, as indicated by the arrows. We will assume for the sake of simplicity that the full battery gives a current strength of four in the main and artificial lines, and that the short end, being one-quarter of the full battery, gives a current strength of one. We will also suppose that a current strength of one is too weak to operate the neutral relay armatures against their retractile springs, and that these two relays remain inactive unless energized by a current strength of four.

At X the full battery is to line, and the current strength in the main and artificial line coils of N R and P R is, therefore, four. It is also four in the main-line coils of P R¹ and N R¹.

At Y the short end only is in circuit, and a current strength of one is added to the current in the main and artificial line coils at that station, and also to the current already in the main-line coils of N R and P R at station X. The values of the currents in the line and rheostat coils at X are, therefore, five and four, and at Y, five and one, respectively. As the current at X is traversing the relay coils in opposite directions, it is only the excess current in either coil which will produce magnetism, hence the cores of N R are magnetized by a current strength of one, which, we have assumed, will not operate the relay. The excess current in P R is also one, but P R responds to this small current, owing to its greater sensitiveness, and its local circuit is

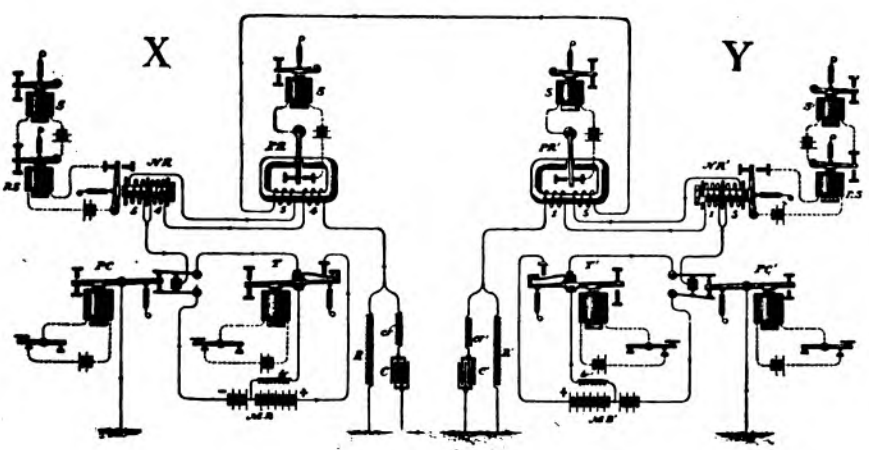

FIG. 74—THEORETICAL DIAGRAM OF QUADRUPLEX APPARATUS AT TWO STATIONS.

R and R¹ are rheostats in the artificial lines; C and C¹ are condensers which compensate for the static induction of the main line; Cr and Cr¹ are resistances for regulating the quantity and duration of the static discharges from the condensers; tr is a compensating resistance, equal to the internal resistance of the long end of the battery. The ratio of current from the short end of M B, as compared with the full battery, is as 1 to 4.

broken in response to the open pole-changer at Y. P R¹ and N R¹ are energized by an excess current of four, and the tongue of the former rests against its local circuit stop, in obedience to the current from P C at X, while the armature of the latter is attracted, owing to the maximum current strength now flowing in N R¹ coils. Now close P C¹ and T¹ at Y. The negative poles of both full batteries are now to line, and the ends of the main line at

X and Y are at the same potential; consequently, there is no current flowing in the main-line coils of the relays. But the cores of N R at X are magnetized by a current strength of four in the artificial line coils, and the armature of that relay is, therefore, attracted. The closing of P C^1 and T^1, besides increasing the current to four in P R at X, has changed its direction; the magnetism of the P R cores is, therefore, reversed, and its armature closes the local circuit.

(To be Continued.)

Utilities Commissions.

In explaining the functions of the new Pennsylvania Public Utilities Commission, which began its legal existence January 1, Mr. William W. Trinkle, of Philadelphia, counsel for the Commission, stated some of the principles involved.

"The people ought to have a full understanding of the fundamental purposes of the new Public Utilities Commission," said Mr. Trinkle. "One of the great values of the commission lies in the fact that through it the people who use street railways, telegraphs, telephones, gas and electricity, acquire a better understanding of conditions surrounding the companies supplying these necessities of modern life.

"The result of lack of information which the people are entitled to have been the occasion of unjust criticism of those who, associated together as public utilities corporations, are engaged in rendering service to the public.

"On the other hand, there are acts of omission and commission on the part of the utility companies and inadequacies and inequalities of the service, which ought to be and which can be corrected in a fair and reasonable way.

"To remove, as far as practicable, such unwarranted antagonisms as exist between the companies and the people, and to promote, as far as practicable, that harmony which should exist between them, and at the same time to compel these companies to deal fairly with the people and to perform adequately their public functions at reasonable rates of compensation that will yield a fair return upon the value of the property of the investors, is the general object and purpose of the new law."

Postmaster-General Burleson on Government Ownership of the Telegraph and Telephone.

Postmaster-General Burleson, on December 17, presented his annual report to Congress. The interest in it to telegraph people at this time lies in the statements he makes with reference to the operation of the telegraph by the Government. He says, "A study of the constitutional purposes of the postal establishment leads to the conviction that the Post Office Department should have control over all means of communication of intelligence. . . . The successful operation of the parcel post," he continues, "has demonstrated the capacity of the Government to conduct the public utilities which will fall properly within the postal provision of the Constitution. Every argument in favor of the Government ownership of telegraph lines may be advanced with equal logic and force in favor of the Government ownership of telephone lines.

"It has been competently decided," he goes on to say, "that a telephonic message and a telegram are the same within the meaning of the laws governing the telegraph service, and therefore it is believed that the statute enabling the Government to acquire, upon the payment of an appraised valuation, the telegraph lines of the country, will enable the Government to acquire the telephonic network of the country. While it is true that the telephone companies have not complied with the requirements of Section 5,267, Revised Statutes, this cannot be held to nullify the intent of the law, since the nonperformance on the part of the Government of any of its constitutional privileges in nowise surrenders the right to exercise these privileges whenever the best interests of the Government demand."

Mr. Burleson states that the English telegraph system has proved a success. It may be of interest to point out in this connection what the English taxpayers have done and are still doing to make their telegraphs a "success." The postal telegraph service has provided a deficiency of $87,279,305. In order to make such a "success," the taxpayers have paid a deficit averaging $2,000,000 per year for forty years and are now paying at the rate of $4,200,0000.

The report of the English postmaster-general for the year 1912-13 showed a deficiency in the telegraph operation for the year of $4,787,830.

Christmas Funds.

Several large Christmas Clubs, both in the Western Union and Postal main offices, distributed their funds during the past two weeks. The total of these funds amounted to over $6,000, and were deposited during the year with the Serial Building Loan and Savings Institution. When the time of distribution came the institution provided the club treasurers with new currency for that purpose.

These clubs have a far-reaching educational influence and should be encouraged and advised in every department of the service of the telegraph and telephone companies. No mere academic advice or reminder can take the place of that club spirit in which a society of friends combine to apply business methods to the common object of Christmas, or any other occasion of financial need. It is in their business life that the young people, and the older also, should learn the lesson of systematic spending as well as systematic saving. Co-operation is the watchword of the future; co-operation in spending will, in time, have a marked influence in improving the common welfare.

MR. W. C. HIRCHERT, of the Erie R. R. system, Salamanca, N. Y., writes: "You did not make a mistake in renewing my subscription to the AGE for another year, as I enjoy every number of the paper, which keeps me in touch with the old timers. I am beginning to think I am one of them."

LETTERS TO THE EDITOR.

A New Telegraph System.

Editor TELEGRAPH AND TELEPHONE AGE:

SIR: In comparing the new telegraph system of Mr. George E. Hines, as published in your issue dated December 1, with the present one, no fundamental alteration in the circuit conditions has been introduced, unless it be the omission of the resistance in series with the battery which, as he states, is necessary in our present system for "protection and economy." We do not see how the shifting of the sending relay from the line side to the ground side of battery has changed the circuit so that it is any more advisable to omit the series resistance.

Mr. Hines' system has the feature that the sending end of the line is grounded when no signals are being sent. This could, however, be introduced as easily into the present used system if it were considered to be of advantage. It is questionable whether it is of any advantage to ground the line at both ends while it is idle unless, perhaps, it be to eliminate induced potentials from parallel circuits.

We also fail to see why it is any more true that the electrical signal may "be said to be made through the earth" in the new system than in the old. In both cases we have, on closing the key, a distribution of the battery potential throughout the circuit by means of a current flow both in the wire and in the ground.

S. THOMSON,

Consulting Engineering Department, General Electric Company.

Schenectady, N. Y.

SIR: I was interested in Mr. Hines' article in your issue of December 1, as it recalled the fact that Mr. J. B. Stearns tried the same arrangement shown by Mr. Hines—two relays with the armature between them, one relay in the main line, the other in the artificial line. The New York-Philadelphia duplex of the Franklin Telegraph Company, of which Mr. Stearns was president, was worked in that way in the spring of 1868, but had been abandoned in favor of the differential relay when I returned to New York in December of that year; and the late Thomas Curry, who will be remembered by old timers as one of the best electricians of that time, told me why. The attraction of the artificial line magnet, when the home battery was to line, offered a greater resistance to the initial impulse from the distant battery than did a retractile spring. It required a stronger pull to overcome the attraction of the rear magnet and start the armature on its forward movement, while a spring offered its least resistance when the armature was on the rear contact.

Of course, the lack of a condenser caused both devices to work rather wobbly, but on the short Philadelphia circuit the differential duplex worked fairly well without it.

D. B. GRANDY.

ST. LOUIS, MO.

Western Union Dinner in Boston.

As announced briefly in our issue for December 16, 1913, the first dinner of the Western Union Chapter of the Telephone and Telegraph Society of New England, took place on Monday evening, December 8, at the New American House, Boston. It was the largest gathering of telegraph men ever held in Boston or New England and, in addition, was one of the most enjoyable and enthusiastic occasions ever held by telegraph employes. There were in attendance about 150 members, including representatives from the commercial, traffic and plant departments, and guests from sister chapters.

Seated at the head table were: Mr. F. W. Barth, president of the Western Union Chapter; Mr. C. F. Ames, district commercial superintendent, and Mr. W. S. Barker, district plant superintendent of the Western Union Telegraph Company; Mr. Philip Harvey, president of the Telephone and Telegraph Society of New England; Mr. E. C. Upton, president of the Commercial Chapter; Mr. M. B. Clark, president of the Accounting Chapter, and Mr. E. W. Pierce, executive clerk of the New England Telephone and Telegraph Company.

The Chapter established a precedent in the matter of after-dinner speaking by omitting such speeches entirely and immediately plunging into the festivities of the occasion, after a short introduction by President Barth.

The dinner was served at 6.30 p. m., and the entertainment began about 7.30. For two hours the members enjoyed one of the best entertainments ever given at any banquet held in the New American House.

During the evening the following contributed to the entertainment: Mr. Paul J. Irwin, baritone solo; Mr. J. Cohen, violin solo, assisted by Mr. Wm. Irwin on the piano, and fifteen numbers by professional artists from local vaudeville theatres.

One of the hits of the evening was the singing by the entire assemblage of the following parody to the tune of "On the Old Fall River Line," composed by Secretary Molloy:

"On the new Western Union Lines,
On the new Western Union Lines,
The Commercial—get the business
And hold it all the time;
If the Traffic do their share
And the Plant hold up the lines;
But we hope, 'Oh Lord,'
They won't fall by the Board,
On the new Western Union Lines."

Mr. S. E. Fitzgibbon acted as master of ceremonies. The success of the affair was due to the activity of the following committee: Mr. F. W. Barth, president; Mr. H. L. Flynn, vice-president; Mr. J. A. Molloy, secretary; Mr. Thos. Wright, treasurer; Mr. W. S. Barker, Mr. J. B. Rex, Mr. W. A. Donovan, Mr. G. H. Bell, Mr. J. S. O'Brien, Mr. W. G. Wetmore, Mr. J. E. Grinsell, Mr. H. J. Coughlin, Mr. S. E. Fitzgibbon, Mr. J. R. Hennessey, Mr. Geo. Dee and Mr. R. W. Hall.

It was announced that the Chapter would give a ball about February 20, and that the dinner would be repeated in February and May.

Rough Testing for Open Keys and Broken Wires With the Voltmeter.

BY JOSEPH MARSHALL, WESTERN UNION TELEGRAPH COMPANY, SAVANNAH, GA.

For several months we have been fairly successful in locating open keys and breaks with the broken ends in the air, by multiplying the extreme deflection of the voltmeter needle by 2.5, but experience soon taught us that while 2.5 as a multiplier did fairly well on trunk wires, 2.75 was more accurate on way wires, and, also, that 3 had to be used as a multiplier when the deflection exceeded 40 or 50. Of course, the insulation must be fairly good, although we have made very good tests even with a leak of five or ten volts.

Recently, we found that a very good location could be made up to 100 miles by multiplying the length of the circuit, in miles, by the deflection to the open key, or break, and dividing that by the extreme deflection obtained with the key open at the end of the circuit, or at some point between the testing office and the break. Always tap the meter half a dozen times, or more, before deciding on the extreme figure, and watch the needle closely, so as to tell at what point it stops between the five-point divisions on the scale.

Here are a few examples: With No. 134 open at Livingston, S. C., 106 miles, got a deflection of 40; with it open at Garnett, S. C., we got 15. Stated as a problem in proportion, 40 : 106 :: 15 : 39.7 miles, the fourth term being correct. Had the key been left open at Livingston, and the deflection and mileage to Garnett being known, the problem would have been, 15 : 39.7 :: 40 : 106. There are fifteen relays between Savannah, Ga., and Livingston, S. C. On a copper wire to Columbia, S. C., 141 miles, we had recorded a swing of 55, when open at Columbia. With it open at Denmark, S. C., we got a swing of 35. Hence, 55 : 141 :: 35 : 89.7. The exact distance from Savannah to Denmark is 91 miles. There were no relays in circuit.

With No. 285 open at Lena, S. C., we got a deflection of 20, and a deflection of 30 when open at Barnwell. The distance to Lena is 54 miles; therefore, 20 : 54 :: 30 : 81 miles. The correct distance is 88 miles.

Now, reverse the problem: 30 : 88 :: 20 : 58.7. The correct distance is 54 miles. There are ten relays between Savannah and Barnwell, S. C. We made an error of 7 miles in one case and 4.7 miles in the other, but such errors occur with the bridge, too.

With No. 105 open at Millen, Ga., 79 miles distant, we got a deflection of 30, and open at Rocky Ford, we got 25. Hence 30 : 79 :: 25 : 6.58. The actual distance is 66.2 miles.

We make some errors, but the scheme has enabled us to save much time and labor in running down open keys. We are generally sure that the trouble is at one of the three stations, or within a distance of 10 or 15 miles, and start testing on the nearest station, instead of testing at random, as heretofore. We miss the station so seldom that the railroad people have faith in our determinations, and run down the causes of the trouble themselves. In cases of wrecks, it often happens that a bridge measurement is not possible. There is, usually, an "open," and on several occasions we have located the break within two miles by the proportional method. Of course, it is necessary to know the extreme deflection to the distant end, or to a point this side of the break.

With a meter made for this test, and the scale calibrated 1, 2, 3, 4, 5, etc., instead of five-degree divisions, I believe better results can be obtained, because it is difficult, with the standard meter, to tell at what point the needle stops between the five-point divisions.

In the case of the test of No. 105, with Millen and Rocky Ford, the difference of 13 miles was represented by a difference of five points on the scale. We keep a record of tests made, and find it valuable in subsequent tests, as it enables us to avoid previous errors in locations.

It would be a step in the right direction to record the swing of the needle to an "open" at test offices on all circuits for a working basis.

To Mr. C. A. Bowen, district wire chief, Atlanta, Ga., belongs the credit for having started us on the plan of multiplying the deflection by 2.5.

Harpers' Wireless Book.

The interest taken by boys in wireless telegraphy is so keen that Harper Brothers have brought out a book on this subject for their special benefit. The author is Mr. A. Hyatt Verrill, who is a well-known writer of juvenile books, and he has produced an excellent work on wireless and one that will be appreciated by practical wireless operators, as well as by boys, on account of the specific information it contains.

The book is divided into three main parts, Part I being devoted to "The Why and How of Wireless," Part II to "How to Build and Use Wireless Apparatus," and Part III to "Wireless Telephony."

The book is written in simple language, and is very instructive, the numerous illustrations being a great aid in the understanding of the text matter. It tells why wireless works; describes the instruments and how to make them, and gives the laws regulating wireless operation and the international rules. It also goes thoroughly into the fundamental principles of wireless telephony, expressed in elementary language, so that the novice may clearly understand this apparently difficult subject.

A chapter about tools contains much valuable information, and will be as much appreciated by "grown-ups" as by boys.

The volume has 184 pages, and is liberally illustrated with clearly drawn diagrams, and with general views of stations, operating rooms, etc. It will form an excellent gift for boys who possess investigating minds, and who find a fascination in the "mysteries" of wireless.

The price of the book is $1.25 per copy. Orders will be received and filled by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

Telegraph and Telephone Exhibits at the National Museum, Washington.

Criticism having been made recently of the arrangement of telegraph and telephone exhibits in the Smithsonian Institution, United States National Museum, Washington, D. C., the matter was referred to Mr. George C. Maynard, curator of the Division of Mechanical Technology, and a well-known old-time telegrapher. Mr. Maynard explains the matter as follows:

"The wholesale criticism made by your callers regarding what they termed the unsatisfactory manner in which the telegraph and telephone exhibits in the National Museum are displayed, is not justified and, I think, must have been made after a hasty visit to the Institution and without a fair understanding of the conditions.

"While the general arrangement of the collections in this division is orderly and systematic, it is true that, in some instances, there is more or less confusion. The reasons for this condition, which is being rapidly improved, can be readily explained.

"For some time an entire rearrangement of the division has been going on. New exhibition halls have been assigned to the various subjects represented; new standard cases are being substituted for old cases of a great variety of patterns, and practically every specimen has been moved to a different locality. At the time of the visit of your friends, eighteen new cases were crowded into the halls awaiting their installations. Most of these are now permanently installed and placed in proper position, and twenty additional cases have been requisitioned.

"The telephone collections, numbering over 200 objects, were received at different times and from different sources, and without definite data explaining their history or uses. Much care and study have been required for the systematic arrangement and labeling of the collection. This work is now nearly completed.

"The telegraph and telephone exhibits naturally belong together and, so far as possible, they are being so arranged, but, owing to the great differences in sizes of closely related objects, it is not practicable to place them all in any one group.. For example, a large number of small objects in the Henry collections are shown in a case protected by electric burglar alarms and placed in a hall devoted to events and persons prominent in American history, while the Henry Yale magnet, which is eight feet high and thirteen feet long, occupies a case in the adjoining hall. Elihu Thomson's original arc-light dynamo is in a case devoted exclusively to its exhibition, while smaller pieces of his apparatus are in other cases. There are Bell telephone diaphragms of thin iron, two inches in diameter, and others made of boiler-plate iron nearly two feet square. From this you will see the impossibility of following a strict classification in installing such exhibits.

"The plan of placing all the Henry relics with the telegraph exhibits, which you recommend, does not appear to the museum authorities to be entirely expedient. The Henry collection includes apparatus relating to electric light and power, and other subjects, which would be out of place with the telegraph instruments.

"The fact that 'many of the exhibits are without tags,' according to your criticism, is easily explained. Small tags are sometimes attached to specimens simply for the purpose of identification until a number is permanently stamped on the instrument and printed labels are provided.

"Thousands of specimens in this division are provided with plain, printed labels, and the work of printing additional labels is constantly going on. I am sending you by this mail duplicates of a few specimen labels displayed with the instruments, which will give you an idea of the way in which information regarding the specimen is given to the public.

"Every division in the National Museum is in charge of a curator, who can give necessary explanations to visitors. I am always glad to receive calls from persons interested in the subjects illustrated in my division, to whom I can generally give some assistance—and I always get valuable information from them."

The specimen labels referred to by Mr. Maynard bear evidence of careful and thoughtful consideration of the subjects. For instance, one reads:

"FIRST ELECTRO-MAGNETIC RECORDING TELEGRAPH INSTRUMENT.

"Made and used by S. F. B. Morse in 1837. The messages were recorded on the strip of paper by the pencil, which was actuated by the magnet. The messages can also be read by sound.....181,250

"Deposited by the WESTERN UNION TELEGRAPH COMPANY."

Another label reads:

"MAGNETIC PRINTING TELEGRAPH.

"ROYAL E. HOUSE, PATENT NO. 9505.

"DECEMBER 28, 1852.

"FROM U. S. PATENT OFFICE, 1908.

252,674."

A Bell telephone transmitter bears this label:

"TELEPHONE TRANSMITTER.

"ALEXANDER GRAHAM BELL, PATENT NO. 161,739."

"April 6, 1875.

"FROM U. S. PATENT OFFICE, 1908.

"252,597."

One of the most interesting labels reads as follows:

"ELECTRO-MAGNETIC MACHINE.

"Devised and constructed by JOSEPH HENRY, in Albany, N. Y., in 1831, for the laboratory of Yale College.

"181,343.

"Deposited by YALE UNIVERSITY, 1893.

"This apparatus was operated with two small cells of battery and used for determining the lifting power of the magnet, which is between 2,000 and 3,000 pounds. The original platform extended about two feet beyond the frame, to allow several men to stand on it, while the iron weights, aggregating

550 pounds, were placed in the middle. The long iron lever was used to raise the loaded platform and bring the armature up to the poles of the magnet.

"Detailed description of the apparatus and account of the experiments made with it are printed in the 'Scientific Writings of Joseph Henry,' published by the Smithsonian Institution, 1886, Volume I, pages 50-53."

Mr. Maynard submitted fifty-nine labels on as many different subjects, and they all show the same care in the preparation of the information.

Western Electric Developments in 1913.

During 1913 the Western Electric Company has contributed a number of new and important developments in electrical apparatus.

Probably the most important addition to the work which is being carried on in mining districts to bring about safety for the workers in the mines has been the perfection of a mine rescue telephone equipment. Rescue crews, although equipped with oxygen helmets and various safety appliances, have heretofore been considerably hampered in their work by the lack of means of communication with the outside of the mine; in fact, rescue gangs have been lost for that very reason.

The mine rescue telephone equipment consists of a transmitter which is arranged to fit the throat of the helmet man, thus permitting of the transmission of the sound waves through the walls of the throat, as the mouth is needed for the breathing in of the oxygen. A head receiver is also furnished, the combination of receiver and transmitter being held in place by a light but serviceable leather harness. The helmet man also carries one or more coils of wire, which connect to the telephone equipment used by the directing party at the mouth of the mine. This wire pays out as the rescue gang advances.

A new test-board for way-station service in railway-train dispatching, known as the No. 2 type, has been developed to meet the need for a compact and flexible testing and patching equipment. The test-boards are so designed that all line terminals are made accessible for inspection by merely unhinging the outside cover, and all jack and key terminals by unhinging the apparatus board.

A series of cordless jack boxes has also been developed for block telephone and telegraph service. They are used to connect the operator's set to any one of a number of lines passing through the way station, by means of a switching plug which is inserted in the jack connected to the line over which the message is to be sent.

The hand-set interphone completes the line of intercommunicating telephones. This type of instrument has transmitter, receiver and ringing button all mounted on one handle. When not in use, the hand set can be placed in any position without causing waste of current, as the current is shut off automatically when the pressure of the hand is released.

Switchboard development work has been confined to changes calculated to improve the old as well as the more recent types. The work has centered upon the standardization of switchboard frameworks and parts, and applies principally to the magneto non-multiple switchboards.

A standard local cable, which is the cable connecting the various co-ordinate parts of the switchboard, has been devised, as well as a standard key shelf which has a greater cord capacity than former types, so that more than the usual number of cord circuits can be furnished, as required by operating conditions. A standard method of mounting signals has also been instituted so that line and supervisory signals are now mounted on the same mounting bars. This results in a board having a more uniform appearance and increased flexibility, at the same time making it possible to furnish single or double supervisory circuits, transfer circuits, etc., without any changes having to be made in the framework.

Two new repeating coils have been developed for phantom circuit telephone work. Their efficiency is such that transmission over a phantom can be obtained about fifteen per cent farther than over the original physical circuits, while the loss in the repeating coil amounts to less than two-fifths of a mile of No. 19 gauge cable, per coil. The loss on the phantom circuits is only one-fifth of a mile.

A new type of metal telephone for central-battery use has been developed. This is a semi-flush telephone and is intended for the same class of service which the non-flush telephone is designed to give.

A semi-flush desk set box has been developed for use with desk stands, and contains the ringer, condenser and induction coil.

The use of insulated transmitters is being extended as rapidly as possible to all types of telephones. This type is inherently a safer instrument to use, as the danger of shock is eliminated.

A still further improvement in the desk stand has been effected by the development of a single-piece switch hook.

A new battery has been developed for general utility work. It is of the high initial amperage and low-resistance type and adapted for use where there is not a constant drain on the current for extended periods of time. Its principal uses are for call bells, railway-signaling systems, annunciators, toys, industrial gas-engine work, and all slow-speed ignition service.

INTERNATIONAL TELEGRAPH INSTRUMENT.—Until lately the German Telegraph Administration has made use of several kinds of telegraph instruments, according to the country communicated with, says the London *Electrical Review*. A great improvement has been achieved by the adoption of a new instrument devised by the firm of Siemens. The instrument belongs to the class which transmit the signals by an automatic sending device, and is thus free from the failings attendant on the human telegrapher. It is able to send 600 signals one way and 1,200 both ways at the same time, or, at the rate of six signals per word, 200 words per minute; as against 720 signals and 120 words with the older system. In practice, no saving of staff is achieved by its use, but there is a possibility of a greatly increased utilization of the existing transmission lines.

The Telepost Before the United States Senate.

Senator Robert L. Owen, of Oklahoma, on November 17, 1913, submitted a resolution in the United States Senate for the appointment of a committee to investigate and report to the Senate upon the merits of the Telepost now in operation between St. Louis and Chicago as to the word-carrying capacity, accuracy, economy and general efficiency; as to its use in connection with the Post Office Department; and any obstacles in the way of its extension, either in connection with the Government or otherwise. The resolution was referred to the Committee on Post Offices and Post Roads.

Mr. Owen then said: "Mr. President, I am well acquainted with the president and secretary of this company. I know them to be upright and honest men. I have personally investigated this matter, and I desire that a committee consisting of the chairman of the Committee on Post Offices and Post Roads and two other Senators be appointed by the President of the Senate to investigate the subject. I send a letter of explanation to the desk, which I ask may be printed in the *Record* without reading and referred to the Committee on Post Offices and Post Roads, to accompany the resolution."

There being no objection, the letter was referred to the Committee on Post Offices and Post Roads and ordered to be printed in the *Record*, as follows:

"NEW YORK, September 30, 1913.

"HON. ROBERT L. OWEN, Washington, D. C.

"MY DEAR SENATOR: In reply to your inquiries at our recent interview, I submit for your consideration the following facts:

"Two years of actual work between cities of the Middle West, including Chicago, St. Louis, Kansas City and Indianapolis, have proved beyond controversy that the telepost system answers all the requirements of commercial telegraphy and surpasses all other systems in word-carrying capacity, accuracy, economy, secrecy and general efficiency.

"The inventor of the system, Patrick B. Delany, spent nearly thirty years in working out and solving the many problems confronting him in his effort to devise an automatic rapid system of telegraphy that would be able to cope with the steadily increasing inductive disturbances due to the rapid electrical developments of the country.

"In 1899 my brother and myself joined forces with Mr. Delany for the purpose of perfecting the system and of building up an independent telegraph company, as we all were convinced that only in this way could the greatest benefits of his remarkable discoveries benefit the people of the entire country.

"Too many inventions had been bought up and suppressed, too much discouragement had been given to inventors for us to be willing to trust to the telegraph companies the proper handling of our joint work. All scientific men had come to realize the correctness of a statement made by the eminent Professor Pupin, of Columbia University, that over the doors of the telegraph companies was the legend, 'No inventors or scientific men wanted.'

"After some years spent in seeking money from men of means we were forced to feel that it was practically impossible to finance the Telepost in this way. Every man approached by us was, either by persuasion or threats, induced to have nothing to do with the enterprise.

"We therefore organized the Telepost Company with $18,000,000 capitalization, no bonds, no preferred stock, shares $10 each, all common.

"As a guaranty of absolute safety for our shareholders, and to prevent anyone on the inside or the outside of our organization bringing about a merging or selling out of the enterprise by the usual method of buying on the open market the stock control of the company, the entire capitalization was issued to a board of voting trustees, each pledged to maintain the integrity of the company and each having full veto power against any attempt to destroy its independence.

"Voting trustees' certificates were issued to shareholders entitling them to all the rights and privileges of the actual stock excepting the right to vote. This board consists of:

"Hon. Henry W. Blair, Manchester, N. H., and Washington, D. C.; Gen. A. R. Buffington, United States Army, Madison, N. J.; Hon. Charles J. Faulkner, Washington, D. C.; Rev. Charles H. Parkhurst, D. D., New York City; Rear Admiral Charles D. Sigsbee, United States Navy, Washington, D. C.; H. Lee Sellers, New York City.

"No one was allowed to buy more than 100 shares of stock, as we recognized that our strength would lie in the number of people interested in the enterprise as fully as in the money secured from the sale of our securities.

"Our shareholders, now numbering over 17,000, are scattered over the entire country. This has simplified and reduced the cost of getting rights of way and franchises to a remarkable degree, as we felt we were justified in expecting.

"It would have been impossible for us to have overcome the vicious opposition of our opponents and the many obstacles put in the way of every forward step we attempted to take but for the helpful co-operation and support of our shareholders and of the thousands of friends secured by the campaign of education we have carried on from the beginning. Even with their help our progress has been shamefully delayed, it being a well-known fact that an enterprise depending upon popular support can be most easily injured by delaying its progress and thereby discouraging its supporters.

"Our poles have been cut down; property owners have been persuaded to charge us exorbitant prices for rights of way; franchises have been refused or held up; our wires continually tampered with where we were in operation; our customers threatened by the telegraph companies if they gave us their business; expensive litigation instituted against us, much of which is at the present moment pending, and all of it based on frivolous grounds; and in many cases well-planned efforts for securing the necessary funds for the construction of our lines have been killed by the active efforts of men of the highest prominence in the financial world. Boards of trade that had taken up actively the work of securing funds for extensions of our lines were practically forced to withdraw their support by the powerful interests against which we were contending.

"Contracts had been agreed upon for the use by

the Telepost of independent telephone lines throughout the State of Ohio, and by which we would have been able to connect our Western offices with Pittsburgh, Buffalo and Detroit, in addition to all the important cities in Ohio. Our men were choosing offices, and Telepost installations were being prepared when the Bell Telephone people bought up, lock, stock and barrel, these Ohio independent telegraph companies. Our contracts naturally were not executed.

"When the laws of Ohio prevented the holding by the Bell of these companies, J. P. Morgan & Co., at a cost of $7,200,000, purchased the properties in question. In their sworn affidavits they stated that these properties were bought as an investment and would be operated in entire harmony with the independent interests.

"Believing these statements to be true, the president of the company in Ohio agreed to furnish us the lines we had previously arranged for, brought the contracts to New York for formal authority from Morgan & Co. to sign them, only to find himself forced to refuse us the use of the lines wanted.

"The independence of the Telepost is and has always been fully recognized. The 'independence' claimed by J. P. Morgan & Co. was evidently of a different kind.

"After two years of commercial work between the Western cities named above, the Bell Telephone interests bought the bonds of the company, leasing us the line running into Chicago. From this time on our wire service became so utterly unreliable that it was practically impossible to handle our business. When, during a period of six weeks we had a working wire only four days, we realized that the only wise thing for us to do was to stop service until we could build our own wires or lease them from companies friendly to our interests.

"Fortunately for us, the work we had done absolutely proved the claims we had made for our system. It had also secured for us the good will of numerous firms and corporations in the cities in which we had been operating.

"We have now secured a satisfactory wire between Chicago and St. Louis and opened up Telepost offices in those cities. As against the 35 cents for 10 words charged by the other companies we are giving 25 words for 25 cents when delivered by messenger or telephone. We also give 50 words for 25 cents and 10 words for 10 cents, when these messages, having been sent by wire, may be delivered through the post office.

"We feel that the fuller development of these latter services in co-operation with the post office might be made to be the entering wedge in bringing about Government ownership and operation of the telegraph.

"We have sold about one-ninth of the stock of the company, the amount received having come in in small sums spread over the six years in which our progress has been delayed by our opponents.

"We have secured rights of way and franchises covering practically all of the distance between New York and Washington, with many miles of poles already set along this route.

"We own an entrance into Boston and have a franchise unlimited as to time, permitting us to lay our ducts in the streets of Boston, connecting us with the business districts of that city. Under this franchise much of the work has been done, and we are free to do the remainder when occasion demands.

"We have secured entrances into New York, with necessary office space.

"We have entrances into Chicago and connections into the business district.

"We have arrangements made with a number of independent telephone companies throughout the country for the fullest co-operation they can give us, which includes entrance into their cities and distribution facilities.

"We are now building, through a subsidiary of the Telepost, known as the Metropolitan Telephone & Telegraph Co., a trunk line between New York and Chicago, work having been centered thus far upon the Chicago-Toledo section, a large part of which is completed.

"Mr. Delany, and ourselves as well, have from the beginning believed in Government ownership of telegraphs. We feel that the Telepost can best serve the people of the country when it is owned by the Government in connection with the post office.

"Telepost rates, as stated above, are uniform throughout the country, regardless of distance. As our lines are extended and new offices opened, 25 cents will carry 25 words between any two offices connected by our wires. When the Government decides to own and control the telegraph business of the country, as is now the case in practically all nations, civilized and uncivilized, it should have the best.

"It should handle the enormous business which will surely come when the shackles are taken off the telegraph service of the country by means of a system in which one wire has the word-carrying capacity of 40 to 60 as now operated by the companies that have for so long controlled the telegraph business of the United States.

"While we feel abundantly able to build up and make fully successful the Telepost as an independent telegraph company, and while this success for our enterprise will force the other companies to give lower rates and better service than are at present enjoyed, we stand ready at any time to turn over all we have to the Government on terms that will be recognized as fair and reasonable, the chief feature being that our 17,000 shareholders, whose money and patience have enabled us to reach the position we now hold, shall be fairly and liberally dealt with.

"It would be very gratifying to us if a committee could be appointed to investigate the claims we make and to secure reliable data as to the serviceableness and value of the Telepost system as a condition precedent to intelligent action on the part of the Government in the matter of Government ownership of the telegraph.

"Every facility will be given for such investigation, our offices now operating in St. Louis and Chicago affording full opportunity for the most careful examination of the subject in all of its details.

Yours, very respectfully,

H. Lee Sellers.

Edison-BSCO Type 452 Cell, 450 Ampere Hours' Capacity.

EDISON BSCO PRIMARY BATTERY

THERE is nothing spasmodic about the growth of **EDISON**-BSCO cells in the telephone field, the increase being gradual and healthy. A trial installation brings out the superior merits of the battery, which usually results in the crowding out of inferior types.

The results of numerous service tests demonstrate that the **EDISON**-BSCO cell is not only ideally suited for transmitter work, but economical, a set of the 400 ampere hour cells showing on the average a longer life, with all conditions equal, than twenty sets of dry cells.

A gravity cell must be given a second charge of bluestone to obtain the same length of service at equal discharge that one renewal in an **EDISON**-BSCO 400 ampere hour cell will give. The zincs must be cleaned frequently to keep the gravity battery in condition to properly actuate the transmitter, and as the Edison cell needs no attention whatever between renewals, it is apparent that the maintenance is more costly with gravity cells.

On busy transmitters the 400 or 450 ampere hour **EDISON**-BSCO cells should be used, but where the work is light the special 200 ampere hour telephone cell is recommended. The latter, known as Type 202, is made up with rectangular heat resisting glass jar 2⅞" x 5¼" x 10" inside dimensions, and the **EDISON**-BSCO 200 ampere hour element. These cells, on account of their shape, can be assembled compactly in a special steel tray, which are manufactured by us for the purpose in three, four, five and six cell sizes.

Catalog and voltage curves on request.

The Cheapest Form of Battery Energy.

TRADE MARK
Thomas A Edison

THOMAS A. EDISON, INCORPORATED
247 LAKESIDE AVENUE, ORANGE, N. J.

EDISON-BSCO
Complete Renewal showing the all-in-one assembled element.

THE RAILROAD.

MR. E. F. RAYMOND has been appointed superintendent of telegraph of the Southern Pacific Railway at San Francisco, Cal., vice F. S. Rawlins, deceased. Mr. Raymond was assistant superintendent of telegraph previous to the present appointment.

TELEPHONE DISPATCHING ON CINCINNATI, NEW ORLEANS AND TEXAS PACIFIC.—The telephone train-dispatching equipment of the Cincinnati, New Orleans and Texas Pacific Railway is now being completed by the installation of the system between Oakdale and Chattanooga, Tenn., a distance of eighty-four miles. Mr. W. S. Melton, Danville, Ky., is superintendent of telegraph.

NEW MICHIGAN CENTRAL DEPOT AT DETROIT.—The new passenger depot and general-office building of the Michigan Central Railroad at Detroit, Mich., which will be opened January 4, will be one of the most modern in design and outfitting. The telegraph, telephone and other electrical equipment are of the best and up to date in all respects.

LONG RUN TO CATCH A TRAIN.—A lineman on the Reading Railway missed the last train for his home town, and was so anxious to get home that he ran eighteen miles in two hours to catch a train on another road.

Wireless on the Lackawanna.

Mr. L. B. Foley, superintendent of telegraph, Lackawanna Railroad, states that the next development in wireless on railroads will be the operation of signals by the same means. He says his company has a selective device by means of which a dispatch can set a signal at any point if he has occasion to flag a train.

Commercial telegrams are offered daily to the radio operator on the train, and the Western Union Telegraph Company is now considering a rate schedule covering commercial business to and from moving trains on the Lackawanna.

Quicker Mail Service for This Journal.

The transportation of TELEGRAPH AND TELEPHONE AGE to its distant subscribers, which has for a couple of years been by fast freight trains, will soon be restored to the regular mail trains, with consequent shortening of transit time. Subscribers at distant points will, under the restored plan, receive their copies as promptly as they did before the "fast freight" idea was put into effect by the Post Office Department under the previous administration.

Book on Storage Batteries.

Storage Batteries: Their Theory, Construction and Use. By A. E. Watson. Second edition. Price, $1.50.

This excellent work has been completely revised and enlarged and brought up to date. The author is assistant professor of physics in Brown University, Providence, R. I., and the manner in which he has treated his subject shows that he is thoroughly familiar with it. The contents are descriptive and general, and there are no mathematics whatever to confuse anyone not familiar with algebra.

The book contains chapters on the construction of plates, the action of the lead storage battery, how to make a storage battery, disease and remedies of the storage battery, boosters, etc., and gives much information valuable to anyone interested.

This book or any other on electrical and kindred subjects may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Trade Outlook for 1914.

The "Shoe and Leather Reporter," New York, in its issue of December 25, 1913, publishes interviews with editors of various trade papers on the outlook of trade during 1914. Of the seventeen replies received eleven take an optimistic view of future business; four look for fair trade and only two take a gloomy view, and even with these there is a difference of opinion. Much will depend, it is thought, upon the outcome of big issues. Trade on the whole is now comparatively normal and on a sound basis.

As regards the telegraph and telephone, the outlook for 1914 is very encouraging. Plans are being made by all offices to increase their facilities, which is the best indication of a continuance of good times.

Operators' Wireless Handbook.

Operators' Wireless Telegraph and Telephone Handbook, by Victor H. Laughter, is an excellent work for those who wish to obtain a general knowledge of what wireless telegraphy and wireless telephony are, and how the systems work. It describes the various pieces of apparatus employed in wireless communication, and their uses, also the various wireless telegraph systems.

A short history of early wireless methods prepares the reader to better understand the later improved systems. The book contains many illustrations, the diagrams being especially clear, which makes them easily understood. The various systems and connections are thus portrayed.

The volume is devoid of mathematics to confuse the beginner. The price is $1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

DINNER OF BROKER TELEGRAPHERS.—The Association of Broker Telegraphers of New York proposes to hold a dinner at Shanley's, on Tuesday, January 13, to celebrate the fifth anniversary, also the annual meeting. Mr. T. R. Mahan is chairman, Mr. Chester L. Hall, secretary, and Mr. J. B. McKeever is treasurer of the association. A large gathering is expected. Quite a number of ex-telegraphers now in the financial district will also be present.

THE BROOKFIELD GLASS COMPANY, New York, has opened an office in the Fourth National Bank Building, Atlanta, Ga. The office will be in charge of Mr. D. R. Peteet, formerly of the Southern Bell Telephone and Telegraph Company.

Railway Way-Station Test Boards.

To meet the demand for an efficient testing and patching device for telephone train-dispatching circuits at way-stations, the Western Electric Company has developed and placed upon the market what is known as the No. 2 type test-board, which is illustrated herewith.

These test-boards, the No. 2-A equipped for two metallic circuits and the No. 2-B for four metallic circuits, are made of solid oak, and built to withstand more than the ordinary amount of use. The jacks through which the lines are carried are mounted in the face of the board, each with its designation strip. Below these jacks are mounted keys, by means of which the selector and telephone equipment is switched from its regular circuit to the patching cords. The patching cords are connected to terminals inside of the test-boards and hang from the bottom of the cabinet. These cords are thoroughly moisture proofed. Wiring is run in twisted pairs and held in place by removable straps.

A striking feature of the No. 2 type test-boards is their accessibility for inspection work. A removable cover, held in place by hooks, gives immediate access to all line terminals, while the apparatus board, hinged at the lower edge, gives access, when opened, to the jack terminals. All wires are visible for inspection when the apparatus board is opened.

The No. 2 test-boards are equipped to make all the tests and patches ordinarily required on train and message wires. They are an essential for roads with a heavy wire traffic, where an interruption to service is a serious matter.

FIG. 1—TEST-BOARD.

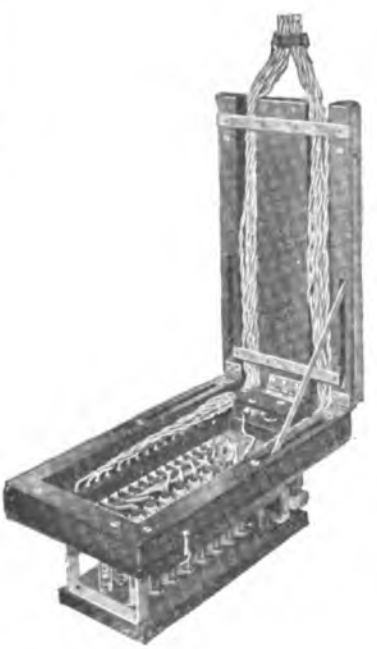

FIG. 2—APPARATUS BOARD OPEN.

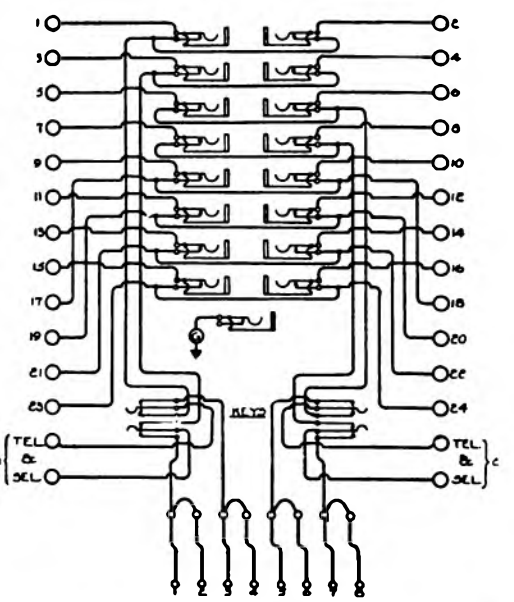

FIG. 3—CIRCUITS OF TEST-BOARD.

San Antonio Scientific Society.—At a meeting of the Junior Scientific Society, San Antonio, Tex., December 12, two methods of transmitting photographs by wire were described. One of them is the invention of Mr. Richard M. Craig, a member of the Society; the other was that of Professor Korn, of Germany, which is now in practical operation in Europe. Papers were also presented on "Wireless Telegraphy," by Sidney Friedrich, and "Pupin Coils in Long-Distance Telephony," by Adolf Seebe.

Cartoon on Government Ownership.—The *Evening Sun*, New York, on December 20 published a clever cartoon bearing on public ownership of telegraph lines. The British lion, with an expression of alarm on its face, is on top of a telegraph pole, and to its tail is a tag on which is written "$5,000,000 loss per year." Uncle Sam, with a broad smile on his face, is standing at the foot of the pole looking up at the scared lion, and remarking, "They Won't Get Me!"

Kleinschmidt Electric Company.—The business formerly conducted under the name of E. Kleinschmidt, manufacturer of telegraph apparatus, at 68 Barclay street, New York, has been acquired by the Kleinschmidt Electric Company, Inc., organized under the laws of the State of New York. Mr. Kleinschmidt is president of the new concern. The company's address is 68 Barclay street.

Form T. D. 2
1-12

THE DELAWARE, LACKAWANNA & WESTERN RAILROAD CO.

TELEGRAPH SUPERINTENDENT'S OFFICE,

90 West Street,

New York, December 16th, 1913.

Mr. E. J. Nally, Vice Pres. & Gen'l. Mgr.,
Marconi Wireless Tel. Co.,
New York City.

Dear Mr. Nally:-

After several weeks use of the Wireless in connection with fixed Stations and moving trains I am pleased to report the following.

"Communication by wireless telegraph to and from fixed Stations with moving trains is no longer an uncertainty. Railroads can now go ahead and install the service without any fear of failure.

There are many fields for the Wireless telegraph in Railroad train operation, emergencies will arise, where lives and property will be saved by its use.

It will not be necessary to increase the train crew as a trainman can easily learn the telegraph alphabet, or a telegrapher can be utilized to operate the Wireless and also perform the duties of a trainman.

Later on it may be found necessary and profitable to install a telegrapher on limited trains, running long distances without stopping, to handle commercial telegrams for the public.

Telegraph offices on trains, in the future, may be of as much value to the public as branch offices in hotels or other places where large number congregate.

Keeping long freight trains in motion for long distances without stops will result in great economy of operation. Railroad operating Officials know how expensive it is to start and stop heavy freight trains, also the additional cost of fuel, with the attendant pulling out of drawheads and the wear and tear of equipment.

With direct communication with the train, dispatchers can keep in touch with the Conductor, in fact the wireless permits the dispatcher to board every train.

The Wireless can also be utilized for displaying signals at points along the road, with a selective device a signal can be set at any point by the dispatcher, if he has occasion to flag or stop a train, in fact the Wireless can be utilized in many ways in Railroad train operations.

The Lackawanna have used the Wireless for handling train orders and find it as accurate and reliable as the telegraph or telephone in transmitting these orders.

Recently owing to a severe sleet storm disabling both the telegraph and telephone service, the Wireless was used to handle all messages between Scranton and Binghamton for several hours, the signals were strong and distinct and the Operators experienced no difficulty in receiving messages, this was the only means of communication between these points for at least two hours.

The total loss of communication between Stations, caused by prostration of poles and wires is a thing of the past.

Very respectfully,

Superintendent Telegraph.

PHILLIPS CODE.

The popularity of Phillips' Code, by Walter P. Phillips, was never more apparent than at the present time. Its acceptance by the telegraphic fraternity, as a standard work of the kind, dates from its first publication, and the constantly increasing demand for this unique and thoroughly tested method of shorthand arranged for telegraphic purposes has necessitated from time to time the issuance of several editions. The present edition was carefully gone over, a few revisions made, and a number of contractions added, until now this "staunch friend of the telegrapher" is strictly up-to-date in every particular. It has been declared that an essential qualification of a "first-class operator" is a thorough understanding of Phillips' Code.

The use of this system promotes rapid transmission, and for press reports especially was long since declared to be the best ever devised. By common consent it is recognized as standard, and everywhere is regarded in the profession as indispensable in contributing to the operator's fund of practical knowledge. In fact, not to understand Phillips' Code acts as a distinct embarrassment to the operator.

The price of the book is $1 per copy. Address J. B. Taltavall, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Production of Poles.

The production of telephone and telegraph poles, and their distribution to the telephone, telegraph, electric light and railway companies throughout the United States and Canada is a considerable undertaking, and one covering a wide territory, states the *Western Electric News.*

The principal kinds of wood used for poles are as follows:

Northern white cedar, found most abundantly in the northern parts of Michigan, Wisconsin and Minnesota, and in smaller quantities in the territory in the same latitude, extending eastward through Ontario and the northern part of Maine to the Atlantic coast.

Western red cedar, an upland product found growing in Idaho, Washington, Oregon, Montana and British Columbia.

Chestnut, largely used in the East, and found in the Atlantic coast states from Massachusetts to North Carolina, inclusive, and in parts of Tennessee, Kentucky, Pennsylvania, Ohio and Indiana.

Yellow pine and juniper are used to a small extent throughout the South, where they are found. Of these four woods, Northern white cedar is the most largely used, and for a great many years has furnished the principal supply of poles.

The poles are generally finished complete to specification in the woods—that is, the bark is removed, the butt and top cut square, and all knots and limbs trimmed smooth. Occasionally, however, if the hauling season is prolonged into the spring, a large number of trees may be cut as rapidly as possible and hauled to the landing yard before the breaking up of the roads, the work being completed at the yard.

When the poles are received at the landing yard, if a sufficient number are delivered there to make a good assortment, they are sorted into the different standard lengths and sizes and held for shipment direct to customer. But if there is only a small number, they are loaded and shipped by rail to some of the large concentrating yards. These yards are maintained for the purpose of storing stocks of poles where they can be sorted and placed in piles, each size by itself, ready for shipment as needed. They are located at various convenient places throughout the cedar territory.

The Western Electric Company's present shipping facilities comprise over thirty yards for the handling of white cedar, scattered throughout Michigan, Wisconsin and Minnesota, and twenty-five yards for handling Western red cedar, in the states previously mentioned. This number includes yards at Oakland and Los Angeles, Cal. The largest yard maintains an average stock of 125,000 poles. Since 1904 orders have been placed with the company for 4,500,000 cedar poles, about 1,000,000 chestnut poles, 40,000 juniper poles, and 125,000 yellow pine poles—about 50,000 carloads. To produce these poles on a basis of an average of forty poles to the acre, which is an approximate yield, would require a forest of 136,156 acres.

As telephone and telegraph lines are built with about forty poles to the mile, the total output during the last nine years, therefore, is sufficient to build a pole line 143,750 miles long, or more than half way to the moon.

Electrical Terms Explained.

BY I. N. MILLER, DISTRICT COMMERCIAL SUPERINTENDENT, WESTERN UNION TELEGRAPH COMPANY, CINCINNATI, OHIO.

ESCAPE means that the current of electricity is escaping from the wire to the ground, which may be caused by limbs of trees touching the wire or anything that will conduct a portion of the current to the ground. Never report an "escape" in a defective joint in the line wire.

RESISTANCE. This is a term used to show how good or how bad a conductor of electricity a wire is. All substances offer more or less resistance to the passage of electricity. The unit of measurement of resistance is the ohm, which means the resistance offered by the metal to the passage of a current of a given strength over 377 feet of No. 8 iron wire, or 1,056 feet of No. 11-gauge copper wire.

In constructing new telegraph lines we now use copper wire because it offers lesser resistance, and we use glass insulators because they offer a very high resistance; the result is the current follows the wire to the distant end and thence to the ground, because it is the route of least resistance. A standard relay generally measures 150 ohms, which means that a given current of electricity will flow through the relay wire as freely as through 56,550 feet, or ten miles, of No. 8 iron wire.

VOLTAGE means the power the current has to force itself through a conductor. A cell of gravity battery generally has about one volt and ten cells, ten volts or more.

AMPERE means the quantity of current that is forced through a wire by the voltage; if the resistance of the wire is low and the voltage high, the quantity of current passing is large, and vice versa.

CONDUCTIVITY means that particular quality of metal of a conductor which enables it to convey electricity either freely or with difficulty.

INSULATORS mean the poorest of conductors. We use wires of the best conductivity and insulators of the poorest conductivity. In one case we want the current to pass freely and in the other we want to obstruct its passage as much as possible. Glass when dry is a very poor conductor, but water is a fairly good conductor, and when glass insulators are covered with water, the current escapes from the wire through the water to the ground. This explains why telegraph wires work slower and harder in wet than in dry weather. The poorest conductors are called insulators. A vast fortune awaits the one who invents an insulator for supporting a wire which will not convey electricity through itself or through the moisture (rain) which covers it.

Inter-Communicating Telephones on a Sea-Going Tug.

An interesting application of the telephone on shipboard is the installation of an inter-communicating system on the ocean-going tug "Perth Amboy" of the Lehigh Valley Railroad, and described in the *Western Electric News*. Captain Harry Farnham of the "Perth Amboy" did not believe telephones could be so used. Something happened

FIG. 1—THE INTER-PHONE IN THE WHEEL ROOM.

to change his mind, however, and he tells it in an interesting way. "We were pulling along off the Maine coast with a long tow of coal barges," said Captain Farnham, "when we struck the worst sou'-wester I've run into in my thirty years of sea going. I wanted to tell the engineer something—something important that my signal bells couldn't tell him. You couldn't hear a sound through the tube,

FIG. 2—THE INTER-PHONE IN THE ENGINE-ROOM.

so I started to send the cabin boy down with the message. But the sea was too high and I was afraid he'd be washed over the side. Without knowing it, I found myself using my inter-phone and all of the next few days while we were riding out the gale I used that thing all the time. You could understand everything in spite of the racket made by the wind and engines. Pretty hard to teach an old sea-dog new tricks, but I'm glad I learned that new one. Now, I wouldn't be without it. I use the inter-phone for everything; and the crew, including the cook, feels the same way about it."

New Book.

HANDBOOK OF TECHNICAL INSTRUCTION FOR WIRELESS TELEGRAPHERS is the title of a new book by J. C. Hawkhead and issued by The Marconi Press Agency, Limited, London, England.

It contains 295 pages and 170 illustrations, and was prepared to meet the increasing demand for such a work for the instruction of wireless operators.

The average land operator usually has a very hazy idea of the nature of the forces governing the working of his instruments. He knows that electricity is the force employed, but beyond that he is unable to explain very little on the subject. The wireless operator, however, must necessarily have a much more comprehensive knowledge than the land operator, as he cannot depend upon line men or engineers to repair faults that may occur in his apparatus. In fact, he is usually held responsible for the efficient operation of his station, and is necessarily compelled to know his instruments and how and why they work. It is to enable operators to be prepared for all emergencies that this book has been produced.

This volume is very comprehensive and its seventeen chapters cover primary cells, accumulators, electric currents and their laws, magnets and electromagnetism, generators, motors and rotary converters, inductance, condensers, electromagnetic waves, the aerial, faults, etc.

The mathematics employed to demonstrate the facts are simple, and the descriptive matter is very clear. In short, it is a book of real merit, and the sincere and determined student will find the time spent in its study well worth the effort. Each copy is a school of instruction in itself, and the student who masters the valuable information it contains will be fitted to maintain efficiently a wireless station anywhere.

The price of this book is $1.50, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE. 253 Broadway, New York.

ITALIAN FEMALE OPERATORS MAY NOW MARRY.—Female telegraphers in Italy have, by a special decree, been permitted to marry. On the day after the passing of the law 300 lady operators handed in applications for permission to marry.

MR. L. W. STORROR, formerly general superintendent of the Postal Telegraph-Cable Company at San Francisco, now identified with the telephone interests at the same point, writes: "With much pleasure I hand you herewith a money order for $2.00, covering a renewal of my subscription to the AGE, which improves with every year."

MUNICIPAL ELECTRICIANS.

UNIQUE FIRE ALARM SYSTEM.—In Springfield, N. J., every water hydrant is numbered, and in case of fire the number of the nearest hydrant is blown on a large steam whistle.

NEW FIRE-ALARM BOX.—Chief Leonard Day, of the fire alarm bureau, New York, and E. A. Faller, telegraph expert of the fire department, have invented a fire-alarm box which is said to cost about one-third of the price of the boxes now in use. The inventors, it is stated, have donated their rights in the city to the New York municipality.

NEW YORK POLICE SIGNAL SYSTEM.—The new police signal system now being tested in the precinct of the West Thirtieth street station, New York, has been pronounced a success. The principle is in the electric lamp atop each of the ten-foot green poles and connected with the station of the precinct. When a call for a policeman comes from any point the lieutenant at the desk simply turns a switch to light a green lamp at the pole top nearest the point of call. The nearest patrolman will hurry to the post then and call up by telephone for instructions.

OBITUARY.

BRIGADIER-GENERAL DAVID J. CRAIGIE, U. S. A., retired, aged 73 years, an old-time telegrapher, died in Washington, D. C., December 14.

ARCHIBALD G. SIBBALD, age sixty-five years, a former well-known Western Union and Baltimore and Ohio telegrapher, of New York, died December 11.

HARRY O'BRIEN, aged forty-four years, formerly operator at the Oriental Hotel, Manhattan Beach, Coney Island, died in Sheepshead Bay, Brooklyn, December 21.

S. A. COLEMAN, aged sixty-two years, operator for the Postal Telegraph-Cable Company, New York, died on December 29. Deceased was born in Middletown, N. Y., and was widely known among telegraphers.

THOMAS D. LOVELL, aged forty-three years, an old-time telegrapher, died in Boston, Mass., December 15. He had been employed by press associations as well as telegraph companies. He was the inventor of a telegraph transmitter.

O. P. S. PLUMMER, M.D., aged 77 years, a well-known old-time telegrapher, died in Portland, Ore., December 14. He was born in Greenville, Pa., and learned telegraphy in 1851. He studied medicine while manager at Rock Island, Ill., graduating in 1857. He returned to telegraphy several years afterward, and worked in San Francisco, Cal., and Portland, Ore., becoming manager at the latter place. He left the telegraph service many years ago to resume medical practice. Dr. Plummer was twice elected to the Oregon Legislature and once to the Portland City Council.

Service in North Florida.

One afternoon two negro cotton-field hands walked into a southeast Georgia telegraph office and busied themselves in the writing of a telegram, but, judging from the number of blanks destroyed and the time consumed, they were making poor progress. Colonel Arnold, the manager, finally walked over to them and said: "Rastus, let me write the message for you; I know how to get it up better than you do, and can save you some money, maybe."

"Thank yo', boss, thank yo'," said Rastus.

"Who is the telegram going to?" asked Colonel Arnold.

"Tis gwine to Jeems Sherman, sah."

"Where does Jeems live?"

"Jeems, he live in Fernandino, Flurridy, sah."

"What street and number?"

"No 'dress 'tall, boss, eve'ybody know Jeems in Fernandina."

"That won't do, Rastus. Does Jeems drive a dray, write policy, shoot craps or preach the gospel?"

"Jeems don't do none of them things, he jes cook for Colonel Yulee."

"Well, what you want to say to Jeems?"

"Tell Jeems dat Mandy done run off an' married dat yaller nigger Cicero Washington, an' dey on de way to Fernandina. Yo' reckon yo' kin find Jeems?"

"Find him! Find him!" replied Colonel Arnold; "of course we are going to find him. We keep two hound dogs in Fernandina to find niggers with."

"'Fo' Gawd!" exclaimed Rastus, "every man to his own business, Please, sah, start a swif' houn' dawg after Jeems an' git me an answer 'fo' dark."

He got his answer.

Measurement of the Resistance of Grounds.

(Continued from page 733, December 16, 1913.)

Measuring resistance. The resistance of a ground may be determined either by measuring its resistance in series with a second ground of known resistance, or by measuring the series resistances of various combinations between the ground under observation and two auxiliary grounds.

Auxiliary grounds. The auxiliary grounds, which are required when there is no ground of known resistance available, shall be ground rods driven into the earth at least two or three feet, anchor rods, or some other underground conducting structure. These auxiliaries should be located at least ten feet apart and at least ten feet from the ground whose resistance is to be determined. Care should be taken that "temporary" grounds make fairly good connection with the damp earth and that they are not located over or close to any other buried conducting system.

In case suitable grounds are available within a few hundred feet of the ground to be measured, they may be used instead of installing special grounds for the tests. It is desirable not to have the auxiliary grounds located at a very considerable distance from the main ground, on account of the possibility of stray earth currents interfering with the measurements.

When it is desired to measure a ground located some distance from the testing point and the auxiliary grounds, approximate results can be obtained by using a line wire or cable conductor for making connection to the distant ground. The resistance of the latter can be determined by subtracting the resistance of the line wire from the observed resistance.

Calculation of resistance. When there is available a ground whose resistance is known from previous measurements, fairly accurate results may be obtained by measuring the ground under observation in series with the known ground. Subtracting the known resistance from the observed resistance will give the resistance of the unknown ground.

Since grounds of known resistance are only occasionally available, the use of two auxiliary grounds will often be necessary. With this method three measurements of the three grounds are required, each measurement giving the resistance of two of the grounds in series.

The results of the series measurements may be represented as follows:

$R_1 = (G + W) + (G_1 + W_1)$ = main and first auxiliary grounds in series. (1)

$R_2 = (G + W) + (G_2 + W_2)$ = main and second auxiliary grounds in series. (2)

$R_3 = (G_1 + W_1) + (G_2 + W_2)$ = first and second auxiliary grounds in series. (3)

in which

G = resistance of main ground.
G_1 = resistance of first auxiliary ground.
G_2 = resistance of second auxiliary ground.
W = resistance of wire to main ground.
W_1 = resistance of wire to first auxiliary ground.
W_2 = resistance of wire to second auxiliary ground.

Solving equations (1), (2) and (3) for "G," it is found that

$$G = \tfrac{1}{2}(R_1 + R_2 - R_3) - W \qquad (4)$$

which is the equation for the ground under investigation. Usually the resistance of the wire to the ground is small and W may be neglected, in which case the working equation becomes

$$G = \tfrac{1}{2}(R_1 + R_2 - R_3) \qquad (5)$$

The resistances of the auxiliary grounds, if desired, may be determined from the following equations, which are derived as above:

$$G_1 = \tfrac{1}{2}(R_1 + R_3 - R_2) - W_1 \qquad (6)$$

$$G_2 = \tfrac{1}{2}(R_2 + R_3 - R_1) - W_2 \qquad (7)$$

Making Measurements. Since earth currents are usually present, it is well to provide means for reversing the ground connections, so that the ground current may be made to flow in the same direction as the battery current. This will permit the use of an ammeter that reads only in one direction,

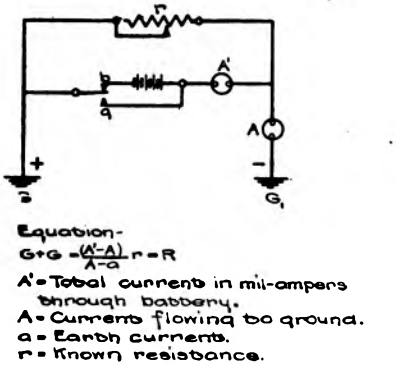

FIG. 1.

and will help to avoid errors in the calculations. Under these conditions the working equation becomes

$$G + G_1 = R_1 = \frac{A' - A}{A - a} r \qquad (10)$$

When two mil-ammeters are available they should be connected into circuit as shown in the theoretical diagram, Fig. 1. In this arrangement

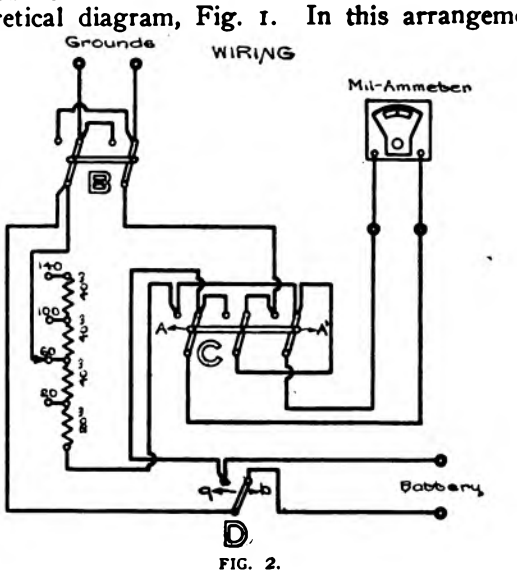

FIG. 2.

only two switches are required—one (switch "B") for reversing the grounds and the other (switch "D") for determining the earth current.

When only one mil-ammeter is available the testing circuit should be arranged as shown in the wiring diagram (Fig. 2). In this circuit switch "C" is for changing the mil-ammeter from its "A" position to its "A'" position, or vice versa.

(To be Continued.)

SERIAL DIVIDEND.—The directors of the Serial Building Loan and Savings Institution, New York, on December 27, 1913, declared the usual dividend.

ANNUAL MEETING OF T. & T. L. I. A.—The annual meeting of the Telegraph and Telephone Life Insurance Association will be held at 195 Broadway, New York, on March 11.

T. & T. L. I. A. ASSESSMENT.—Assessment 561 has been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of G. M. Hughes, at Brooklyn, N. Y.; J. M. Crowley, at Augusta, Ga.; S. C. Mason, at Lockport, Ill.; C. H. Gogel, at Govanstown, Md.; G. E. Dunning, at New Orleans, La., and J. C. Bishop, at Birmingham, Ala.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Miss Anna F. McCarthy, the treasurer of the Gallery Christmas Fund, of which H. A. Moody was manager, distributed more than $450 to its members last week. The club had been in operation during the year, and its funds were deposited in the Serial Building Loan and Savings Institution.

PHILADELPHIA POSTAL.

Among recent visitors at this office were D. H. Gage, jr., of the electrical engineer's office, New York, and J. H. Zecher, manager at Atlantic City, N. J.

Mr. Andrew S. Weir, formerly president of the Electrical Aid Society, and well known to many telegraphers, was elected Worshipful Master of Corinthian Lodge of Masons, December 16. Mr. Weir is manager for Cramp, Mitchell & Shober, bankers and brokers.

Mr. Herbert Mills is now assisting Mr. Krewson regularly and caring for the Morkrum printers.

ST. LOUIS WESTERN UNION.

Messrs. C. W. Frey, assistant supervisor of wire service, New York; S. H. Rogers, chief clerk of the division office, Chicago, and C. W. Steinhauer, wire chief, Western Division, Chicago, were recent visitors on a general inspection trip.

Mr. Paul Mader, city lineman, left, on December 16, for San Antonio, Tex., where he expects to spend a vacation. Mr. Mader is one of our very best "trouble shooters."

SIOUX CITY, IA., POSTAL.

Mr. E. B. Scanlon, chief clerk to superintendent A. B. Richards, Kansas City, Mo., was a recent visitor.

SIOUX CITY, IA., WESTERN UNION.

Miss Katheryne K. Bodwell, manager at Vermillion, S. D., is enjoying a few weeks' vacation and spending Christmas in Wisconsin. Mr. J. L. Resegieu, of this office, is acting as manager during her absence.

The following are spending Christmas out of town: W. J. Corrigan, at Casey, Ia.; Miss Ida M. Warner, at Pomeroy, Ia.; H. M. Phillips, at Ruthton, Minn.

Mr. W. A. Davis will resign on January 1 to enter other business.

Mr. P. M. Waterbury resigns on January 1 to accept the position of physical director of the Sioux City High School.

Among recent arrivals at this office are A. H. McAhern and B. F. Herman.

Telegraph and Telephone Age

No. 2. NEW YORK, JANUARY 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

Annual Crop of Stereotyped Questions.

PART I.

About once a year, nearly every chief operator or other official who has the reputation of possessing reliable knowledge concerning electrical matters usually finds himself suddenly deluged with "confidential" notes from momentarily ambitious operators and friends, containing a list of questions which they desire answered. The recipient of these questions needs no other cue to tell him that there is a civil service examination to be held somewhere in the immediate future, and that each of his inquiring friends intends making a "try" for some advertised position.

A comparison of the various lists of questions asked will usually show that practically the same questions are submitted by each operator and phrased in almost identical words. Evidently, each competitor has raked up an old list of questions used in some previous examination, and hopes thereby to get a line on what he may expect this year.

As a matter of fact, many of the questions asked in municipal civil service examinations for electrical positions are practically identical each year, the only difference, if any, being in the wording. The following questions, however, have never failed to appear in any list that the writer has seen, and, for that reason, the answers thereto may be of interest to future competitors. As will be seen, the questions are of a very elementary nature.

Ques. What is the difference between a metallic and a grounded circuit? Describe each.

Ans. A metallic circuit is one in which the external circuit is all metal, or other conducting material, and which has no connection with the earth whatever. The simplest form of a metallic circuit is that of a chemical cell of battery short circuited by means of a short length of wire connecting the positive and the negative poles together. Here, the external circuit consists entirely of the wire thus joining the two poles. It will still be a metallic circuit,

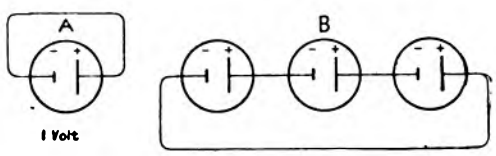

FIG. 1—SERIES BATTERY CONNECTIONS—METALLIC CIRCUIT.

even though the connecting loop may be many miles in length, as long as the two free ends of the loop are connected to opposite poles of the same battery or generator.

A grounded circuit, in the usual sense, refers to one in which the earth is used in the capacity of a return wire between two points, such as, for instance, a single-line Morse circuit. In this case, each end of the wire terminates in the earth, either directly or indirectly through the battery or a generator. The distinction between a metallic and a grounded circuit, then, is that one uses a second wire to complete the circuit, while the other uses the earth for the same purpose.

Ques. What is the difference between a series, a multiple, and a multiple-series battery?

Ans. A series battery is one in which a number

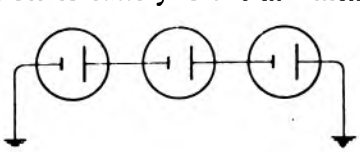

FIG. 2—SERIES BATTERY CONNECTIONS—GROUNDED CIRCUIT.

of cells are arranged in a row, and have opposite poles in adjacent cells connected together by means of short pieces of wire, as shown in Fig. 1. In other words, one pole of the first cell, say the positive pole, is connected by wire to the negative pole of the second cell, while the positive pole of the second is, in turn, similarly connected to the negative of the third cell, and so on, to the end of the row.

The object of a series-connected battery is to obtain a greater electromotive force than one cell alone could provide. The number of volts a series-connected battery will generate is found by multiplying the e. m. f. of one cell by the number so connected. The quantity of current any series-connected battery will furnish at any time when short circuited, will be no greater than one cell of the same battery is capable of furnishing when short circuited, because, when cells are added, the

internal resistance of the circuit increases in the same ratio as does the electromotive force.

Example: When a one-volt cell of battery, having an internal resistance of, say, three ohms, is short circuited, the maximum quantity of current flowing through the liquid and connecting wire (the resistance of which latter is negligible), will be $\frac{E}{R} = I$, or $\frac{1\,E}{3\,R} = 1/3$ of an ampere. Two cells in series would furnish two volts and have six ohms in circuit; twenty cells, twenty volts and 60 ohms resistance; hence, each group will furnish exactly one-third of an ampere of current, regardless of the number of cells in the row. But, where the resistance of the conductor, or external circuit, is comparatively great, the addition of more cells in series will always increase the quantity of current in the line, for the reason that the additional internal resistance of the cells thus added is too small to appreciably alter the original ohmic resistance of the entire circuit. In other words, the ratio of e. m. f. thus added is much greater than that of the resistance added to the circuit.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED DECEMBER 16, 1913.

1,081,368. Selector Mechanism. To E. B. Craft and A. F. Dixon, New York, N. Y.

ISSUED DECEMBER 23, 1913.

1,081,990. Telephone Indicator. To T. L. Savin, Pine Bluff, Ark.

1,082,221. Radio-telegraphic Station. To. G. G. von Arco, Berlin, Germany.

1,082,248. Condenser Telephone. To J. Unterholzner, Zweibrücken, Germany.

1,082,289. Telephone Receiver. To M. Setter, Chicago, Ill.

ISSUED DECEMBER 30, 1913.

1,082,856. Attaching for Controlling Telephone Switch Hooks. To J. Frith, Bridgeport, Conn.

1,083,085. Loose-Coupled Tuning Coil. To A. C. Gowing and M. C. Spencer, Worcester, Mass.

1,083,256. Telephony. To I. Kitsee, Philadelphia, Pa.

1,083,257. Telegraph System. To I. Kitsee, Philadelphia, Pa.

1,083,258. Electric Transmission of Intelligence. To I. Kitsee, Philadelphia, Pa.

1,083,259. Cable Telegraphy. To I. Kitsee, Philadelphia, Pa.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, January 12:

American Telephone and Telegraph Co.	120¼
Mackay Companies	77
Mackay Companies, preferred	66
Marconi Wireless Tel. Co. of Am.	4¼
Western Union Telegraph Co.	60

PERSONAL.

MR. G. OHATA, telegraph engineer of the Imperial Department of Communications, Tokio, Japan, is in the country for the purpose of studying telegraph and telephone matters.

MR. J. FRANK HOWELL, stock broker, New York, an old-time telegrapher, distributed among his friends and customers a highly optimistic letter regarding the outlook of business during 1914.

MR. DONALD MURRAY, of London, England, inventor of the Murray system of telegraphy, arrived in New York on the steamer "Lusitania," January 9. He expects to return to London the end of this week.

MESSRS. J. SAYERS and J. DALZIEL, engineers of the Midland Railway, Derby, England, were in New York last week in the interest of their railroad, looking into the question of interference by single-phase trolley systems with telegraph and telephone lines.

MR. E. L. MYERS, formerly of the Chicago Great Western Railroad Company, Dubuque, Iowa, has identified himself with the Willard Storage Battery Company, with headquarters at Chicago. Mr. Myers is a very capable telegraph engineer, and he will add strength and experience to the new interests with which he is now associated.

MR. HENRY FORD, of Detroit, Mich., the wealthy manufacturer of auto mobiles, who has recently achieved wide notoriety through his profit-sharing plan for the benefit of his employees, was named by someone as one of America's three best men, the other two being George Washington and Abraham Lincoln. Mr. Ford thought that Thomas A. Edison is the greatest and best man in America to-day. "Edison," he said, "can never do enough. He is still working out things that will do the most good for the most people."

MR. WILLIAM H. O'BRIEN, Dorchester, Mass., a former telegrapher, who has, for several years, been supervising the establishing of joint telephone and telegraph service as a representative of the New England Telephone and Telegraph Company, has been appointed chief of the telephone and telegraph bureau of the Public Service Commission of Massachusetts. Mr. O'Brien was a member of the Massachusetts House of Representatives in 1908, 1909 and 1910. He is also a member of the Massachusetts Immigration Commission.

MR. GERARD SWOPE, vice-president and general sales manager of the Western Electric Company, New York, has been nominated by the alumni association of the Massachusetts Institute of Technology, Boston, as a term member in the corporation of the Massachusetts Institute, to serve five years. Mr. Swope is a graduate of the class of 1895, and a member of many societies and clubs. Mr. Swope delivered an address before the December meeting of the Philadelphia Telephone Society, his subject being "The Western Electric Company's Place in the Bell System."

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. H. MACKAY, president, sailed for Europe on the steamer "France," January 7.

MR. EDWARD REYNOLDS, vice-president and general manager, who resides in New Rochelle, N. Y., is, with his family, stopping at the Great Northern Hotel, on Fifty-seventh Street, New York, for the winter months.

MR. THEO. L. CUYLER, JR., former assistant treasurer of this company, whose marriage, on December 25, 1913, was announced in our issue of January 1, sailed, with his wife, January 8, on the steamer "Franconia" for Mediterranean ports.

MR. E. KIMMEY, superintendent, has returned from a trip of inspection through his district.

VISITORS.—Among recent executive office visitors were: H. Scrivens, superintendent, and W. D. Vincent, chief operator, Pittsburgh, Pa., and Mrs. L. M. K. Hawes, manager of a branch office, Jacksonville, Fla.

MR. J. W. WEST, manager of the Paducah, Ky., office of this company, made Christmas presents to the employes of his office on December 24. Operators, clerks, linemen and messengers were all remembered. Among those present at the festivities were Mayor Hazelip, of Paducah, who gave a talk to the boys. Mr. West made an address, in which he stated that it had been his custom for the past few years to have Santa Claus remember each one of his force, and stated that these events were among the happiest moments of his life. He stated that he felt interested in their welfare, and hoped to greet them some day as great men.

MANAGERS APPOINTED.—The following appointments of managers have been made: C. W. Osborne, Sidney, Ohio; T. J. Lovett, Hicksville, Ohio; A. E. Calder, Bel Air, Md.; F. E. Bueking, Missoula, Mont.; S. G. Brown, Butte, Mont.; J. F. Logan, Coatesville, Pa.; Mrs. M. G. Mullins, Alliance, Ohio; B. L. Webb, Prescott, Ark.; H. A. Patterson, Brewster, Fla.

JOHN B. SLOCUM, aged 62, night chief operator of the Buffalo, N. Y., office, died on December 22. He was one of the oldest operators in Buffalo, and was well known throughout the country.

MAGNETIC CLUB NEW OFFICERS.—The annual meeting of the Magnetic Club, New York, was held January 8. Officers were elected as follows: President, C. F. Leonard; vice-presidents, E. P. Tully, M. R. Cockey, J. J. Whalen, W. I. Capen, secretary, W. B. Dunn; treasurer, J. J. Cardona. Four members of the Board of Governors to serve two years; J. A. Manning, J. H. Flood, J. F. Skirrow and J. Costelloe.

Mr. Charles P. Bruch, who has been president of the club for five years, announced, prior to the election, that he was not a candidate for re-election. He expressed his appreciation of the compliment paid him in suggesting that he continue in office, but he thought that the interests of the club are best served by changing its officers at not too frequent intervals. "New officers," he said, "infuse fresh energy and enthusiasm into the management of the club's affairs, and excite renewed interest on the part of the members at large."

The Situation in the Western Union-Telephone Separation.

There have been no new developments since the date of our previous issue in regard to the separation of the Western Union and American Telephone and Telegraph interests. The matter is under consideration and progress is being made as far as circumstances will permit. The disposition of the $29,000,000 of Western Union stock held by the American Telephone and Telegraph Company is, of course, an important feature of the situation that will require careful handling, but the telephone company expresses its intention to deal with this matter in a way that will meet the approval of all concerned.

Since the announcement of the decision to separate the telegraph and telephone interests, other aggregated interests have arranged with the Government to resolve their organizations into their constituent parts, the latter to be conducted as separate entities. Notably among these is the New York, New Haven and Hartford Railroad system.

Another important development in the general situation is the announcement that J. P. Morgan, the well-known banker, has resigned from the directorates of over thirty corporations, including the Western Union Telegraph Company. Other prominent financiers have also resigned as directors in many of the corporations with which they were interested, among them being Mr. Henry P. Davison, director of the American Telephone and Telegraph Company.

New Year's Greetings.

Appreciative acknowledgment is made of further Christmas and New Year's greetings from S. Inada, telegraph engineer, Department of Communications, Tokio, Japan; Minor M. Davis, electrical engineer and chief engineer of telephones, Postal Telegraph-Cable Company, New York; National Executive Association of Irish Post-office Clerks, Dublin, Ireland; H. P. Trainor, divisional plant superintendent, Orange Free State and Northern Cape Colony, Bloemfontein, South Africa; T. W. Goulding, European commercial manager, Western Union Telegraph Company, London, England; John A. Roebling's Sons Company, Trenton, N. J.

MR. DAVID HOMER BATES, secretary and treasurer of the Society of the United States Military Telegraph Corps, New York, writes: "I congratulate you upon the excellent character of your journal, and the evidently increasing good influence it has upon the telegraph fraternity."

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MESSRS. NEWCOMB CARLTON and Belvidere Brooks, vice-presidents; W. N. Fashbaugh, general superintendent of traffic, and G. M. Yorke, general superintendent of plant, left New York January 11 on a business trip to Chicago, Minneapolis, St. Paul and other Middlewest points, and will be gone about a week or ten days.

MR. J. R. TERHUNE, district commercial superintendent, Nashville, Tenn., announces the appointment of Mr. F. B. Washington as manager at Natchez, Miss., vice Mr. F. E. Frazier, transferred to Bristol, Tenn., as manager.

MR. R. T. MEIGS, district plant superintendent, Philadelphia, Pa., has been transferred to the office of the general superintendent of plant, New York. Mr. E. P. Totman has been appointed to fill Mr. Meig's former position in Philadelphia.

MR. DAVID F. INGOLD, chief operator at Los Angeles, Cal., is the subject of an interesting little sketch in the *American Globe*, published in Los Angeles. An excellent picture of Mr. Ingold accompanies the article.

MR. G. E. PALMER, chief operator of this company at San Francisco, is in New York, where he will remain until about February 1. His trip is one of business and pleasure.

MR. T. J. MEADE, assistant chief operator at Albany, N. Y., has been appointed chief operator to succeed C. C. Bauer, deceased.

MR. U. W. BOGGESS, of Parkersburg, W. Va., has been appointed manager of the Marion, Ohio, office, to succeed Mr. M. F. Miller, who enters other lines of business.

W. E. FLIPPEN, of the Vicksburg, Miss., office of this company, died on December 16. He had been connected with the company more than fifty years.

C. W. MONTGOMERY, of the Natchez, Miss., office, has been granted a pension.

WESTERN UNION IN ALBERTA, CANADA.—It is announced, says the *Canadian Railway and Marine World*, that the Western Union Telegraph Company will soon restart business in Alberta, under an arrangement with the Alberta government. The company at one time had an office at Lethbridge.

MORSE ELECTRIC CLUB.—The annual dinner of the Morse Electric Club will be held at the Hotel Knickerbocker, New York, on February 21.

Retirement of Theo. P. Cook.

Mr. Theo. P. Cook, general manager, Western Division, Western Union Telegraph Company, Chicago, Ill., whose retirement from active service January 1, was announced in our issue of that date, is a native of Tennessee, and has been associated with the telegraph all through his business career. He entered the employ of the Western Union Company on the Overland Route to California in 1862, and in 1863 he took charge of the office at Lawrence, Kan. He afterward worked in other cities in Kansas, and in 1882 was made night chief operator at St. Louis, later becoming manager of the gold and stock department of the local service. In 1885 he was appointed assistant superintendent at Dallas, Tex., and in 1897 became superintendent, with headquarters at St. Louis. Mr. Cook was appointed general superintendent at Chicago in March, 1902, succeeding Colonel Robert C. Clowry, who was elected president of the company at that time, his title being changed to general manager last year.

Mr. Cook has a thorough and practical knowledge of every branch of the telegraph business, and has been successful in the building up of the company's interests in his division.

Public Utilities Commissions and Public Utilities.

A technical conference of alumni and students of Stevens Institute, Hoboken, N. J., was held January 9 and 10. The control and regulation of public utilities was discussed.

Mr. Newcomb Carlton, vice-president of the Western Union Telegraph Company, who is a graduate of the institute, was one of the speakers. Mr. Carlton said in part:

"The principle that your property, that my property, shall be protected by laws considered and passed by our representatives, and properly established upon the statute books of the Commonwealth, has been set aside, and in its place has been set up a public service commission which has not only vested in it the functions of a legislative assembly, but the powers of the court and the police department as well. Is this reasonable regulation? Is it practical regulation? Our prayer is: Give us better public sentiment toward commissions, reasonable limitation of their functions, the chance to exercise our enterprise, and our patriotism.

Dr. Alexander C. Humphreys, president of the Institute, expressed the opinion that, as a general rule, public utility commissions are as much in need of regulation as are the public utilities.

All the speakers agreed that the personnel of most public utilities commissions could be improved greatly by the addition of engineers.

New Year's Eve Banquet to Superintendent Terry.

The Commercial Efficiency Promoting Association of the Western Union Telegraph Company tendered district commercial superintendent A. C. Terry a banquet on New Year's eve at the Fort Pitt Hotel, Pittsburgh, Pa., forty-five persons being present.

The music was furnished by the Association's own orchestra, composed of Geo. S. Walters, Herman Goetz, Frank Goetz, Albert Blum, C. H. Reed, and Grier J. Tress.

Mr. Thos. Gosden, chief clerk in Mr. Terry's office, was the toastmaster, and in a happy vein intro-

duced Mr. Terry, who reviewed the work of the past year.

Remarks were made by district cable manager T. J. Jones, district commercial manager Geo. S. Walters, district commercial agent L. L. Leith, and Pittsburgh manager E. A. Baird. An original poem by district commercial manager Geo. F. Stadtmiller, entitled, "A New Year's Dream," was a ludicrous reference to various members of the superintendent's force. A bass solo was rendered by chief collector Samuel Bell, and a tenor solo by special agent W. W. Kelser.

The burlesque on routines, by Grier J. Tress, disguised as a tramp, was exceedingly funny. Immediately after the conclusion of Mr. Tress's effort, he was arrested by Wm. T. Sims, in full police uniform, for high treason, and was tried before Judge L. L. Leith, Mr. E. A. Baird acting as prosecuting attorney, and Henry Abrams as attorney for the prisoner, who, after much argument on the part of counsel, was acquitted.

The officers of the Commercial Efficiency Promoting Association are: President, Thos. Cosden; vice-president, E. A. Baird; treasurer, E. J. Lane, and secretary, T. J. Jones.

Among the out-of-town attendants at the banquet were district commercial manager E. Ross Collins, Charleston, W. Va.; Geo. F. Stadtmiller, district commercial manager, and J. L. Meldon, cashier, Erie, Pa.

THE CABLE.

Mr. James A. Scrymser, president of the Central and South American Telegraph Company, New York, has been elected treasurer of the New York Botanical Garden.

Rowley A. E. Taylor, aged sixty years, a cable operator at Canso, N. S., died on December 30, 1913.

New Anglo-German Cable.—Owing to the increase of traffic between England and Germany, it has been decided to lay a new telegraph cable, with four wires, between Emden and Bacten. This will be the seventh cable between the two countries.

Cable Rates Between England and West Indies.—Postmaster-general Herbert Samuel, of Great Britain, has announced that the cable rates between England and the West Indies will soon be reduced to a uniform rate of sixty cents a word. Press messages and deferred plain language messages will be half that rate.

Enjoined From Charging Extra-word Tolls in Cablegrams.—A permanent injunction was issued in San Francisco, Cal., January 6, against the Commercial Pacific Cable Company, restraining it from charging the Western Union Telegraph Company for extra words added to cablegrams to the Orient, transferred from the Western Union to the cable company.

Cable Systems of the World.—The *Elektrotechnische Zeitschrift*, of Berlin, Germany, prints a statistical article, covering the development of the cable systems of the world from 1898 to 1913. In 1898, the total length of cables in the world was 197,176 miles; in 1903, the length was 255,460 miles; in 1908, it was 290,208 miles; and in 1913, 321,995 miles. Of this latter mileage, 57,960 miles were owned by government and 264,034 miles by private companies. Great Britain owned 175,735 miles; United States, 62,515 miles; France, 27,080 miles; Germany, 26,840 miles; Denmark, 10,860 miles. Japan, Holland, Spain and Italy each have less than 6,200 miles.

THE TELEPHONE.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, by invitation, attended a conference at the convention of the National Independent Telephone Association in Chicago, January 15, and explained the measures necessary to carry into effect the details of the recently announced toll line policies of the Bell Company.

Miss E. G. Salt, telephone supervisor at Vancouver, B. C., has now left the service and is studying medicine at Valparaiso, Ind.

Malcolm Williams, an engineer for the New York Telephone Company, New York, shot himself at his home in Babylon, L. I., December 31, 1913.

Texas Independent Telephone System.—Texas Independent Telephone System, Waco, Tex., of which Mr. P. Kerr Higgins is general manager, has prepared a chart of its organization. The chart shows in very comprehensive form the responsibilities of the various officials, from the president down.

Male Telephone Night Operators in Pittsburgh.—The Pittsburgh and Allegheny Telephone Company has substituted seventy-five young men for its young women switchboard operators for night duty. Under the state child-labor law the employment of young women after 9 p. m. is prohibited.

Ann Arbor, Mich., Exchange a Third of a Century Old.—The first telephone exchange in Ann Arbor, Mich., was opened on January 1, 1881, with twenty-five subscribers. The company is now serving over 4,000 subscribers in Ann Arbor, and about half that number in Ypsilanti and suburban territory. Mr. T. J. Keech, who was local manager up to a year ago, was instrumental in organizing the original company.

Reduction of Telephone Rates in New York.—The Public Service Commission, Second District, New York, has approved a compromise offer of the New York Telephone Company to make a horizontal reduction of ten per cent on all contract charges, ending the physical valuation of its property. The reduction will apply to all private branch exchange contracts and to all the various residence and business contracts, including extension telephones taking measured service, charitable rates and municipal discount rates. It will not apply to flat rates nor to toll rates of any description.

Eye Strain on Telephone Operators.—Eye strain, according to a report of the American Medical Association, is to blame for the injury

to the health of telephone switchboard operators, whose average length of service, even under good conditions, does not exceed three years. To complete one call means four flashes of light, and investigations show the operator's eyes are exposed to from 500 to 1,000 flashes of light every hour. Headache, dullness, indigestion, exhaustion, nervous strain, insomnia and colds are some of the symptoms that follow this work.

Telephones on New Quebec Bridge.

Telephones will play an important part in the construction of the new bridge over the St. Lawrence River at Quebec, which, when completed, will be the largest cantilever span bridge in the world. They are used to connect the different parts of the work, while in progress. Eight Western Electric iron box telephone sets are placed on a traveller 200 feet in height, two of these connecting with a sectional unit switchboard equipped for twenty lines on shore. The other six telephones on the traveller are used by men in different parts for operating cranes to place the different bridge members. A flexible cable and a reel allow the traveller to move without disturbing connections.

Convention of Independent Telephone Association of America.

The first annual convention of the Independent Telephone Association of America was held at the Hotel La Salle, Chicago, January 6, 7 and 8, about 200 members being present. Mr. B. G. Hubbell, president of the Federal Telephone and Telegraph Company, Buffalo, N. Y., in an address before the convention, referring to the agreement of the American Telephone and Telegraph Company to deal with the independent telephone companies in the matter of toll line connections, said: "No association has ever demanded a settlement so far-reaching in its results, or that has been so earnestly received by the people at large. This settlement has brought confidence to the general public and has opened up a new future for the telephone business that we never hoped to have."

Officers were elected as follows: President, B. G. Hubbell, Buffalo, N. Y.; Vice-Presidents, E. B. Fisher, Grand Rapids, Mich., and E. D. Schade, Johnstown, Pa.

RADIO TELEGRAPHY.

Mr. William Marconi was a passenger in an aeroplane flight at Hendon, England, on January 4. He states that he intends soon to carry out some wireless experiments with aeroplanes. He denies that he is carrying on wireless telephone experiments across the Atlantic, as has been reported.

Timing the Close of 1913 by Wireless.—Wireless time signals were sent out from the Arlington, Va., station at midnight, December 31, 1913. The radio station was connected by wire with the naval observatory on Georgetown Heights, four miles distant, so that the beats of the observatory clock were transformed into radio waves.

"Jack" Binns Wins Suit.—"Jack" Binns, the well-known wireless operator, has been awarded $12,500 in a suit against a moving-picture concern which exploited a false portrait of Binns, in connection with the "Republic" disaster in 1909.

Mine Signals by Wireless.—A mining engineer at Bachum, Germany, as it is stated, has invented a wireless apparatus for signaling from the inside of a coal mine to a station at the mouth of the pit in case of the existence of dangerous conditions in the mine.

Rescued from Shipwreck by Wireless.—The oil-tank steamer "Oklahoma" was wrecked off Sandy Hook, N. J., during a storm early in January. Many of the crew were lost, but life-boats containing some of the other members were picked up by the United States revenue cutter "Seneca" and other steamers which had been summoned to the scene of the disaster by wireless.

Wireless in South Sea Islands.—The first section of the German wireless telegraph system in the South Seas has been opened to public use on the islands of Yap and Nauru. Telegrams to Nauru are dispatched by cable as far as Yap, and are sent thence by wireless telegraphy. The wireless station at Kamina, in Togo, German West Africa, has received a number of wireless telegrams from the station at Nauen, a distance of 3,348 miles.

Wireless Promoters Sentenced.—James Dunlop Smith and Elmer E. Burlingame, who were convicted on January 1 of having used the mails to defraud, in connection with the sale of stock of the Radio Wireless Telephone Company, were sentenced, on January 7, in the Federal District Court, New York, by Judge Hunt. Smith, who had been president of the Radio Wireless Telephone Company, was sentenced to twenty-one months' imprisonment in Atlanta Penitentiary and to pay a fine of $5,000, and Burlingame to two years and six months in the same institution and to pay a fine of $10,500. The Ellsworth Company, which was also a defendant, was fined $10,500.

New Officers of Institute of Radio Engineers.

The annual meeting of the Institute of Radio Engineers was held at Columbia University, New York, January 7, at which officers were elected as follows: Dr. L. W. Austin, president; Dr. J. S. Stone, vice-president; J. H. Hammond, jr., treasurer; E. J. Simon, secretary, and R. H. Marriott, J. L. Hogan, jr., R. A. Wiegant and G. Hill, members of the board of managers.

Mr. R. H. Marriott read an interesting paper on the subject of range variation in wireless telegraphy. His paper was notable in being based entirely on observations taken in connection with regular commercial operation. The paper was discussed by Dr. Stone, Mr. J. L. Hogan, jr., and Dr. Lee DeForest.

Mr. Floyd Bess, Western Union Telegraph Co., Tucumcari, N. M., writes: "Thank you for renewing my subscription, for I could hardly get along without Telegraph and Telephone Age."

Automatic Telegraphy.

BY PATRICK B. DELANY, SOUTH ORANGE, N. J.

In your issue dated December 16, 1913, somebody ascribes to me an estimate of telegraph systems which is not correct.

I have always held, and still believe, that the polar duplex, manned by four first-class Morse operators, using typewriting machines for receiving, and, in these days, auto dot transmitting keys, constitutes the most efficient and economical printing telegraph.

The term automatic is rather loosely used in these days. Of course, there is no absolutely automatic telegraph. The message has to be composed or set up in some way for transmission, and in all but the electrochemical system of recording, electromagnetic mechanical movements, more or less manually controlled, are employed for transcription at the receiving end. While the ingenuity underlying the various printing systems in use and proposed is of the highest order, and impels unstinted praise, the inventors seem to have altogether lost sight of circuit conditions, and failed to appreciate that intricate combinations of contacts and movements, synchronous and isochronous, dependent upon unvarying and unfailing impulses subject to the numerous disturbing influences now more than ever before prevalent, could not be made the basis of practical telegraphy.

In all printing systems speed depends on sensitiveness and certitude of apparatus, controlled by limited power, while power often precludes sensitiveness, and is, at best, restricted on account of its inductive effects. The higher the speed the less the margin of variation in quality of the impulses. Depletion or augmentation of a single signal impulse by induction from another circuit may throw the printing system out of operation.

The polar duplex is entirely free from these critical situations. Fundamentally, it is more sensitive and more reliable than ordinary simplex Morse. With an auto-dot key an operator may easily average thirty words per minute all day long. There need be no "breaking," and the receiver using a typewriting machine is not hurried at all. His machine is endowed with human intelligence. It can punctuate, rub out and correct without change of line currents in polarity or potential, and it never gets out of order, and is at all times amenable to the receiving operator's touch. The sound-reading operator interprets signals, good and bad, heavy and light, and is able to allow even for their absence to an extent which maintains continuous operation over circuits impossible for any other electromagnetic system.

Of course, when it comes to electrochemical telegraphy, things are different. It is the nearest approach to automatic operation possible, up to the present time.

The message is punched in a tape, as in fast printing and the Wheatstone systems, by a typewriter keyboard, at typewriter speed. Recording is done without intervention of electromagnets or mechanical movements of any kind. The signals, light, heavy, or impaired in any way, are all recorded at speeds unhampered by any movement whatever, and only limited by the circuit itself.

Operation is as constant as a stream. The system can be installed in a few minutes, needs no adjustment, and will adapt itself to the most radical weather change without impairment of speed; no impulses are clipped or dropped. Resistance of the circuit may be doubled during transmission without causing a signal to fail. It is, least of all systems, affected by induction currents, and is especially adapted to underground circuits, or lines having high electrostatic capacity. It will afford the only practical means for economically carrying the great volume of traffic which the demand for enlargement of electrical correspondence is already bringing about in the night and day letter service, and only by this method would postal telegraphy be possible to anything like the requirements which inauguration of this service would impose.

Book on Telephone Trouble.

The recently issued book, "A Manual of Telephone Trouble," by W. A. Gibson, is the first and only work that has attempted to place in the hands of telephone and telegraph men a clear and simple system, treating on the clearing of telephone troubles that are to be found in Western Electric and Bell Telephone apparatus.

The size of the book, which is bound in black flexible leather, is four and a half inches by seven and a half inches. The binder is of loose-leaf design, so arranged that new leaves can be added at times when the advancement of the telephone art may require it.

Every case of trouble is dealt with in clear, simple English. After describing the trouble and its effect on the equipment, the method of clearing it is outlined in a manner that cannot be misunderstood, and all technical words and phrases have been left out. This makes the work a valuable asset to the man who has not been fortunate enough to acquire a high school or college education. To the trained man it will serve as a daily reminder.

While the book contains certain circuit diagrams, a series of forty-one standard Western Electric and Bell Telephone circuit diagrams are sold separately to purchasers of a book. These diagrams will be mailed, post paid, on receipt of twenty-five cents to cover cost of printing, handling and mailing. The book, as sold, contains 225 pages.

The price of the complete book is $3.50, and of extra diagrams, twenty-five cents. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MR. E. D. EDWARDS, formerly manager of the Western Union Telegraph Company at Reno, Nev., now manager of the Lander Electric Light and Power Company, Lander, Wyo., in renewing subscription for two years, writes: "The AGE is worth more to a man who has retired from the telegraph because it brings fond recollections of the pleasant days spent in the service and keeps him in communication with his many friends, with whom he is too busy to keep in touch with in any other manner."

Regulation from the Telephone Viewpoint.*

MR. THEO. N. VAIL, PRESIDENT AMERICAN TELEPHONE AND TELEGRAPH COMPANY.

While regulation by commission is now a recognized policy of our government, it is still important to bear in mind that, in order to be permanently successful, regulation must be effective. The legal machinery for effective regulation has been created. The controllers of the machinery are the men chosen to execute the laws. If wise men are not appointed or elected the laws will not be administered properly. If the commissioners have not sufficient ability or breadth of mind to understand clearly the problems before them, they will fail to satisfy the various elements composing the public. If their work does not attract and hold public respect, it cannot be effective.

Because a wise form of control of operations and rates will protect properties as well as the consuming public, it is the duty of managers of public utility corporations to try to make regulation effective. If, however, regulation is to be effective, it must be fair. It should be so fair that the justice of it will be recognized by both the corporation and the consuming public. Men of ability and strength of character will be likely to want to follow this course. In order to do so, they will have to resist public clamor at times and undue demands from corporations at other times.

Commissions can never become effective unless the matters over which they are supposed to have jurisdiction are left to them and not taken out of their hands by self-constituted public committees, or even by legislative committees. The object of a commission is to obtain deliberate action and gather facts and conditions that cannot be obtained by a temporary committee, and also to establish a body of permanent record and to establish precedent.

There is still room for education on the part of the public and corporation managers as to the best disposition of the problems arising from their relations. Both, however, realize now that a form of regulation is the most promising method of developing the relations that should govern their transactions. Neither one should expect more than he ought to have. Some of the old bargains were closed after long negotiation in which each side showed plainly its belief that if it wanted to get one foot of advantage it was necessary to ask for a mile. Those times have passed. Regulation is not a synonym for trading. It should be on the highest plane. It should develop standards of equity so well recognized that the country would manifestly progress under them.

A corporation fairly entitled to a return of 10 per cent on its investment in a certain locality should not have to go into court and ask for 15 per cent in order to accept, apparently as a compromise, the 10 per cent to which it is reasonably entitled. If the public wants a rate of, say, $1.00 for gas now costing $1.25 and it is fairly entitled to some reduction, it ought not to have to ask a rate of 75 cents and accept the rate to which it justly should have as an apparently unsatisfactory compromise. The more equitable the rules are the more contented the litigants will be likely to be. If there is a fair question concerning the adequacy of rates or their excessiveness, it is to the ultimate interest of all parties to settle it, if possible, without rancor. Certainly, the issue involved in such a case is plain. The company needs a revenue large enough to meet all of its expenses, including depreciation, its taxes and charges, and a fair return on the investment. Unless, however, it has a margin above these necessary outlays sufficient to give evidence to bankers of a reasonable certainty of a continuation of enough revenue to meet all of them without default, it will have difficulty in raising capital for extensions.

The ways in which the public and the companies can promote the effectiveness of public regulation vary in different localities. Every effort should be made on both sides to secure commissioners of ability and fairness who will administer the laws that ought to be enforced.

Every effort that is made to put men of less satisfactory kind on commissions will tend to nullify the spirit of regulation and will harm both the public and the companies. If the commissioners are able and are earnestly trying to do their best to solve fairly the problems before them, the public and the companies should uphold their hands.

While the complexity of the telephone industry makes it a difficult subject of regulation, yet it has advocated and seeks full public control. This is done with a confidence in the ultimate fairness of the public and a belief that regulation will help to perpetuate the co-operative relations that should prevail between the public utilities and their customers.

* From *Electrical World.*

MAPPING THE EARTH'S MAGNETISM.—The nonmagnetic yacht "Carnegie" arrived in Brooklyn, N. Y., December 19, 1913, after a voyage of over three years in the work of making a magnetic survey of the globe for the Carnegie Institution.

COMBINATION OF HARVARD AND TECHNOLOGY EDUCATIONAL FORCES.—The engineering departments of Harvard University and the Massachusetts Institute of Technology, Boston, are to be combined. Harvard is to discontinue its schools of applied science in the departments of mechanical, electrical, civil, sanitary and mining engineering and metallurgy. Dr. A. E. Kennelly, an old-time telegrapher, is professor of electrical engineering at Harvard, and has held that chair ever since the course was instituted.

BOUND VOLUMES OF TELEGRAPH AND TELEPHONE AGE.—Bound volumes of TELEGRAPH AND TELEPHONE AGE for 1913 are now ready for sale. This volume is full of interesting and instructive matter, and will be found valuable for reference and study. It has a comprehensive index, and covers the events of the year in a thorough manner. The price is $3.50 per volume, sent by express, charges collect. Address TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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NEW YORK, JANUARY 16, 1914.

Universal Telegraph Alphabet.

The universal telegraph alphabet, commonly called the continental code, is in use in all countries except the United States and Canada, and, in the case of radio-telegraphy, it is employed exclusively. There is no good reason why the telegraph companies in the United States and Canada should not substitute the universal for the American alphabet, and thus remove the last remaining barrier to its universal application. It is probably the old stubborn fact that "nothing is so unpopular as an innovation" that stands in the way.

The time has arrived, it seems to us, for the companies to bring about the change. There should be no difference between wire and wireless codes. Operators could then change from land to sea service, or vice versa, with no trouble to either. As the matter stands now, a wireless operator is regarded, in one sense, as a foreigner by the American Morse operator—as though he spoke a foreign language. The two interests are so closely related, however, that an operator should be able to fill positions in either service.

In order to bring about the exclusive use of the universal telegraph alphabet, the American operators should not let themselves be dominated by false pride, but should welcome the change, since it would open the world to them. They are proverbial travellers, but only in their own country. If they were universal Morse alphabet operators, they could go to any country in the world, and, under the proper requirements, obtain employment.

All reports indicate difficulty of getting wireless operators for sea service. The demand is increasing so rapidly that it seems quite impossible to educate operators fast enough to supply this demand. If American Morse operators were familiar with the universal alphabet, a large supply of ship operators could be recruited from their ranks.

There would be practically no difficulty or risk involved in making the change from the American Morse to the universal Morse alphabet, and we are of the opinion that the American and Canadian telegraph companies would offer no objection if their best interests demanded such a course. Indeed, the companies would likely hail the change with satisfaction, since the discontinuance of the use of the spaced letters would tend to reduce the number of errors.

In 1907, letters from prominent telegraph officials were printed in the columns of this journal on the subject of eliminating the spaced letters from the American Morse alphabet. The idea met with general favor, only one man objecting to it, because he thought it would be sacrilegious to separate the Morse alphabet from the Morse telegraph. It was a matter of pure sentiment with him. The matter was dropped, however, probably through lack of authority to enforce adoption.

Should the government in the United States and in Canada ever obtain control of the telegraphs, one of the first things that would be required would be the adoption of the universal alphabet, in order that it could become a member of the International Telegraph Conference. One of the first requirements of the conference is that all signatories thereto shall use the universal alphabet.

Apart from this question, much can be said in favor of the substitution of the universal for the American Morse, and little against it, and it seems to us that the time is ripe to take up the subject in earnest.

Wireless in Railway Operation.

A most important and significant step in the application of radio-telegraphy to railroad operation is the decision of the Lackawanna Railroad to equip the entire length of its road for radio service.

It will be remembered that this Company, in November, 1913, began tests with wireless equipment on a portion of the line and on one of its fast express trains. The results of the experiments were reported in these columns at various times.

The system has evidently given such favorable results as to satisfy the officials of the company that radio-telegraphy as a means of communication between fixed stations and moving trains is entirely practicable.

The problem of keeping in touch, at any and all times, with trains out on the line, is a most interesting one. It is easily conceivable that such a resource would mean the safety of human lives, property and time—all of the deepest concern to a railway company.

Two advantages of the greatest importance derivable from the use of such a system are: First, that the railroad company is not likely to suffer loss of means of electric communication by reason of storms, floods, fires, etc., and, second, that its

trains, wherever they may be, are within the immediate reach of headquarters.

The Lackawanna Railroad is to be congratulated in showing such a progressive spirit, and taking the lead in so important a matter.

Its action, in this instance, may be the forerunner of a more extensive use of wireless in railway operation, inasmuch as all the large railways of the country are constantly watching developments along lines of invention that promise safety and economy in the operation of their systems.

Early Speculations on the Telegraph.

In the early days of the telegraph, some interesting views were entertained regarding the then new marvelous invention. The following extract from the April, 1853, number of *The National Telegraph Review and Operators' Companion* will be read with interest and some amusement by telegraphers of the present day, who know more about the telegraph than did the early investigators. The latter, evidently, were enthusiastic over the idea that streams of water could be employed as part of a telegraph circuit. Such use of the Atlantic Ocean was even suggested. The extract is as follows:

"The electric principle seems to be only in the beginning of its developments. It is found that wires are not the only conductors of electric intelligence. They may be dispensed with, for hundreds of miles, while the elements of earth and water supply their place, and carry the marvelous matter! Electricity is communicated from one city to another on a wire, but it will come back itself. It is found necessary to insure its going the required distance, lest anything should thwart it on its outward way. But once at the place proposed, it seems to return like the carrier pigeon. In this manner: The wire from the positive pole stretches round the magnetic apparatus at the end of the long way, and is there bent back, bent home to the zinc in the distant tub. But instead of being carried home on poles, it is broken short, and put, there, into the ground, pointing to its destination. A short piece of wire is carried from the home battery a short way into the ground, whereupon the moist earth fills the gap and completes the circuit. Instead of wandering out of the way in the dark, the lightning darts straight to its mark. Animated nature cannot furnish such a curious piece of instinct as that!

"Water is found to be a conductor as well as earth. A wire is carried from a distant battery to the bank of a river, broken off, and the end sunk in the water pointing to the further bank. There, another end of the wire is set in the stream, pointing to the first, and the rest of it drawn away to the distant place at which it bends back. Bending back, it is led to the stream, and laid in it, with its point to the opposite bank, where another wire from the battery is sunk and pointed to meet the returning wire. Here are two large water-gaps left in the circuit. But the electricity flows all around.

"But swifter is the sure flash of that amazing chemistry. The rolling stream bridges the way for that incomprehensible lightning-traveller! From this striking fact people have concluded that seas may become conductors, and that the Atlantic Ocean may be made, like a stupendous messenger, to carry to and fro the intelligence of its bounding continents! It has been demonstrated, however, that the distance from the battery must be greater than the water-space to be cleared. Still, there is no knowing how soon this difficulty in the way of ocean telegraphing may be obviated. It has been suggested that the wire from the battery may be so coiled as to be long enough to compel the current through the ocean.

"In the mean time the nations seem bent on having ocean telegraphs, one way or the other. They are laying a set of wires across the Straits of Dover, to bring Paris and London within speaking distance, and ignore, so to speak, that 'perilous narrow ocean' which has witnessed so many hostile armaments of the two nations in days gone by. Another is intended to run underneath St. George's Channel to Ireland. Speculators of grander views have thought of laying down wires from Galway to Halifax. Mr. Stuart, of New York, set forth the details of the business some time ago. There is nothing of impossibility in his calculations. Besides, we are beginning to think that this word 'impossible' not to be classed among the vocables of the American language. Another great lightning project—no less than a line of telegraph wires (on a railway) from the English Channel to India and the Golden Chersonese—has been talked of in England. The length of the course would be 3,800 miles—1,000 miles more than the space between Liverpool and New York. The route proposed is through Vienna, Belgrade, the Balkan range, the Hellespont, eastward between the Euphrates and the Tigris, by the ruins of Nineveh and Persepolis, and so on, through Beloochistan and over the Indus, into the city of Meanee."

TELEGRAPH ERROR RULING.—The Court of Appeals, at Albany, N. Y., on December 30, 1913, handed down an opinion in the case of a firm of cotton brokers in New York against the Postal Telegraph-Cable Company for an error in a message. The plaintiff claimed damages amounting to $27,565, as a result of the error. In reversing the verdict of the lower court in favor of the plaintiff, the Court of Appeals explained that proof of gross negligence would be necessary to warrant giving the plaintiff a verdict. The opinion of the court was unanimous.

THE COST OF GETTING-RICH-QUICKLY.—According to the annual report of Mr. W. H. Lamar, assistant attorney general for the postoffice department, Washington, D. C., the sum of $129,000,000 was lost in two years by the unsuspecting public through fraudulent use of the mails.

OPERATOR ROBBED.—The belief that telegraph operators are usually not considered objects of prey by thieves is not borne out by the experience of a telegrapher on the Western Maryland Railroad. Thieves entered his room during his absence, and stole a suit of clothes, a watch, two guns and a sum of money.

Course of Instruction in the Elements of Technical Telegraphy—LV.

(*Continued from page 14, January 1, 1914.*)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

The Quadruplex (*Continued*).

It has been stated that a point midway in the stroke of the pole-changer lever, all the contact points touch each other, and the battery is for the moment short circuited.

It follows that between each reversal of the home pole-changer there is a moment when there is "no magnetism" in the polar and neutral relays at the distant staion. The polar relay simply retains its last position at this moment of no magnetism, but if the neutral relay armature be on its front stop,

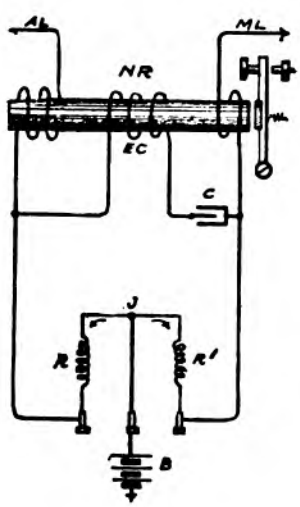


FIG. 75—DIAGRAM OF SMITH CONDENSER ARRANGEMENT.

owing to the long end of the distant battery being in circuit, there will be a tendency for the relay to open at each reversal of the distant pole-changer. This moment of no magnetism, although too short, ordinarily, to allow the neutral relay armature to reach its back stop, is yet sufficient to cause kicks on the N R sounder if the local circuit connections are made in the usual way, but by using a repeating sounder, R S, which closes the local circuit of the receiving sounder, S, through its back stop, these false breaks are avoided; since the local circuit of the receiving sounder remains intact until the N R armature makes actual connection with its back stop.

While it is true that the kick due to the withdrawal of the neutral relay armature from its front

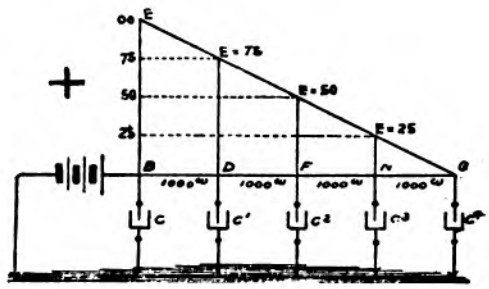


FIG. 76—CONDITIONS UNDER WHICH CONDENSERS RECEIVE THEIR CHARGES.

stop is, in many instances, eliminated by the use of a repeating sounder, yet the efficiency of the quadruplex would be increased if the moment of no magnetism in the relay could be further reduced.

Fig. 75 shows a device known as the "Smith Condenser Arrangement," used to a limited extent on quadruplex circuits to effect the shortening of the moment of no magnetism.

The neutral relay is provided with a third coil, E C, which is in the circuit of a condenser, C, whose terminals are in connection with the main (M L) and artificial (A L) lines. R and R^1 are resistance coils of about 600 ohms each. B is the battery—the pole-changer, transmitter, and polar relay are omitted in the figure—the current from which divides at J, one portion proceeding to line via the line coils of the neutral and polar relays, the other going to ground via the artificial line coils and the rheostat.

Before attempting to explain the action of the condenser in this arrangement, it may be well to reconsider the conditions under which a condenser receives its charge. It has been stated the charge of a condenser is proportional to the difference of potential between its two series of plates, or its outer and inner coatings, and is equal to the condenser capacity multiplied by the pressure. Potential, it will be remembered, denotes the difference between the potential, or electrical condition, of a body, or point, and the potential of the earth, which is zero. Since the potential along a telegraph line falls in proportion to the resistance overcome, it is evident that the charge accumulated in a condenser of any given capacity will vary according to the position it may occupy in the circuit. Let the horizontal line BO, in Fig. 76, represent, by its length, the resistance of such a wire, and let the electrical pressure applied to it at B be represented by the perpendicular, B E. Let also a series of

condensers, C, C^1, C^2, C^3, C^4, of equal capacity be respectively connected with the wire at points 1000 ohms apart, as illustarted in the diagram. Then, since the line, E O, represents the fall of potential, the charge communicated to the condenser nearest the battery will be obviously greater than that imparted to the others more remote.

If the capacity of each condenser be taken as 1 micro-farad, and at the point, B, where the condenser, C, is attached to the line the potential equals 100 volts, then that condenser will receive a charge equal to the product of its capacity into the potential at that point, or, 1 M F $\times$ 100 volts = 100 micro-coulombs of electricity.

As the outer coating of each condenser in the figure is represented as being earth-connected, or at the zero point of potential, the condensers at the successive points along the conducting wire will, each capacity being 1 micro-farad, be charged to an amount represented by the potential at those points. At B and D, for instance, this difference will be 100 and 75, respectively; at F, midway in the circuit resistance, the voltage will have dropped through half its value, and accordingly the potential difference between the opposing plates of the condenser at that point will be but 50 volts.

At the point O, where the line is supposed to be grounded, the potential of the wire will have fallen to zero, and both series of plates of condenser C^4 will thus be at the same potential—a condition that does not admit of that condenser being charged at all.

It will be apparent from this that when the functions of a condenser are to be called into play at the opposite end of the line to that in which the charging battery is placed, some provision must be made for establishing the requisite amount of potential difference between the plates. The object of the resistance coils, R and R^1 (Fig. 75) is to bring about this condition by lengthening out the main and artificial lines in a manner calculated to increase the potential difference between the terminals of the condenser. The insertion of the resistance coils in the circuit practically changes the position of C^4, in Fig. 76, to a point nearer the battery where the potential is not at zero.

(To be Continued.)

John Bellamy Taylor.

Mr. John Bellamy Taylor, after fourteen years' connection with the General Electric Company, as announced in our issue dated January 1, resigned his position as engineer of the foreign department of that company, in order to take up work independently as a consulting engineer.

Mr. Taylor was born in Brookline, Mass., in 1875, and was graduated from the Massachusetts Institute of Technology in the electrical engineering course, class of 1897.

Following graduation, he was with the New England Telephone and Telegraph Company, on testing and locating troubles, as a "noisy line doctor," as manager of the Burlington, Vt., exchange, and as assistant to the division superintendent at Lowell, Mass.

He joined the General Electric Company's forces in Boston, in 1899, and remained there until 1902, when he was transferred to the railway engineering department at Schenectady, N. Y. He was appointed one of the company's consulting engineers in 1910.

At the time the single railways began to attract public attention, Mr. Taylor's previous telephone experience led him to foresee many of the serious difficulties to be encountered in the telegraph and telephone problems presented, and devoted himself actively to tests in the laboratory and in the field to points bearing on the signal and power relations. He presented a paper to the American Institute of Electrical Engineers, in 1909, on "Telephone and Telegraph Systems as Affected by Alternating-Current Lines," and his services were sought by the Western Union Telegraph Company as an expert

JOHN BELLAMY TAYLOR.

adviser in connection with the electrification of the New York, New Haven and Hartford Railroad.

He was one of the first to demonstrate the possibilities of the oscillograph in studying telephone and telegraph problems and for sound analysis. With other engineers of the General Electric Company, he applied the oscillograph to a study of some of the electrical and acoustical problems of the "Telharmonium."

In 1905, Mr. Taylor was awarded a prize of 1,000 francs by the *Association des Industriels de France Contre les Accidents du Travail* "pour son indicateur d'état de chargé d'un conducteur électrique."

He has taken an active interest in the work of the American Institute of Electrical Engineers and other scientific and engineering societies, and is an honorary member of the Association of Railway Telegraph Superintendents.

Mr. Taylor is keeping his residence in Schenectady, where he has his laboratory, and expects to divide his time between there and New York City.

COLONEL A. B. CHANDLER, formerly president of the Postal Telegraph-Cable Company, New York, writes: "I thank you for renewing my subscription for another year for your excellent publication, which I read with great interest and for which I enclose herewith my check."

Measurement of the Resistance of Grounds.

(*Concluded from page 31, January 1.*)

When switch "D" is in its "g" position, the meter indicates only the ground current; when in its "b" position, the meter indicates both the battery and ground currents.

In case there are times when the ground current becomes zero, readings "A" and "A_1" should be taken at such periods. If the ground current always flows in one direction or remains fairly constant for a short time, the readings should be taken when the meter indicates a steady ground current of some definite average value.

The resistances may be calculated as hereinbefore described and as illustrated in the following example:

Example. Assume that the various meter readings observed in making measurements between a main and two auxiliary grounds are as follows:

	R_1	R_2	R_3
A'	119 mil-amperes	102 mil-amperes	72 mil-amperes
A	84 "	66 "	48 "
a	4 "	4 "	2 "
r	60 ohms	60 ohms	100 ohms

The values of R_1, R_2 and R_3 as calculated by equation (10) are 26.3, 34.8 and 52.2, respectively.

The resistances of the individual grounds as calculated from equations (5), (6) and (7) are

$G = \frac{1}{2}(26.3 + 34.8 - 52.2) = 4.5$ ohms.
$G_1 = \frac{1}{2}(26.3 + 52.2 - 34.8) = 21.8$ ohms.
$G_2 = \frac{1}{2}(34.8 + 52.2 - 26.3) = 30.4$ ohms.

VOLTMETER METHOD.

Theory. In the theoretical diagram shown in Fig. 3 the potential drops across the resistance "r," and the grounds are directly proportional to their resistances. Then

$$\frac{V}{V' - V} = \frac{r}{G + G_1}, \text{ or } G + G_1 = \frac{V' - V}{V} r = R_1 \quad (11)$$

in which

V' = Total potential drop across resistance "r" and the grounds.
V = Potential drop across "r."
r = Known resistance.

When there is a difference of potential between the grounds, equation (11) becomes

$$\frac{(V' - V) \pm e}{V} r = R_1 \quad (12)$$

in which "e" is the earth potential observed with the voltmeter key in its normal position. In this equation "e" is negative (—) when the earth potential opposes the battery, and positive (+) when it aids the battery.

Making Measurements. In the circuit shown in Fig. 4, switch "B" is provided for the purpose of reversing the ground connections, so that the earth potential gives a reading on the voltmeter in the same direction as the battery. In this case the working equation becomes

$$\frac{(V' - V) - e}{V} r = R_1 \quad (13)$$

When the voltmeter key is in its normal position, the meter indicates the difference of potential between the grounds; when in its V'— position, it indicates the total potential drop across "r" and the grounds; and when in its V— position, it indicates the potential drop across "r" only.

In taking meter readings with the voltmeter method it is necessary to observe the same precautions in allowing for fluctuations of ground potentials as mentioned in connection with the ammeter method.

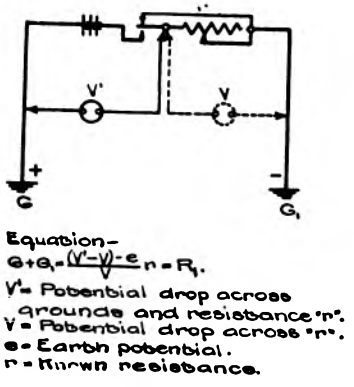


FIG. 3.

The resistances of the grounds may be calculated as shown in the following example:

Example. Assume that the meter readings taken of the various combinations of grounds are as follows:

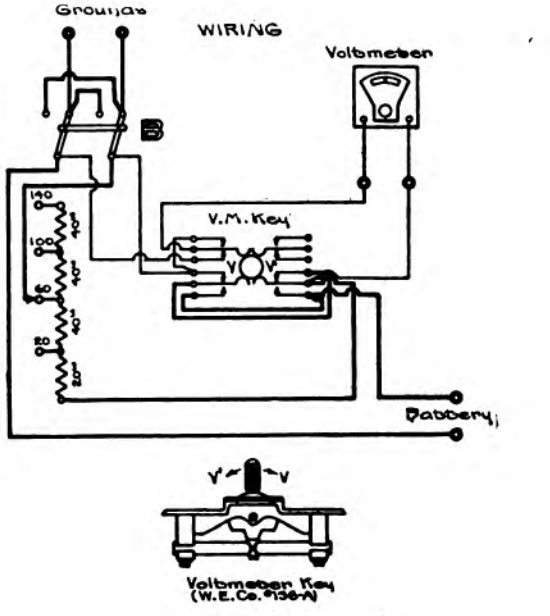


FIG. 4.

	R_1	R_2	R_3
V'	11.4 volts	11.5 volts	12. volts
V	7.75 "	7.15 "	7.8 "
e	.2 "	.2 "	.1 "
r	60 ohms	60 ohms	100 ohms

Solving for R_1, R_2 and R_3 by substituting in equation (13), their values are found to be 26.7, 34.8 and 52.6, respectively.

The resistances of the individual grounds can be calculated as described under the ammeter method.

BRIDGE METHOD.

Theory. This method involves the use of alternating current in connection with a Wheatstone

bridge. The arrangement of the circuit is shown in Fig. 5.

When the resistances in the bridge arms "a" and "b" are equal, the resistance inserted in the variable arm "r" is equal to the series resistance of the two grounds connected to the bridge. When the arms are unequal the resistance of the grounds may be calculated with the following equation:

$$R_1 = G + G_1 = a - r \quad (14)$$
$$b$$

Making Measurements. The galvanometer associated with the bridge should be disconnected and a telephone receiver substituted for it. A source of

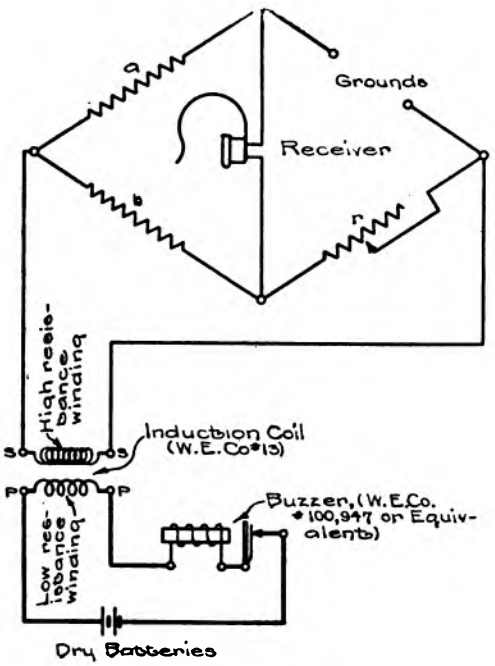


FIG. 5.

alternating current, such as is produced by a buzzer in connection with an induction coil, should be used for supplying the current.

The series resistance of the grounds connected to the bridge can be determined by changing the resistance of the variable arm of the bridge until a balance is reached at which the volume of sound produced in the receiver is a minimum.

In cases where earth currents or other disturbances make it difficult to determine the exact point of silence, note should be made of the points where the buzzer tone most nearly vanishes, both above and below the probable balancing point, and the average of these two values should be taken as the exact point of balance.

PRECAUTIONS.

A few of the most frequent causes of inaccuracies in measuring ground resistances, and some suggestions as to how they may be avoided, are given as follows:

Poor Connections. In all methods of measuring ground resistances it is important that all connections and switch points make good electrical contact.

Switching Mil-ammeter. When using the ammeter method arranged for switching one meter from one branch of the circuit to another, it is important that the change in resistance caused thereby be small. In case the resistance of the meter is comparatively high, readings A^1 and A should be taken with switch "B" in both positions. The equation in this case is

$$\frac{(A_1^1 - A_1) + (A_2^1 - A_2)}{A_1 + A_2} r = R \quad (15)$$

in which

A_1^1 = Total current, with ground current flowing in the same direction as the battery current.

A_1 = Current to ground with the ground current flowing in the same direction as the battery current.

A_2^1 = Total current with the ground current tending to flow in an opposite direction from the battery current.

A_2 = Current to ground with the ground current tending to flow in an opposite direction from the battery current.

Battery Supply. The battery used in the ammeter and voltmeter methods should have a capacity large enough to maintain a constant potential during the test.

To prevent a possible excessive current flow, which might injure the mil-ammeter associated with the circuit, it is advisable to start the test with a single cell of battery, and then increase the number of cells until the desired deflection is reached.

Polarization. When a direct current flows through a ground, polarization is usually set up and thereby increases the effective resistance of the ground. To avoid this, the battery current should be permitted to flow for as short a period as possible immediately before each reading is taken.

When considerable current normally flows to a ground, as in the case of a battery ground, the resistance of the ground connection usually varies considerably with the amount of current flowing. In such cases the measurements should be made, if possible, when there is no current flow to the ground other than that used for testing.

Fluctuating Earth Currents. When earth currents are very fluctuating it is difficult to obtain satisfactory ground measurements. In such cases it is advisable to use all possible precautions to obtain simultaneous readings. When using the ammeter and voltmeter method under such conditions, it is advisable to use two meters rather than to switch one meter from one position to another.

Variable Resistance of Temporary Grounds. As the resistance of a "temporary" ground is often high, the variation in its resistance may be considerable. In making measurements on such grounds, therefore, each set of readings should be taken in as short a time as possible.

Known Resistance. In order to reduce the errors of observation in making measurements with the ammeter or voltmeter method, it is desirable that the "A^1" or "V^1" readings be about twice as large as "A" or "V" readings, respectively. These conditions will be obtained when the known resistance "r" is approximately equal to the resistance of the two grounds in series. For this reason the proper value of "r" should generally be determined by preliminary tests.

Specifications for Installation and Operation of Western Union Loop Switchboards.

(Concluded from page 742, December 16, 1913)

"N"—*Duplex Set and Office Loop.*—This circuit links together the duplex or half-quadruplex set and the office loop with which it is normally operated. As shown in Fig. 3, no switching devices are provided on the office loop sets, but instead, the grounded resistances are connected to the circuit through the normal contacts of jack No. 3 of the group at the loop switchboard. To add an outside loop to this combination, a regular patching cord would be run from the desired loop jack to jack No. 3, where the insertion of the plug would open off the grounded resistances and extend the circuit to the branch or subscriber's office. If it were desired to connect the outside loop directly to the duplex set, the plug of the patching cord would be placed in jack No. 1 instead of jack No. 3, thus throwing out of circuit the office loop. This discarded office loop is still available for connection to some other duplex set by running a regular patching cord from jack No. 2 of the first group to jack No. 1 of the group containing the other duplex sets. An outside loop can also be added to this combination by connecting it to jack No. 3 of the first group with a regular patching cord.

"NA"—Duplex Set and Regularly Assigned Loop. For cases where an outside loop is normally operated in connection with some particular duplex or half-quadruplex set, this circuit shall be used. Whenever a change becomes necessary, the loop may be connected to any other duplex set by running a regular patching cord from jack No. 2 of this group to jack No. 1 of a similar group or of a group as per Circuit N. As shown in Fig 3, each loop used for duplex service is provided with two "equalizing" resistance lamps, one in the sending and one in the receiving leg. The purpose of these lamps is to make the resistance of all legs approximately uniform (about 90 ohms for 26 volt local battery or 350 ohms for 52 volt local battery) in order that all sounders may operate with equal force.

"O"—Duplex Loop Without Regular Assignment. This circuit is used for branch office and subscribers' loops which are not regularly assigned to a particular set or circuit, the loops being temporarily connected to the most available circuits which will accommodate the variable volume and direction of their traffic. As each of these loops terminates in a jack, connection to any desired duplex set, either directly or through an office loop, may be made by a patching cord as described under Circuit "N." If the loop jack is located more than three feet away from the jack of the duplex set, the loop shall be transferred by means of a trunk (Circuits H or J, Figs. 9 and 10, June 16), one patching cord connecting the trunk to the loop and another patching cord connecting the trunk to the duplex set. Equalizing resistance lamps are provided in each loop as described in the preceding paragraph (Circuit "NA," Fig. 3).

"P"—Battery Group. For the purpose of combining single Morse loops, repeaters, etc., these groups of jacks are provided. As indicated in Fig. 2, one terminal of the group is connected to a battery tap of any required potential and the other terminal to ground. To avoid waste of current, one jack in the group (jack No. 1) is normally open; one of the patching cords used to connect the loops or sets into the group must be plugged into this jack to close the circuit. For the purpose of avoiding excessive current flow if the group is accidentally closed through insufficient resistance, resistance lamps of not less than 3 ohms per volt are specified for each battery tap connected to these circuits. Most of these groups, however, will give best results with lamps having resistances amounting to 4 to 12 ohms per volt.

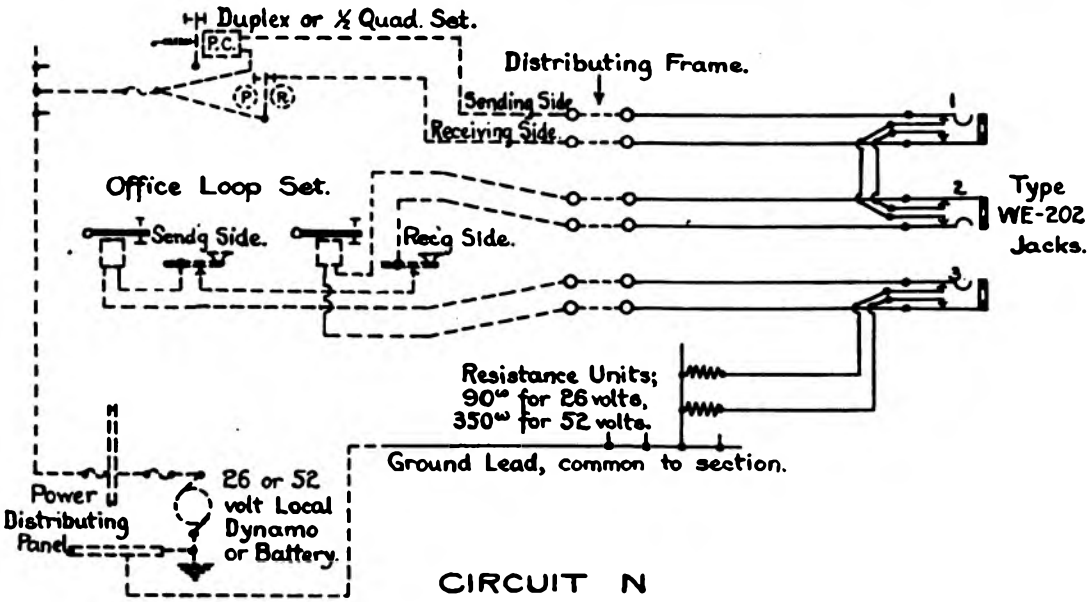
"Q"—90-Ohm or 350-Ohm Ground Jack. Very few of these circuits are required, as their principal function is to temporarily replace the grounded resistances of an office loop when any failure occurs either in the normal contacts of the jacks or in the resistances and wiring. In such cases a patching cord should be run from the ground jack to jack No. 3 of the duplex-office loop, Circuit N (Fig. 3). These ground jacks may also be used in testing.

"R"—Duplex or Quadruplex Repeater. As shown in Fig. 2, this circuit consists of two jacks on which are terminated the two duplex or half quadruplex sets constituting the repeater. The normal contacts of these jacks are connected together in reversed order, *i. e.*, the normal contact of the spring of each jack is connected to the normal contact of the sleeve of the other jack. This circuit will be used for all regular multiplex repeaters except those arranged for direct-point repeating; any other pair of sets may be combined to form a repeater, however, by the use of a reversed patching cord.

"S"—Duplex Leg Testing Set. This set enables the loop switchboard attendant to make all the ordinary tests and observations of service on duplex or half quadruplex sets and the loops associated with them. (Fig. 4.)

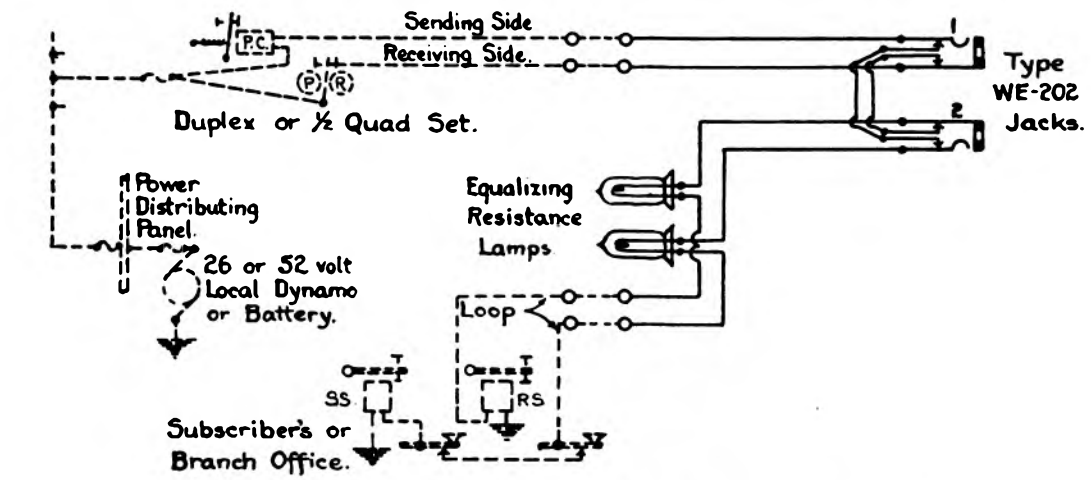
To test a loop, the levers of the 6-point switch are thrown to the left, and the testing plug inserted in the jack of the loop; the central jack of the testing set is left unoccupied. As will be seen by tracing out the circuit a sounder and key of the testing set is now included in series between the grounded local battery and each of the sending and receiving legs under test. The attendant can then see at a glance whether either leg is open; he can call the branch or subscriber's office on either leg and simultaneously watch the other for a response, or, if it is open, see when it closes.

If the loop is a "combination" one, and both legs show open, he can determine whether or not this is due to its being connected for single Morse working at the subscriber's office, by throwing one of the levers of the 6-point switch to the right, the other remaining to the left; for although the current flowing from the grounded local battery through the 150-ohm relay at the subscriber's office and back to the ground at the 6-point switch will not operate the sounders of the testing set, it will be sufficient



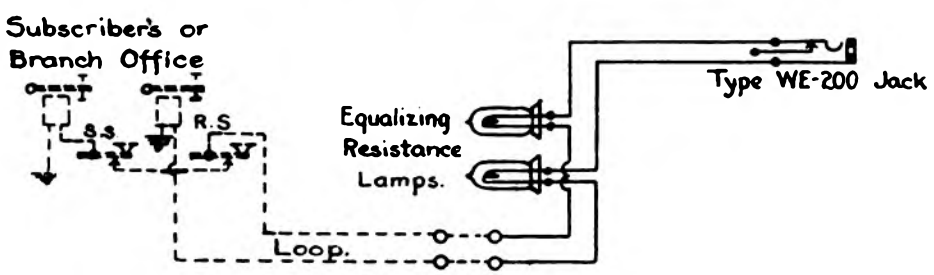
CIRCUIT N

Duplex Set and Office Loop.



CIRCUIT NA

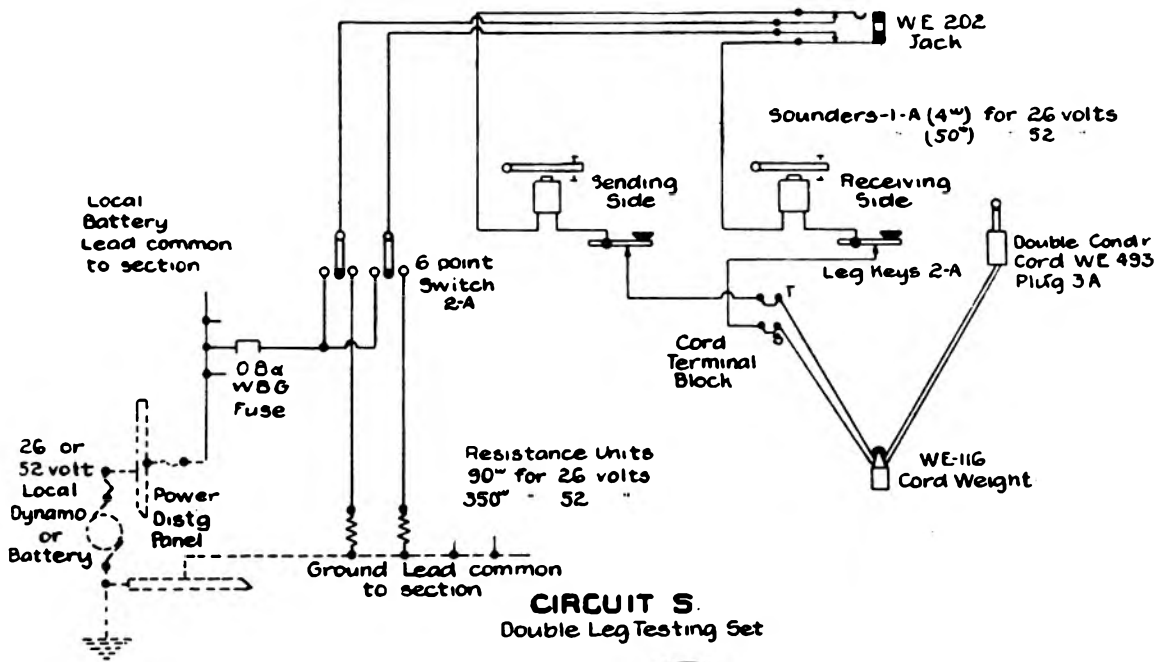
Duplex Set and Regularly Assigned Loop.



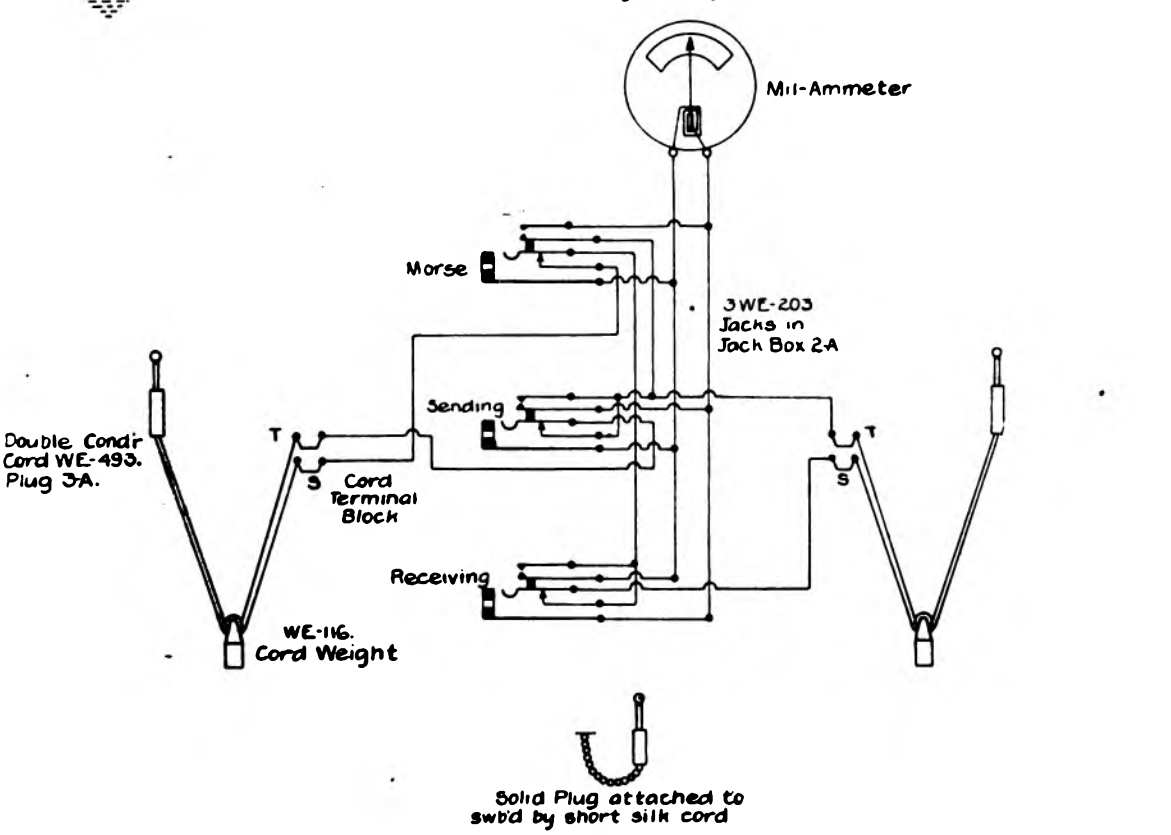
CIRCUIT O

Duplex Loop without Regular Assignment.

FIG. 3—SWITCHBOARD CIRCUITS N AND O.



CIRCUIT S.
Double Leg Testing Set



Note To connect Mil-Ammeter to Right Hand Plug only, put Solid Plug in Morse Jack
in Tip (Sending) Circuit, - - - - Sending
Sleeve (Receiving) - - - - - Receiving

CIRCUIT T
Loop Switchboard Mil-Ammeter

FIG. 4—SWITCHBOARD CIRCUITS S AND T.

to hold the sounder levers if the attendant first presses them down by hand. Under these conditions, the attendant may desire to communicate with the subscriber's office. To do this, the Morse testing set, Circuit L, and a battery group, Circuit P, should be used. A patching cord should be run from jack No. 1 of the battery group to the jack of the loop under test, and in another jack of the battery group should be inserted the double conductor plug of the Morse testing set.

To test a duplex or half-quadruplex set, the levers of the 6-point switch of the duplex leg testing set are thrown to the right, thus making the testing set equivalent to the sending and receiving legs of a branch office loop. The testing plug may then be inserted in the jack of a duplex set (jack No. 1 of Circuits N or NA, Fig. 3) or in the normally grounded jack of an office loop connected to such a set (jack No. 3 of Circuit N); the attendant can then see whether either side of the duplex set or office loop is open, or, if the circuit is in operation, observe the character of the signals being sent and received. Throughout the above operations the jack of the testing set must be left unoccupied.

To observe the operation of a circuit when a branch office or subscriber's loop is connected to a duplex set, either directly or through an office loop, one plug of the patching cord is transferred from the loop jack to the jack of the testing set, the other plug of the patching cord remaining in jack No. 1 or No. 3 of Circuit N; then the testing plug is inserted in the loop jack. This connects the sending and receiving sides of the testing set in series between the duplex set or office loop and the subscriber's or branch office loop, and all signals will be heard by the attendant.

In a similar way the testing set may be looped in on other circuits; for example, in the case of Circuit NA, the testing plug may be inserted in the loop jack (No. 2) and a patching cord run from jack No. 1 to the jack of the test set.

"T"—Loop Switchboard Mil-Ammeter. It will be seen from Fig. 4 that this circuit terminates in two double-conductor cords and plugs and is equipped with three WE-203 jacks and a solid idler plug for switching the mil-ammeter in or out of the circuit.

When none of the switching jacks are occupied by the idler plug, the two double-conductor plugs are connected directly together and may be used as a regular patching cord, running between a duplex set jack and loop jack or between any other two jacks where it would be in series with the sending and receiving sides of a circuit. The mil-ammeter may then be cut in on either of the two legs by inserting the idler plug in one of the two lower switching jacks; the bottom jack for the receiving leg or the jack just above it for the sending leg. In either case the other leg will be kept closed by the jack connections, so that no interference with the circuit need occur while making a mil-ammeter test.

By placing the idler plug in the top jack (marked "Morse") the mil-ammeter is connected directly to the tip and sleeve of the right hand double conductor plug. This plug may then be inserted in any looping jack of a single Morse circuit, such as the closed and battery groups, Circuits G and P. It should be noted that at this time the sleeve conductor of the left handle double-conductor plug is open, but the tip conductor is tapped on to the mil-ammeter circuit. Care should therefore be taken to keep the left hand plug clear of all other conductors while the mil-ammeter is being used for Morse testing. Because of the wider range of its scale, the loop switchboard mil-ammeter will not give as satisfactory indications of Morse currents as the volt-mil-ammeters used on main switchboards.

The Omniscient Telephone.

Some people think that telephone employes are omniscient, and ask all sorts of odd questions. To the credit of the telephone companies it should be said that they are rarely balked, and they go to much trouble to please their subscribers, although some of the questions asked may seem by the average person to be utterly impossible of answering.

In Indiana these questions were recently asked over the telephone:

"Can you give me a yellow-haired girl that works in a restaurant at Blairsville?"

"I wonder if you can get me a widower who had a grocery store at East Brady?"

In the first instance the "yellow-haired girl" was located in three minutes and in the second in five minutes.

Puck's Quarterly recently printed the following imaginary episode on a telephone line, and although it is pure fiction, it is not an exaggeration of many of the experiences of telephone operators:

"Hello, there, central! Is this central? It is? I thought it was, but I couldn't be sure. The other day I supposed I was talking to central and here it was only my grocer. I do think there are some queer mix-ups in the telephone service. What I want now is to find out the number of a Mrs. John Smith, S-m-i-t-h, Smith. I find that there are more than 100 persons of that name in the book, and I don't know which one is the husband of the lady I want. She is a large lady with a florid face, and prematurely white hair, and I think her husband is a traveling man, and a brother-in-law of her's named Jones lives somewhere on M street, a stoutish, elderly gentleman with side whiskers.

"Now, kindly let me have Mrs. Smith's number at once. I have it on a slip of paper that I can't find. Seems to me it was two four-sixteen ring three, or ninety-two-sixty-four ring two. You know how confusing telephone numbers are. Let me have Mrs. Smith's number right away, please."

Mr. W. C. Mason, manager of the Atlantic Coast Line, Rocky Mount, N. C., in renewing his subscription for another year, states that "TELEGRAPH AND TELEPHONE AGE is some paper."

CHINESE TELEGRAPHS ON AMERICAN PLAN.—China is considering the advisability of reconstructing its telegraph system on American plans.

Telephone Repeating Coil and Its Operation.

BY I. C. PETTIT, ENGINEERING DEPARTMENT, WESTERN ELECTRIC COMPANY.

There are many types of telephone repeating coils and they have many different uses, but the most common and widely used type is the one through which practically every telephone conversation on the common battery system of the Bell companies is transmitted—the battery supply coil. These coils are mounted on racks and each is connected to the two plugs which the operator inserts in the jacks on the switchboard connecting the calling subscriber's line to the line of the subscriber called.

A repeating coil is practically a double induction coil. Each coil consists of an iron core and primary and secondary copper windings. The core is ring shaped, and is built up of a large number of turns of small soft iron wire. The iron wire core is covered with a wrapping of cotton tape, over which are wound the copper windings. The primary and secondary windings are each composed of two sections, one section on each half of the core, the sections of the secondary being wound over the primary.

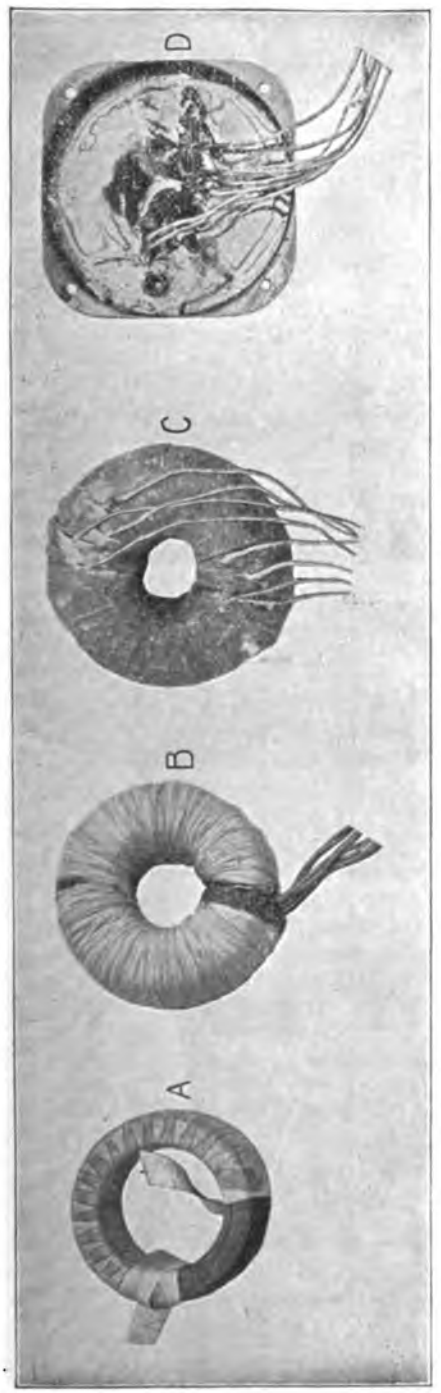


FIG. 1—STAGES IN THE MANUFACTURE OF A REPEATING COIL. A, Iron Core Wrapped with Tape; B, Primary and Secondary Windings in Place; C, Coil Taped and Waterproofed; D, Coil in Position, Impregnated with Rosin.

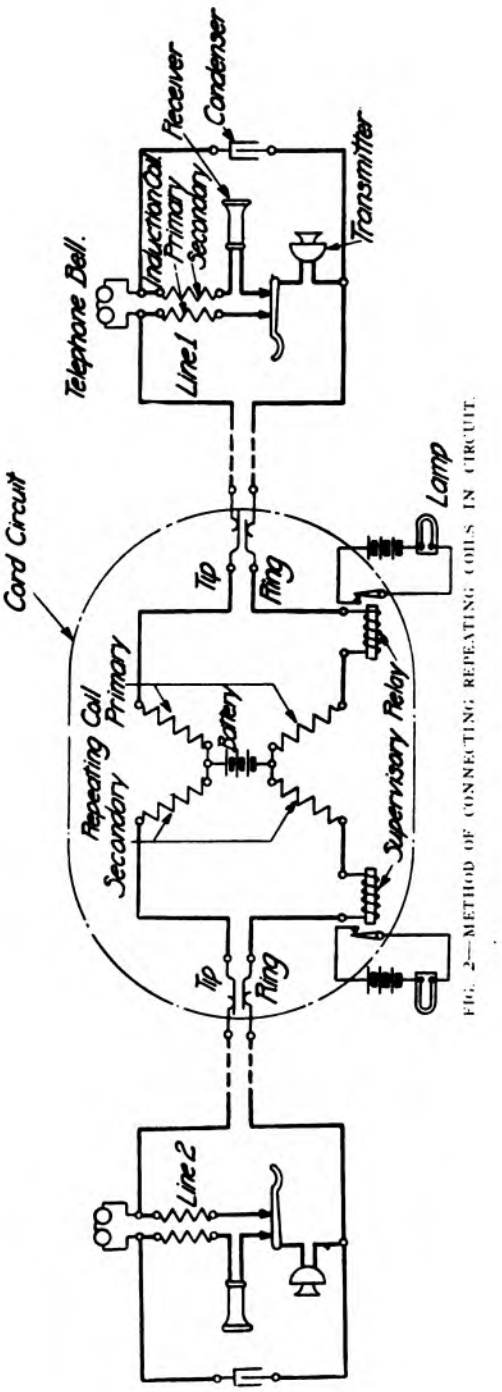


FIG. 2—METHOD OF CONNECTING REPEATING COILS IN CIRCUIT.

Each section consists of hundreds of turns of small insulated copper magnet wire, the number of turns in each being the same. The coil is then given another wrapping of cotton tape, after which it is impregnated with a moisture-proof compound. It is then placed in an iron case and the case filled with melted rosin, after which it is mounted on a wooden base, and the ends of the several sections of primary and secondary windings connected to their properly numbered terminal clips. The different stages in the coil assembly are shown in Fig. 1.

One of the principal uses of this type of repeating coil is to permit the introduction of the continuous current from the central-office battery into the telephone line without producing an appreciable loss in the alternating speech current which is generated in

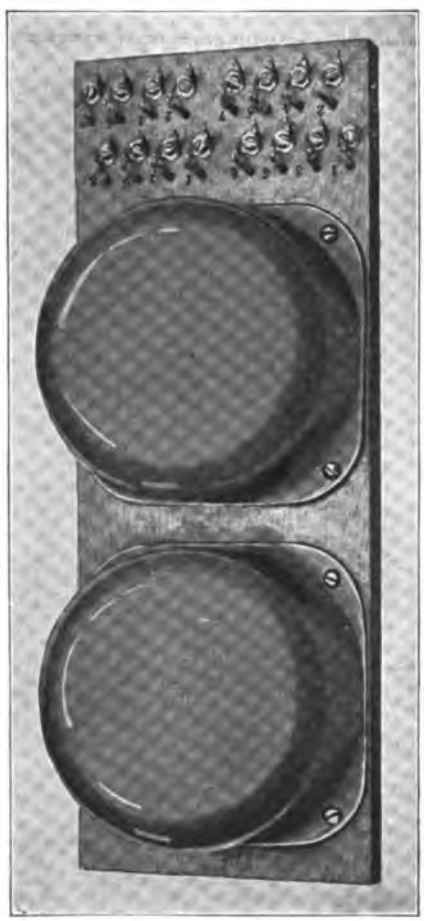


FIG. 3—TWO FINISHED AND MOUNTED COILS CONNECTED TO TERMINALS

the telephone transmitter by the vibrations of its diaphragm. This method of connecting the repeating coil in the circuit shown in Fig. 2. The battery current flows out on either line through the repeating coil windings and the operator's supervisory signal relay at the central office and energizes both of the subscribers' transmitters.

If the battery should be connected between the lines without the repeating coil, a very small percentage of the generated speech current from one line would pass to the other. Nearly all of it would pass through the battery and back to the transmitter, as the battery would offer a far easier path for the speech current than would the other line.

The operation of the repeating coil is as follows: The continuous current flowing out from the battery through one pair of windings of the repeating coil, line and telephone set is varied in strength by the varying resistance of the transmitter caused by a person talking into it. This varying strength of current, flowing through one pair of windings of the repeating coil causes a corresponding variation in the magnetic strength of its iron core. This varying magnetic strength of the core induces a correspondingly variable current in the second pair of windings of the repeating coil. This current, in turn, flows through the second line, and, superposed on the continuous current from the battery, produces variations in the current flowing through the second line and, through the induction coil, in the listener's receiver. The action of the repeating coil thus corresponds to the action of the induction coil.

Repeating coils are also extensively used for separating, electrically, lines, or sections of lines, which, for certain reasons, cannot be joined directly; for adapting one line for simultaneous telephone and telegraph use; for equipping two parallel lines to act as a third line—the so-called "phantom" line; and for a large number of special purposes. Their action, in repeating speech current is, however, the same in all cases as in the one described.

Pupin Coils.

Dr M. I. Pupin, of Columbia University, New York, addressed the New York Electrical Society recently on "The Science and Art of the Pupin Coil."

In the practical loading of lines, he said, the coils are now inserted about eight to the wave-length, although accurate spacing need not be preserved. To prevent "cross-talk" where groups of loading coils are installed together in constricted space, the toroidal or ring-shaped core was developed. Such coils are devoid of leakage flux. Eddy currents, which add to the apparent ohmic resistance of the windings, are minimized by building the cores of insulated laminations or fine iron wires. Iron of rather low permeability is preferably used, the core being worked at a very low density involving only the lowest portion of the permeability curve below the first knee. Great skill and experience are required in the design and construction of the coils themselves, although the matter of installing them in the line requires little care. Use of the loading coils on aerial lines has incidentally pointed out the need of better insulation for the higher voltages employed on loaded lines.

MR. J. F. WALLICK, for many years superintendent of the Western Union Telegraph Company at Indianapolis, Ind., now retired, writes: "While practically out of active service, I take a lively interest in all that pertains to the telegraph and telephone business, and appreciate fully information obtained through your paper."

THE RAILROAD.

CHARLES E. WAYS, aged seventy-two years, assistant general traffic manager of the Baltimore and Ohio Railroad Company, and an old time telegrapher, died in Baltimore, Md., January 2. He was an operator at Harper's Ferry, W. Va., at the time of John Brown's raid on the United States Arsenal at that place in 1859.

NEW DISPATCH SYSTEM.—Mr. E. R. Gill has been granted a patent for a dispatch system for use on railroads. The particular feature in this system lies in arranging the circuits so that each tower man may signal others, as required, but yet the circuit be under control of the message man when he requires it. Indicators show visibly the condition of the line.

OPERATING TRAIN SIGNALS BY WIRELESS.—The Lackawanna Railroad Company has, in conducting its experiments with wireless telegraphy, developed a relay which can be operated by wireless impulses, and which, in turn, will operate a local sounder. One of the applications of this development will be the operation of train signals by wireless. Each signal would have a selector, under the control of the dispatcher, the selectors being operated by means of the relay.

NEW SELECTIVE SYSTEM.—Mr. R. F. Spamer, engineer sales department, Western Electric Company, New York, has patented a selective system for use in connection with railway train dispatching by telephone. The novelty consists in controlling the application of the step-by-step signaling impulses by the simultaneous operation of an impulse-producing relay with a line relay. When the step-by-step mechanism operates it causes the desired line relay and the impulse-producing relay to operate synchronously, applying energy from the battery to the desired line. By the use of this method the lines are left free from any step impulse mechanism, except during selection.

Loud-Speaking Telephone Tests on the Lackawanna.

The Lackawanna Railroad Company has equipped its dispatchers' circuit between Hoboken and Franklin Furnace, N. J., with the "stentor" transmitters and reproducers (loud-speaking telephones) of the Electrical Experiment Company, New York. With this apparatus, the dispatcher is relieved of the necessity of wearing the telephone head gear, which is very objectionable and a source of annoyance and danger to the wearer, especially during electrical storms. The reproducer, or receiver, is placed on the desk about six inches from and in front of the dispatcher, and the enunciation is said to be very loud and distinct. The circuit in question is 108 miles long, and has thirty-two stations.

The use of apparatus of this kind has been a subject of discussion among railway telegraph superintendents for many years, and at the Washington meeting, on November 13, 1913, of the Eastern Division of the Association of the Railway Telegraph Superintendents the necessity of eliminating the head gear worn by dispatchers was strongly urged. Several of the members present described their experiences and observations with reference to loud-speaking instruments, and all agreed that a reliable loud-speaking receiver would be a very desirable thing to have in their work.

Mr. L. B. Foley, superintendent of telegraph of the Lackawanna road, referred to tests then being made on his road of the instruments which have since given so satisfactory results.

Wireless to be Extended Over the Entire Lackawanna Road.

The wireless service on the Lackawanna Road between one of its limited trains and fixed stations at Scranton, Pa., and Binghamton, N. Y., has been so successful that the installation of additional towers at points between Hoboken, N. J., and Buffalo, N. Y., has been authorized.

The other limited train running in the opposite direction, between Hoboken and Buffalo, will also be equipped for wireless, and a regular operator will be assigned to each train, to handle railroad and commercial business.

With the completion of these additional stations, communication will be established between the two trains and the fixed stations over the entire length of the road.

Mr. L. B. Foley, New York, is superintendent of telegraph of the Lackawanna Railroad.

Mr. Vail Takes Part in Railway Telegraph Superintendents' Deliberations.

At the meeting, in Washington, D. C., on November 13, 1913, of the Eastern Division of the Association of Railway Telegraph Superintendents, Mr. Theo. N. Vail, president of the Western Union Telegraph Company, and of the American Telephone and Telegraph Company, and Mr. N. C. Kingsbury, vice-president of the latter company, spent a few minutes and greeted the members present. A short open conversational discussion took place between Mr. Vail and some of the members. Among the remarks made by Mr. Vail, that gentleman said: "The first thing you know there will be no more railroad telegraphers; they will be railroad telephoners. It looks to me as though we were coming to that."

The promptness in answering telephone calls by railroad operators was referred to in the discussion. Mr. Vail said: "I remember in the old days I used to be a railroad telegraph man myself, a pretty poor one at that. They would call and call and call, half an hour or so, and the operator called did not pay any attention to the call."

Mr. W. F. Williams, of the Seaboard Air Line, remarked that it is very much like that now with the telegraph; but it is different with the telephone.

"There is something very curious about the telephone," said Mr. Vail. "It is the only thing that a man will drop everything to answer. A man comes to call on you; you tell him to wait outside, and, if you are busy, you take your time about seeing him, but the moment you hear the telephone bell ring it

calls attention, and you answer it. It is a habit—that is all—people are accustomed to it."

"There is another curious thing about the telephone," said Mr. Charles Selden, of the Baltimore and Ohio. "If a person holds the receiver to his ear for about ten seconds and the exchange does not answer, he will say it is about five minutes."

"We all do that, you know," said Mr. Vail.

Cordless Jack Boxes for Way-Station Service.

A simple switching device for connecting the operator's set in a railroad way-station to one or more lines passing through the station is found in

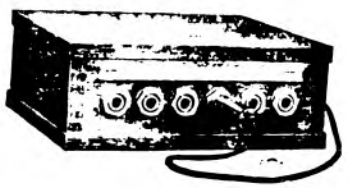


FIG. 1—CORDLESS JACK BOX FOR SIX LINES.

the cordless jack box recently perfected by the Western Electric Company's railway engineers. The cordless jack box does away with the unsatisfactory knife-switch method of cutting in the operator's tele-

FIG. 2—CORDLESS JACK BOX FOR TWELVE LINES.

phone or telegraph set on the train-dispatching lines. The connection is effected by means of a single conductor plug, which is inserted in the line jack corresponding to the line over which it is desired to talk or telegraph.

The cordless jack boxes are of two kinds, one for

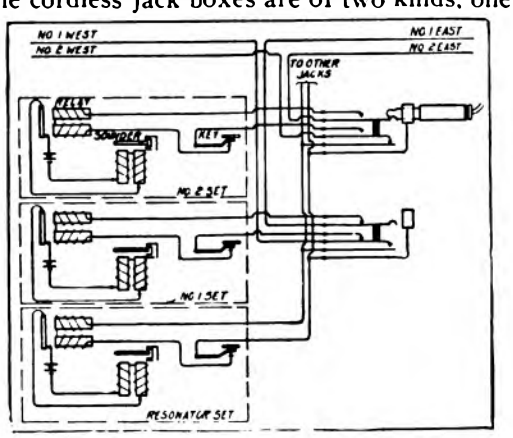


FIG. 3—CIRCUIT DIAGRAM FOR TELEGRAPH LINES.

telephone dispatching circuits and the other for telegraph lines. One distinctive feature of the telephone jack boxes is that they may be used to connect two or more lines together, and have the operator's set bridged in on all of them merely by using one or more extra switching plugs.

The cordless jack boxes are manufactured in three sizes, viz.: For three lines, for six lines and for twelve lines, consisting of two six-line units hinged

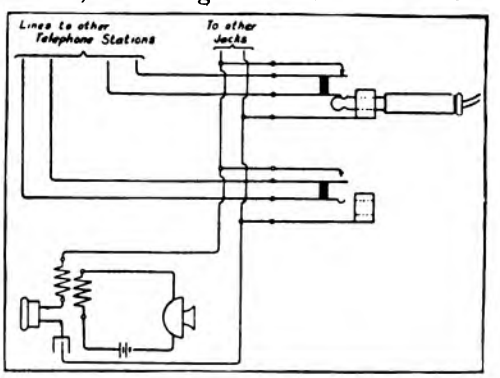


FIG. 4—CIRCUIT DIAGRAM FOR TELEPHONE LINES.

together. Any of the jack boxes can be ordered partially equipped with dummy wood plugs in the unequipped spaces. Jacks can be added at any time by knocking out the wood plugs and screwing in the jacks. Wiring is always furnished for the full equipment.

RATS HOLD UP PENNSYLVANIA RAILWAY TRAFFIC.—Rats ate the insulation from a cable of signal wires at Moore's Station, Pa., on the Pennsylvania Railroad, causing the wires to cross and a hold-up of train traffic for over half an hour on November 28.

MR. E. E. STARCHER, of the Oregon Railroad and Navigation Company, Umatilla, Ore., writes: "I certainly appreciate your paper. It fits in with every day work in so many ways."

OBITUARY.

F. P. DOWNEY, aged forty-five years, superintendent of telegraph for the Eureka Pipe Line Company at Parkersburg, W. Va., died in that place January 1.

MRS. J. W. O'BRYAN, wife of John W. O'Bryan, an old-time operator, and a lineman for the Postal Telegraph-Cable Company at Paducah, Ky., died in that place January 6.

GEORGE W. IRWIN, aged sixty-five years, died at Mansfield, Ohio, January 4. Mr. Irwin was one of the best-known operators in New York City for over a quarter of a century. In later years he was identified with the Hearst News Bureau. He retired from active service some time ago, returning to his native town, Mansfield, Ohio, where he lived in retirement.

S. S. MOORE, aged seventy-nine years, an old-time telegrapher, died in Elizabeth, N. J., January 5. Deceased was postmaster at Elizabeth at one time, and later filled various other local government positions. He directed the installation of the first telegraph lines established by the Central Railroad of New Jersey, at the time when the railroad terminals were located at Somerville and Elizabethport.

The Late John D. Taylor.

BY G. H. GROCE, SWISSVALE, PA.

John D. Taylor died at his home in Wilkinsburg, a suburb of Pittsburgh, Pa., on December 16, 1913.

Mr. Taylor worked for a number of years in his early life as a telegraph operator. He was the inventor of what is known as the "dynamic return" system of switch and signal control. At the time of his death Mr. Taylor was connected with the Union Switch and Signal Company in the capacity of consulting engineer. He was a man of high ability and attainments, but was of a very reserved disposition, and had but few intimate or close personal acquaintances.

To those readers of TELEGRAPH AND TELEPHONE AGE who are not familiar with the history and working details of railroad signaling a brief explanation of the meaning of "dynamic return" may assist in their understanding of the life accomplishments of Mr. Taylor.

At railroad crossings, junctions, approaches to large stations and yards, and similar busy points, some method is necessary of centralizing the control of the switches and tracks, and, therefore, by signal, the control of trains using these switches and tracks. In the development of this apparatus it was soon discovered that it was of the greatest importance that the man in charge at the central point (now generally referred to as a "tower"), not only made the proper lever movement combinations, but that the proper sequence of switch and signal movements outside of the tower had been carried to their completion. In the mechanical type of switch and signal control apparatus (known to telegraph operators as the "armstrong"), this assurance was made by special devices; some of it with individual pipe lines and levers. Of course, the idea of operating switches by electric power soon followed the development of the electric motor, but there was the danger of a false operation of the motor-controlled function due to an accidentally crossed wire, stray current, or other unforeseen condition. This was the situation in the "all-electric" interlocking field when the country-boy telegraph operator at Piketon, Ohio, had his attention called to it in his study of electrical matters beyond the requirements of a telegraph operator. Taylor had learned that a motor is also a generator of electric current. He saw that when the propulsion current is removed from a motor the armature would continue to revolve for several seconds, unless stopped by some method of braking. During this time of idle revolution of the motor armature, due to momentum, the apparatus is a generator and would send out a current if the proper wire connections were made to the motor terminals. He then carried this supplementary current, which could only be generated after the desired work had been performed, back to the tower, and, by means of it, the next proper movement was unlocked and permitted. Any crossing of the wires simply meant that the current generated at the switch or signal motor could not get back to the tower, and the next movement would remain locked. Of course, there were other things to take into consideration before the system could be safely used, but this is the basic principle of "dynamic return."

The first interlocking machine built by Mr. Taylor was placed in service on the Baltimore & Ohio Southwestern Railroad at East Norwood, Ohio, a suburb of Cincinnati, and at that time a rather unimportant crossing. Every time I see one of these little, old-fashioned, second-hand cash-registers, occasionally used to-day, I think of the office apparatus of that interlocking machine. It is a far cry from that to the wonderful machinery controlling the switch and signal movements in use at the New York Central Terminal in New York—in fact, on the entire electrified zone—but that can be taken as the measure of success attained by Mr. Taylor through his discovery of the "dynamic return" principle. After spending fifteen years with the different companies which developed and placed on the market the "dynamic return" system, Mr. Taylor joined forces with the Union Switch and Signal Company and assisted in the development of another system of all-electric interlocking, thus giving to the railroads, and through them, to the world in general, the benefit of competition, as well as the production of a device based upon the advanced knowledge of electricity.

I met Mr. Taylor first about twenty-two years ago, but saw very little of him until the early part of 1897. From 1897 until 1900 business affairs brought us together frequently. From 1900 until early in 1913 we very seldom were together, but during the six months immediately preceding his death I had many idle-time conversations of a half hour or more at his desk. He still, to a great extent, retained his early life habits of taciturnity, but I could see a very considerable change in him. He had grown to enjoy general conversation, and especially the discussion of affairs connected with the hard-time trials of early Taylor Signal Company days.

As a telegraph operator, Mr. Taylor never attended any speed contests, and I imagine that he never had any real desire to break a lance with the wire-burning key heroes who used to hang up a new record every time a president's message was flashed across the continent. Some years after Mr. Taylor had made a success of his interlocking apparatus I was talking with an official of the Scioto Valley Company, under whom Mr. Taylor had worked, and he remarked that "John D." was really one of the poorest agents and operators they ever had. He would be experimenting or studying and would forget that there was such a thing as a railroad. However, the expression on my friend's face, the tone of his voice, and the laugh which followed, served to remove, in a genial way, the sting of the charge. In effect, he said, "bring on more of your geniuses to try our souls."

Mr. Taylor was born on a farm, near Piketon, Pike County, Ohio, fifty-five or fifty-six years ago. He had such school education as was furnished in those days by the usual country or village school. He was, however, a student all his life, and the

higher mathematics were to him what recreation is to the average man. There was something about the shape and size of the man's head which always impressed me with the idea that it contained something that would be of great benefit to everybody if we could just get it out.

As far as I know, Mr. Taylor was not a member of any of the different engineering societies. His general inclination to herd by himself kept his friends from inviting him to take part in such movements, I presume. Personally, I thought it would be useless to ask him to do anything that might call for his public appearance at some time. However, one day, only a short time before his death, at one of our half-hour social talks, we were discussing some subject which had lately been before the American Institute of Electrical Engineers and I told him that I would let him have my copy of the proceedings which contained the published report. When I gave him the document I asked him why he did not join the institute, and, to my surprise, he answered that he would like to do so. I secured the necessary membership blank from secretary Hutchinson, and had placed it on Mr. Taylor's desk only a few days before his death. At the time this incident occurred, I wondered if I had previously erred in my judgment of the man's nature, or whether he was changing to an ideal of more active communion with his fellowman.

Mr. Taylor's interest was not confined to the signal field, but extended to many branches of dynamics, his qualifications in the higher mathematics enabling him to readily grasp abstruse problems. In his early years, one of his particularly cherished friends was Mr. Horace Johnson, superintendent of telegraph of the Baltimore and Ohio Southwestern Railway, now general foreman of line repairers of the Illinois Central and Yazoo and Mississippi Valley Railway Companies, located at Memphis, Tenn. Long before there was any general attempt to use telegraph wires simultaneously for telegraph and telephone service, Mr. Johnson was making experiments to this end, and Mr. Taylor took great interest in those experiments. He was frequently present when some of the trials were made.

Mr. Taylor was married in 1896 to Miss Mary Dunlap, of Chillicothe, Ohio, who survives him, and their married life was very happy. They had no children.

Questions and Answers.

A correspondent asks the following questions:

1. Why are the new pole-changers of the Postal Telegraph-Cable Company (with permanent magnets) marked plus and minus on the local binding posts?

2. How can you tell the north from the south pole of an electromagnet?

3. In duplex operation, why is it that the current sent out from the home station does not interfere with the incoming signals?

Answers:—

1. In order to secure maximum efficiency in operation of the pole-changer, it is necessary that the north and south poles of the electromagnet shall face the north and south poles of the permanent magnet, respectively. This condition is attained by sending current through the electromagnet in the proper direction; *i. e.,* by connecting the positive current to the + post and the negative current to the — post of the relay.

2. The north and south poles of an electromagnet may be distinguished in two ways. Take an ordinary magnetic compass, and bring it near the electromagnet. The north-seeking end of the compass needle will be attracted by the north pole of the electromagnet, and the south pole of the electromagnet will attract the south end of the magnetic needle. If the direction of the current is known, the north pole of the electromagnet can be determined in the following manner: If the current flows around the magnet coil in the direction of the hands of a watch the end of the electromagnet farthest away from the person holding it will be the north end, and the end of the magnet nearest to the person will, of course, be the south end. If the current flows around the magnet from right to left, or in the direction opposite to the motion of the hands of a watch, the near end of the magnet will be north.

3. This effect is fully described in the lessons in technical telegraphy published in TELEGRAPH AND TELEPHONE AGE, November 1, November 16, December 1 and December 16, 1913, and January 1, 1914. The subject will also be continued in the issue of January 16.

James D. Reid Memorial.

The trustees of the Reid Memorial Fund will be able to complete their work and erect the monument during the coming summer or fall, if those who desire to contribute forward their subscriptions in the near future, and all such are urged to do so.

The list of subscribers to the fund has now become almost a complete list of the names of present and former telegraphers now living who were friends and acquaintances of Mr. Reid. Nevertheless, there are still some who have not yet joined the movement to erect over Mr. Reid's grave in Mt. Hope Cemetery, Rochester, N. Y., a monument so inscribed as to identify the grave as that of a pioneer of the telegraph whose character and service to the fraternity entitle his memory to perpetuation.

In addition to subscriptions made by individuals, liberal subscriptions have been received from a number of societies, including the Association of Railway Telegraph Superintendents, the Postal Telegraph Club of Atlanta, Ga., the Magnetic Club of New York, and the Old Time Telegraphers and Historical Association.

MR. J. W. WEST, manager Postal Telegraph-Cable Company, Paducah, Ky., writes: "Enclosed find remittance to cover subscription for the TELEGRAPH AND TELEPHONE AGE, the best paper that money can buy."

MUNICIPAL ELECTRICIANS.

CHAS. W. CORNELL, aged 69 years, secretary of the Gamewell Fire Alarm Telegraph Company, New York, died suddenly of heart failure at his home in Brooklyn on January 1. Mr. Cornell was born in New Rochelle, N. Y. In 1886, he entered the service of the Gamewell Company as assistant to Mr. Gamewell, becoming afterwards secretary and assistant treasurer of the company, which positions he held at the time of his death. Mr. Cornell was an ideal official, efficient, conscientious and courteous. He had the confidence and esteem of all of his business associates, and the warm affection of a host of friends.

Automatic Fire Alarm.

The Siemens & Halske Company, Berlin, Germany, has recently introduced two distinct types of electric fire alarms to meet the practical conditions which occur most frequently, says the London *Electrical Review*. One form consists of a U-shaped metal strip, formed of two strips of materials of different expansion coefficients welded together. When a temperature rise occurs the unequal expansion causes the strip to bend up, and so either make or break a contact, as desired, at some definite predetermined temperature.

The second type (differential alarm) consists of a glass U-tube, each arm of which is about half filled with mercury, over which a small quantity of a volatile liquid is placed. One limb is composed of thicker glass than the other, so that when a rapid rise of external temperature occurs, the heat penetrates much more slowly into the thick glass limb than into the other. The liquid in the thin glass limb will, therefore, be vaporized first, and the excess of pressure so produced will cause the mercury to fall in that limb, and, as soon as the drop is sufficient, the mercury contact between two platinum wires sealed into the glass will be broken, and this serves to give the alarm.

The dimensions are so chosen that ordinary temperature variations produce no effect, but any exceptionally rapid rise of temperature, such as occurs at most fires, will at once be notified. Occasionally, *e. g.*, in the case of spontaneous combustion, a fire occurs with only a slow rise of temperature, and in such a case this differential alarm would possibly fail to act. To meet such cases, an alarm of each form (maximum and differential) is some times made up in a single frame.

Besides the alarms themselves, the apparatus includes an indicator-board at the fire station, by which the locality of the fire is shown, and the necessary testing instruments.

Elmira Shows Its Appreciation of Mr. Ellett's Long Service.

If republics are ungrateful toward their faithful servants, the city of Elmira, N. Y., is not. Mr. Will Y. Ellett, superintendent of telegraph in that city, and well known in electrical circles throughout the country, one of the oldest employes of the fire department in point of service, and one of the most faithful, received an increase of salary recently, and this action has met with unanimous approval in Elmira. In referring to the matter, the *Elmira Advertiser* speaks in praise of Mr. Ellett's services. He entered the Elmira fire department as torch boy in 1866, and has been continuously a fireman, and, for the major part of that time, has had to do with the fire-alarm system. "The history of Mr. Ellett is the history of the Elmira fire department," the *Advertiser* states, "and it is interesting history, recalling many old names and old times.

"In 1883, Mr. Ellett was made assistant chief of the Elmira department, and the next year, 1884, a telegraph alarm system was first installed in this city. He was made superintendent of this system, and he has grown with the improvements made in this means of sending alarms of fire.

"There has been, on the whole, very little complaint about the working of the fire alarm," the paper continues. "There have been accidents, of course, during all of these years, but they have been quickly covered. No superintendent, whether of a railroad, a factory, or a fire-alarm system, no matter how expert he may be, can control the ravages of the weather, and wires are as subject to trouble in a fire-alarm system as in a railroad. But Elmira has not often suffered badly from this source. There has been a vast deal of repair work done also, at a much smaller proportionate expense than other cities have had to pay.

"Chief" Ellett, as his scores of more intimate friends have for years called him, has a wider

acquaintance among firemen, both the professional and amateur variety, than, perhaps, any man in the 'Southern Tier' counties. He is an honorary member of Susquehanna Hose Company No. 1, of Owego; of Wave Hose Company No. 2, of the same town; of Giles Hose Company, of Montour Falls; of Beacon Hose Company No. 1, of Matteawan; of Independents No. 1, of Lestershire, and Liberty Five, of Reading, Pa.

"Not long ago, after a visit of firemen, Mr. Ellett received from the chief engineer and fire commissioners of the city of Newark, N. J., a gold badge of honorary membership in the department of that city. The badge is one of the most beautiful and costly ever given an Elmiran, and, along with a number of other trophies of his career, is highly prized by the big fellow."

Mr. Ellett is very well known in New York, where he has many friends, all of whom, together with the entire staff of TELEGRAPH AND TELEPHONE AGE, extend their congratulations and well wishes.

MR. JAMES B. YEAKLE, superintendent fire-alarm telegraph, Baltimore, Md., writes: "I would not like to miss a number of the paper which you keep so well up in information needed to give us early advice in the rapid progress of electrical matters."

L. S. Daniel, of Galveston, Tex., Retired After a Service of Sixty-two Years.

Mr. Lee S. Daniel, a well-known old-timer, employed as operator by the Western Union Telegraph Company at Galveston, Tex., retired on January 1, after an active service at the key of sixty-two years. At the time of his retirement he was still a "master" in his profession, very few of the younger generation of operators being able to equal his ability to send and receive.

Mr. Daniel was born at Hick's Ford, Va., October 19, 1837, and is consequently in his seventy-seventh year. He became a telegraph operator in 1851 in the office of the old New Orleans and Ohio lessees before the Western Union came into existence. He worked alone until the arrival of A. E. Trabue, general superintendent, whom he assisted in clearing away the limbs from the trees along which the line was carried into Vicksburg. He afterwards became manager of the office. In the meantime he passed unscathed through several yellow fever epidemics. Then, in 1861, shortly after attaining his majority, he was among the first volunteers in the Confederate army, being appointed first lieutenant in the Vicksburg Light Artillery, and ordered to Pensacola, Fla., in April, 1861. He was soon transferred from the field service to the military signal and telegraph department. In October, 1861, he was again transferred to the trans-Mississippi department and detailed to Lake Providence, La., to watch for the Federal fleet, then preparing for a southern move from the upper Mississippi and Ohio Rivers. His vigilance in discovering the fleet and the quick action of Colonel Fall are credited in the war sketches of General Stephen D. Lee with "preventing the almost complete surprise of the Confederate army at Vicksburg in December, 1862. Later Mr. Daniel was captured by the Federals and held a prisoner until June 29, 1862, when he made his escape.

He was stationed at Crockett, Tex., until 1864, when yellow fever broke out in Houston, and, as the only immune operator of ability, he was appointed manager at Houston. He remained there until the surrender of Lee.

In 1865 Mr. Daniel returned to Vicksburg and became city and telegraph editor of the Vicksburg *Daily Times* for two years. Then he went back to the Western Union office at Vicksburg. Changes brought him in turn to New Orleans, Galveston and Hempstead, and, after a brief venture in commercial life at Shreveport, he returned to Galveston. He had brief service in railroad telegraphy with the Santa Fe and International and Great Northern roads.

In 1883 he went to Victoria with Count Telfener's "Macaroni" road, now the Victoria division of the Galveston, Harrisburg and San Antonio. He remained with this branch of the Southern Pacific for twenty-four years as operator and train dispatcher. When he resigned in 1906 he was placed on the pension role of the Southern Pacific and went to Houston to live with members of his family.

In August, 1907, while in Galveston on a visit to his daughter, Manager Schultz, of the Western Union, called on him for duty, "and," as he explained, "about 10.30 a. m. I was thar."

In his sixty-two years of active service he has taken part in the history of the Southwest to such an extent that he has accumulated an inexhaustible fund of reminiscence. He was a personal friend of Jefferson Davis and has known many other men who have played important parts in United States history.

LONG-DISTANCE PRESS TRANSMISSION.—On the night of December 23, the new currency bill was transmitted direct from Washington, D. C., to the *Spokesman Review*, Spokane, Wash., over six circuits. The message, which contains 16,000 words, was transmitted in two hours and fifty minutes, and there was not a moment's trouble on any of the wires during that time.

Banquet of Engineering Discussion Club, Philadelphia.

The Engineering Discussion Club, Philadelphia, Pa., composed of Drexel Institute evening electrical students, held its mid-winter banquet in the Bingham Hotel, Saturday evening, January 10.

Covers were laid for thirty, and President H. S. Avres acted as toastmaster. Secretary F. P. McElroy read a message of regret from the guest of honor, President Hollis Godfrey, D. Sc., stating that his physician had forbidden him to attend, owing to a severe cold.

Lengthy addresses were made by the club president and Prof. Arthur J. Rowland, D. Sc., Dean. Professors J. L. Beaver and William G. Creagmile, members of the faculty, also responded with brief addresses. All members contributed brief essays,

which were liberally applauded. Music was under the personal direction of Mr. O. H. Kassmann.

The enthusiasm started by Prof. Rowland's speech did not subside until the call of midnight brought the festivities to a close, with a call upon the president for another in the near future.

THE CHICAGO TELEGRAPHERS' AID SOCIETY will hold its twenty-fifth anniversary informal dance at the Hotel La Salle, Wednesday evening, February 4. The officers of the society are: J. J. Harrington, president; Robt. Haiges, vice-president; A. J. Fuller, secretary; C. H. Shell, sr., treasurer.

Dinner to T. & T. L. I. A. Delegates.

Mr. T. E. Fleming, 195 Broadway, New York, has been designated by the Executive Committee of the Telegraph and Telephone Life Insurance Association to make arrangements for a subscription dinner to be given the visiting delegates to the annual meeting on March 11. In a circular letter Mr. Fleming says:

"The forty-seventh annual meeting of the Telegraph and Telephone Life Insurance Association (old T. M. B. A.) will be held on Wednesday, March 11. It is expected that a number of visiting delegates will be present and it is the desire of the Executive Committee of the Association to entertain the delegates on the night of the annual meeting by means of a subscription dinner. Place to be announced later.

"It is expected that the cost of the dinner will not exceed $2.00 per plate.

"You will appreciate the necessity of an early response that preparation may be made for the comfort and enjoyment of all who may be in attendance."

Mr. Fleming is anxious to have a good attendance at the dinner.

New York Telegraphers' Aid Society.

The quarterly statement of the New York Telegraphers' Aid Society, for the quarter ended December 6, 1913, is as follows:

Balance on hand September 6	$25,749.71
Receipts	1,904.40
Total	$27,654.11

DISBURSEMENTS.

Death Benefits	$600.00	
Sick Benefits	808.47	
Expenses	190.60	
		$ 1,599.07
Balance on hand December 6		26,055.04
Total		$27,654.11

RELIEF FUND.

Balance on hand September 6	$ 6,229.72
Receipts	421.85
Total	$ 6,651.57
Disbursements	$ 331.40
Balance on hand December 6	6,320.17
Total	$ 6,651.57

Quicker Mail Transportation for Telegraph and Telephone Age.

The new arrangement with the postal authorities at Washington, whereby TELEGRAPH AND TELEPHONE AGE will be listed in the special class of newspapers entitled to regular mail train transportation, instead of by freight, will take effect January 26. Therefore our issue, dated February 1, and subsequent issues, should reach distant subscribers several days earlier than heretofore, since the freight-mail service went into effect.

Telegraph and Telephone Age

No. 3. NEW YORK, FEBRUARY 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Annual Crop of Stereotyped Questions.

PART II.

Among other questions usually asked annually by aspirants to municipal positions before taking the examinations are:

"What is a multiple or parallel battery?"

"What is a multiple-series battery?"

"What is a series-multiple battery, and what particular benefit is gained by each arrangement?"

Ans. *Multiple Battery.*—A multiple battery consists of a number of cells arranged in a row having all the positive poles in the group joined together by one wire and the negative poles similarly connected to another wire, as shown in Fig. 1.

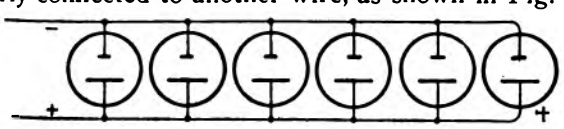


FIG. 1—PARALLEL OR MULTIPLE BATTERY. SIX CELLS CONNECTED FOR QUANTITY. TOTAL E. M. F. ONE VOLT.

By this arrangement the equivalent of one large cell having plates six times larger than those in a single cell is obtained.

The benefits derived by means of large plates are two-fold. One is that on account of a greater superficial area being exposed to the action of the acid solution a greater quantity of current may be developed per second than is possible to obtain from a battery having smaller plates. The other benefit gained is the elimination of the greater part of the internal resistance of the battery. Thus, in Fig. 1, where the internal resistance of each cell is normally, say three ohms, the total internal resistance of the six cells, arranged in multiple, is equal to that of the joint resistance of the circuit, or ½ ohm. If this group of cells is now short-circuited an ammeter will show that two amperes of current are flowing through the connecting wire, although the total E.M.F. of the battery is the same as that of one cell, *viz.*, one volt; yet one volt from any single cell cannot alone furnish more than one-third of an ampere when similarly short-circuited. The object of multiple connections, therefore, is to obtain a low-resistance "quantity" battery from a number of comparatively high-resistance cells.

Series Multiple Battery.—As a multiple or parallel battery with all the cells arranged as shown Fig. 1 can furnish a total E.M.F. of only one volt, it follows that in order to increase the voltage of a multiple connected battery, additional groups of such combination batteries must be connected together in series in the same manner as would be done if each such group was one single large cell. Fig. 2 shows two multiple batteries of six cells each,

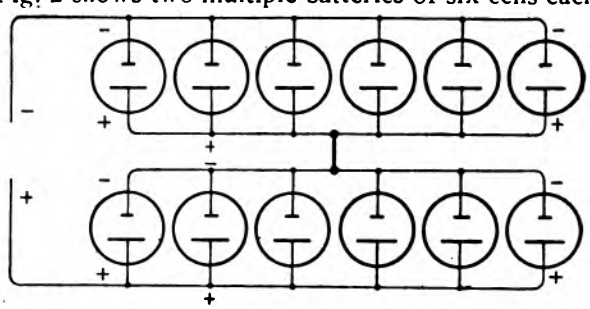


FIG. 2—SERIES-MULTIPLE BATTERY. TWELVE CELLS. TOTAL E. M. F. TWO VOLTS.

connected together in series in order to obtain an E.M.F. of two volts from the combination of twelve cells.

The object of series-multiple connections is to increase the voltage of a battery and still maintain the lowest possible internal resistance.

Multiple-Series Battery.—This term is usually applied to a battery of comparatively high E.M.F. consisting of two or more rows of series-connected cells joined together in multiple as shown in Fig. 3. The object of this connection is to obtain a battery of a given voltage that will have a lower internal resistance than one row of the same voltage would have, but not necessarily have an extremely low internal resistance. Where the latter is not required, the twelve cells may be arranged as shown in Fig. 3 so as to constitute a battery of six volts and furnish a somewhat greater quantity of current than six cells alone could furnish, although the E.M.F. would be the same in both cases, *i. e.*, six volts.

If a number of generators are considered as so many large cells of battery, they may also be con-

nected in series, multiple, etc., by joining together their positive and negative brush terminals in the same manner as if they represented the binding posts of chemical cells.

Another question usually asked is: "What is the difference between a single and two-fluid battery?"

Ans. A single-fluid battery is one consisting of a cell or number of cells where the jar or jars contain but one kind of solution.

A two-fluid battery is obviously one where each cell requires two different kinds of solution. The Daniel cell is a typical two-fluid battery. In this type a solution consisting of diluted sulphuric acid

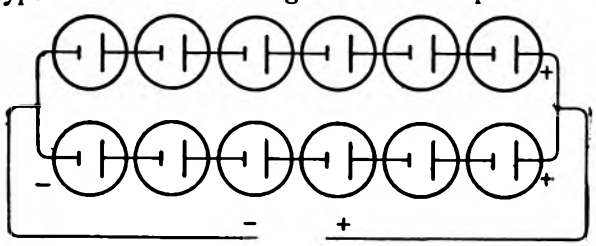


FIG. 3—MULTIPLE-SERIES BATTERY. TWELVE CELLS. TOTAL E. M. F. SIX VOLTS.

is placed in a porous cup containing the zinc plate, and this cup and contents is placed inside of a larger glass jar containing a solution of sulphate of copper and the copper plate. The object of the porous cup is to prevent the different solutions from mixing too freely while at the same time allowing electricity to pass through it.

A gravity cell is another form of a two-fluid battery. In this type the denser fluid remains near the bottom of the jar with the copper plate, while the lighter fluid rises to the top where the zinc plate is suspended.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, January 26:

American Telephone and Telegraph Co.	123¾
Mackay Companies	83
Mackay Companies, preferred	67⅝
Marconi Wireless Tel. Co. of Am.	5½
Western Union Telegraph Co.	64

Telegraph and Telephone Patents.

ISSUED JANUARY 6.

1,083,406. Telephone Desk Set. To H. L. Knight and B. W. Sweet, Cleveland, Ohio.

1,083,456. Translating and Selecting System. To E. C. Molina, Boston, Mass.

1,083,569. Protector for Telephone Transmitter. To H. Van Hoevenberg and R. W. Pope, North Elba, N. Y., and Elizabeth, N. J.

1,083,671. Telephone Mouthpiece with Antiseptic Attachment. To T. Duquette, sr., North Grosvenor Dale, Conn.

1,083,788. Loud-speaking Telephone Receiver. To C. Adams-Randall, Boston, Mass.

ISSUED JANUARY 13.

1,083,926. Microphone. To L. Ericson, Chicago, Ill.

1,084,070. Loud-speaking Telephone System. To J. J. Comer, Chicago, Ill.

1,084,189. Telephone System. To F. M. Wolf and R. M. Austin, Monroe, Wis.

1,084,328. Telephone Attachment. To E. Gransaull, New York, N. Y.

PERSONAL.

MR. WILLIAM GIBSON succeeds Mr. Roberts with DeHaven & Townsend, 40 Wall street, New York.

MR. E. B. ORR, of New York, has accepted a position with Harris, Winthrop & Company in their Chicago office.

MAJOR W. A. J. O'MEARA, formerly engineer-in-chief of the British post office, London, has entered the legal profession in London as a barrister.

MR. SAMUEL J. ROBERTS has accepted the position of chief operator for Danzig & Company, bankers and brokers, 100 Broadway, New York, vice George F. Conklin, resigned.

MR. DONALD MURRAY, of London, Eng., inventor of the Murray telegraph system, who has been in this country for three weeks, sailed for England on the steamer "Cedric" on January 29.

MR. I. D. HOUGH, JR., son of Mr. I. D. Hough, division wire chief Western Union Telegraph Company, Dallas Tex., was married to Miss Elsie Barker, of El Paso, Tex., January 15.

MR. MELVILLE E. STONE, general manager of the Associated Press, New York, was the principal guest at the annual dinner of the Old Time Printers' Association in Chicago, January 16.

MR. FIDEL VILLACORTA, of the telegraph department of San Salvador, Salvador, who has been in New York for some months, has gone to Chicago on business connected with his government.

MR. REGINALD H. EARLE, of St. Johns, N. F., brother of Mr. W. E. Earle, manager of the Western Union Cable Company at North Sydney, C. B., stopped in New York on his way to Portsmouth, England, whither he has gone in the interest of a marine distress signal, of which he is the inventor.

MR. ANDREW CARNEGIE, on January 20, discoursed before an Edison moving-picture machine, in the Edison studio in Bronx Borough, New York. His words were recorded upon a cylinder of a phonograph, adjusted so as to synchronize with his motions. He was congratulated on his success as a moving-picture actor.

MR. W. R. WILLIAMS, an old-time telegrapher, who, in the early seventies, was a member of the Western Union force at Cleveland, Ohio, is now a resident of Seattle, Wash. He is in the insurance business in that city. He is a native of Painesville, Ohio, and has filled positions as messenger, operator, manager and train dispatcher and left the telegraph service as manager at Ogden, Utah, in 1888.

HON. EMMETT WILSON, congressman from Florida, started his business career in 1897 as a telegraph operator on the Louisville and Nashville Railroad at Chipley, Fla. He has been United

States attorney for the Northern District of Florida and State attorney, first judicial circuit, of the same State. He is one of the youngest members of the House of Representatives at Washington, and represents the Third Florida district.

MESSRS. OTTO VON FEJER and B. E. DE PASKAY, counselor and plant superintendent, respectively, of the Hungarian Royal Post and Telegraph Administration; EUGENE KAISER, vice-director of the Telephone Centre, and A. DE TERSZYTYANSKY, engineer, Hungarian Royal Post and Telegraph Administration, Budapest, Austria-Hungary, are making a very short visit to this country for the purpose of inspecting and studying the advance made in the art of telephony. These officials visited the offices of the American Telephone and Telegraph Company and the New York Telephone Company and were greatly impressed by the magnitude of the work carried on by these companies and the efficient and reliable manner in which the business is conducted.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. P. BRUCH, vice-president of this company, made an address on "Government Ownership of the Telegraphs" before the January meeting of the Get-Together Club, at Hartford, Conn., on January 20. He argued against the proposition.

MR. H. A. TUTTLE, president and general manager of the North American Telegraph Company, Minneapolis, Minn., accompanied by Mrs. Tuttle, sailed from New York on January 24 for Nassau, Bahamas, where he will remain for a month on vacation.

MR. H. W. HETZEL, of the auditor's department, New York, is making a trip of inspection through the New England States.

AMONG RECENT EXECUTIVE OFFICE VISITORS were C. F. Thompson, chief operator, Washington, D. C.; S. L. Dickson, chief operator, Baltimore, Md.; J. D. McDonald, chief operator, Boston, Mass., and H. G. Hadden, general manager, Martha's Vineyard Telegraph Company, Woods Hole, Mass.; H. C. Shaw, division engineer, Chicago.

MANAGERS APPOINTED.—Managers have been appointed as follows: J. L. Liston, Washington, Pa.; G. E. Widel, Franklin, Pa.; Ira C. Bruce, Winslow, Ariz.; L. E. Russell, Muscatine, Ia.; O. R. Beatty, Fremont, Neb.; H. H. Schaeffer, Bucyrus, Ohio.

JAMES F. MORAN, aged thirty-five years, manager of the Board of Trade office of this company at Toledo, Ohio, died on January 8.

MR. CLARENCE A. MATHANY, whose appointment as manager for this company at Columbus, Ohio, was announced in our issue dated January 1, is a native of Ohio, having been born in North Bristol, June 15, 1864. He entered the telegraph service on the Atlantic and Great Western Railway at Cortland, Ohio, July 1, 1880, and on August 4, 1883, became associated with the Postal Telegraph-Cable Company, with which interest he has been connected ever since.

POSTAL'S NEW TARIFF BOOK.—The revised tariff of the Postal Telegraph-Cable Company, for 1914, has been issued. It contains 670 pages of printed matter and 11 pages of maps. After the list of offices, which is printed on white paper, follows general instructions regarding money transfer service (blue paper) rules, rates and instructions to be observed in dealing with cablegrams with the Commercial and connecting cable companies (pink paper) and Book of Rules, on yellow paper. The maps show the cable routes of the Commercial Cable Company and those of connecting companies throughout the world. The book also gives complete information regarding wireless service with steamers at sea. Mr. Isaac Smith, superintendent of tariffs, New York, is to be congratulated on the excellent results of his labor as exemplified by this book.

MAGNETIC CLUB COMMITTEES.—Mr. C. F. Leonard, president of the Magnetic Club, New York, has appointed the following committees for the year 1914: Entertainment Committee—Felix J. Kernan, chairman, Leona Lemon, Theodore L. Cuyler, jr., Juan de Jara Almonte, Marston R. Cockey, Eugene P. Tully; Reception Committee—E. B. Pillsbury, chairman, E. Reynolds, C. C. Adams, D. F. Mallen, F. E. McKiernan, J. J. Ghegan, J. P. O'Donohue, J. B. Taltavall, J. J. Whalen; Membership Committee—F. F. Norton, chairman, J. A. Manning, T. J. Donovan, H. W. Hetzell; Finance Committee, C. Shirley, chairman, I. Smith, J. F. Skirrow.

The Situation in the Telegraph-Telephone Separation.

The work of arranging the details for the separation of the Western Union Telegraph Company from the American Telephone and Telegraph Company is going forward, but it has not yet advanced to a point where anything can be announced publicly. One of the recent developments in the relations of the two interests was the announcement of the recording of a lease from the New York Telephone Company to the Western Union Telegraph Company of the eleventh to the seventeenth floors of the Walker-Lispenard Building, on Walker and Lispenard streets, New York, for twenty-one years, from May 1, 1913, to January 1, 1934, at an annual rental of $83,670.

In a recent statement President Theo. N. Vail said that the financial condition of the Western Union Company was never better, and unless conditions change very much for the worse the shareholders of the company are on the eve of getting some return for their patient waiting, and this return should be continuous and increasing.

The American Telephone and Telegraph Company is now engaged in the development of plans for carrying out its decision to give toll line service to independent telephone companies. It is the company's desire to be as liberal as possible in these matters and it is hoped that its plans will meet with the approval of the independent companies.

Referring to the labor involved in preparing a practical scheme of operation, Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company says:

"No one seems to have any idea of the countless ramifications involved. I didn't myself when I made the toll service provision in my letter of negotiation. But since our operating force has taken up the work of determining the necessary new schedules of charges, this phase of the matter has presented itself to me very forcibly by the many questions—minute in detail but very essential to our plan—which have been put to me for decision."

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MESSRS. NEWCOMB CARLTON and BELVIDERE BROOKS, vice-presidents; W. N. FASHBAUGH, general superintendent of traffic, and G. M. YORKE, general superintendent of plant, have returned from their trip of inspection through the Middle Western States.

MR. J. B. VAN EVERY, vice-president, New York, will leave New York on February 2 for Southern California, where he will spend an indefinite period of time for the benefit of his health.

MR. WM. HOLMES, superintendent tariff bureau, has gone to Nassau, N. P., where he will remain until May 1. In the meantime he may take a trip to Jamaica.

VISITORS AT HEADQUARTERS.—Among recent business visitors were: R. W. Whitehead, division plant superintendent, Chicago, and E. Parsons, district plant superintendent, Cleveland, Ohio.

MR. J. D. FELSENHELD, formerly assistant to Manager W. A. Porteous, at New Orleans, La., has been appointed manager at Houston, Tex., to succeed Mr. Ramond D. Gould, who has gone to Los Angeles, Cal., to study osteopathy. Mr. Kirk Reese will remain as assistant to Mr. Felsenheld.

RETIREMENT OF MR. GILSON.—Mr. S. L. Gilson, former manager of the Pittsburgh, Pa., office of this company, has retired, after an active service with the company for over fifty years.

WESTERN UNION IN SAN FRANCISCO.—The Western Union Telegraph Company in San Francisco, Cal., is the subject of an article in the *San Francisco Chronicle*. The article is general in character. Mention is made of C. H. Gaunt, general manager, Horace C. Chace, division traffic superintendent, and H. J. Jeffs, district traffic superintendent. A portrait of Mr. Jeffs is shown.

ELECTRICAL STUDENTS INSPECT NEW TELEGRAPH HEADQUARTERS.—Professors Esty and Siefert, of Lehigh University, Bethlehem, Pa., with the senior students in electrical engineering, on January 7 made an inspection of the new telegraph installation in the Walker-Lispenard building in New York. They also inspected the telephone installation.

MORSE ELECTRIC CLUB ELECTION.—The annual meeting of the Morse Electric Club, New York, was held on January 14, and officers were elected as follows: President, Belvidere Brooks; Vice-Presidents, W. J. Dealy and A. G. Saylor; Secretary, W. C. Merly; Treasurer, R. J. Murphy. Messrs. Gardner Irving and M. H. Kerner were elected directors for three years. The winter dinner of the club will be held at the Hotel Knickerbocker, New York, Forty-second street, at Broadway, Saturday evening, February 21. A number of prominent gentlemen will be guests of the club, and a suitable entertainment programme is being arranged. Mr. R. J. Murphy, 195 Broadway, is treasurer, from whom tickets may be obtained not later than February 18.

THE CABLE.

THE CABLE STEAMER "MACKAY-BENNETT," belonging to the Commercial Cable Company, has finished overhauling the cables off the coast of Ireland and is in London preparatory to returning to this side of the Atlantic.

NEW JAPAN-CHINA CABLE.—As a result of negotiations with the Great Northern Telegraph Company, the Japanese Department of Communications will this year lay a submarine cable between Nagasaki, Japan, and Shanghai, China.

CANADIAN NOTES.

HON. G. A. COX, aged seventy-four years, a prominent Canadian senator and financier, and a former telegrapher, died in Toronto, Ont., on January 16. He started his business career in the service of the old Montreal Telegraph Company as an operator and was for three years manager of the Toronto office of that company. He left the telegraph business to engage in life insurance. He was mayor of Peterboro for seven terms, and was active in politics, philanthropy, education, temperance and church work and his varied business ventures and affiliations yielded him a large fortune.

CANADIAN GOVERNMENT TELEGRAPH SYSTEM.—The Canadian Government telegraph system added 1,150 miles of new lines during the past year. The telegraph lines owned by the government now aggregate a length of 9,792 miles. The most important extensions during the year were made in British Columbia, the Prairie Provinces and the Yukon.

MONTREAL TELEGRAPH COMPANY'S DIVIDEND.—From the revenue derived from the investment of the Montreal Telegraph Company's contingent fund the twelfth annual bonus, amounting to $5,000, was declared at the sixty-seventh annual meeting on January 8. Quarterly dividends amounting to $160,000 were paid, this being at the rate of eight per cent.

MUNICIPAL TELEPHONES IN EDMONTON.—The statement of the municipal automatic telephone system at Edmonton, Alta., Can., for the first eleven months of 1913 shows an increase of 2,826

telephones over the previous year. The revenue for the year 1912 was $100,773, while the estimated revenue for the year ending December 31, 1913, is $195,000. The capital invested in the telephone department in 1912 was $862,074, for 1913 it will be approximately $1,800,000. Work is at present in progress on the laying of 11,100 miles of underground cable pairs, and it is expected that this will be completed in February.

NEW OFFICE AT HAMILTON, ONT.—The Hamilton, Ont., office of the Great Northwestern Telegraph Company has been completely overhauled, re-wired and re-equipped, giving Hamilton an office on a par with the best of the company. A large steel frame switch with slate charging panel in one end has been installed, together with new natural white oak operating tables throughout. The placing of a special steel protector rack takes care of the liability of damage through high-tension crosses on outside lines, while a new storage battery furnishes power for the lines, the battery being charged by a motor-generator. Great improvement in working conditions is to be expected from the new plant and its installation is another step in General Manager Perry's policy of placing all offices upon an up-to-date footing. The work was done under the supervision of Mr. Chas. E. Davies, supervisor of equipment, and H. K. Clark, electrician for the company.

Death of Lord Strathcona.

Donald Alexander Smith, Baron Strathcona and Mount Royal, aged ninety-three years, Canadian High Commissioner, died in London, England, January 21. He was a native of Scotland and went to Canada when he was eighteen years old. In 1838 young Donald Smith was a junior clerk for the Hudson's Bay Company, and in 1898 he became a peer of the realm. He was one of the richest men in the world and gave millions to charity. In 1871 he was elected to the Dominion Parliament as a representative of Manitoba. Thereafter he was recognized as one of Canada's great statesmen. In later years his most notable services were in the line of railway and waterway development in his adopted country. He took up the project of building the Canadian Pacific Railway and carried the great work to completion, himself driving the last spike, on November 7, 1885. In 1886 he was knighted. Baron Strathcona gave several millions of dollars to educational and other public institutions. In early life he was a poor boy and had only a common school education. He was a director in many Canadian public enterprises, including the Canadian Pacific Railway, the British Pacific Cable, the Commercial Cable Company, and other like enterprises.

MR. W. C. DAVIET, superintendent Postal Telegraph-Cable Company, Louisville, Ky., in remitting to cover the renewal of his subscription for another year, writes: "You did right in renewing my subscription, as I would not like to miss receiving the paper, even for a single issue."

THE TELEPHONE.

MESSRS. THEO. N. VAIL, president, and FREDERICK P. FISH, of Boston, former president of the American Telephone and Telegraph Company, were among those at the annual dinner on January 17 of the New York Alumni Association of the Massachusetts Institute of Technology. President Richard C. MacLaurin was the guest of the evening.

MR. E. J. HALL, vice-president of the American Telephone and Telegraph Company, and J. C. Vail, formerly assistant treasurer of the same company, now retired, and a son of Alfred Vail, a partner of Prof. Morse in developing the telegraph, are at Miami, Fla., for the winter months.

MR. CARL T. KELLER, assistant general manager of the New England Telephone and Telegraph Company, Boston, Mass., has resigned.

MR. E. F. SHERWOOD, general superintendent of traffic, New York Telephone Company, has been appointed chief engineer of that and the other companies constituting the eastern group of Bell Telephone Companies. Mr. Sherwood succeeds the late R. M. Ferris, who was drowned last summer. Mr. J. H. Gordon, jr., traffic engineer of the New York Telephone Company, has been appointed general superintendent of traffic, vice Mr. E. F. Sherwood.

MR. R. H. BOGGS, division superintendent of traffic for Long Island, of the New York Telephone Company, has been appointed traffic engineer, vice J. H. Gordon, jr., promoted.

MR. E. E. BAWSEL, special agent, Southern Bell Telephone and Telegraph Company, Atlanta, Ga., has been appointed general manager of the Cumberland Telephone and Telegraph Company, with headquarters at Nashville, Tenn.

MR. J. S. KENNEDY, formerly secretary of the Public Service Commission, Second District, New York, has been appointed secretary of the Benefit Fund Committee of the Eastern group of the Bell System, succeeding Mr. T. P. Sylvan, who has been relieved of this duty on account of the press of other duties which have been assigned to him as assistant to the vice-president.

MR. A. S. CAMPBELL, general superintendent of lines, American Telephone and Telegraph Company, New York, and Mr. W. D. Staples, division superintendent of plant, of the same company at Kansas City, Mo., who were seriously injured some three months ago, in an automobile accident at Wellington, Col., are now on the road to recovery. Mr. Campbell suffered a very severe cut in the head and Mr. Staples a serious injury to his hip. The accident occurred in connection with their work on the transcontinental line through Colorado. Mr. Campbell has returned to duty after an absence of three months.

MUNICIPAL TELEPHONES IN HULL, ENGLAND.—The corporation of Hull, England, has decided to purchase from the Post-Office the telephone system in its own area. The license will be for

twenty-one years. It is stated that Hull will be the only town in the United Kingdom to conduct its own telephone service.

BOSTON PLANT CHAPTER.—The regular meeting of the Boston Plant Chapter, Telephone and Telegraph Society of New England, was held January 27 at the American House, Boston. Mr. E. K. Hall, vice-president, New England Telephone and Telegraph Company, gave "An Intimate Talk on Some of the Larger Problems of the Company."

DALLAS DEVELOPMENT.—At the request of Mr. Frank B. Knight, special agent of the Southwestern Telephone and Telegraph Company, Dallas, Tex., Mr. J. R. Babcock, secretary of the Dallas Chamber of Commerce, has sent us a full line of Dallas advertising literature. The citizens of that enterprising place certainly have good reason to be proud of their city, its growth and commercial development.

BELL EARNINGS.—The earnings of the Bell Telephone System in the United States for the eleven months, ending November 30, shows the following results: Gross earnings, $197,452,138, an increase of $16,041,055, as compared with the gross earnings for the corresponding period in 1912; expenses, $143,593,986, an increase of $14,994,383; net earnings, $53,858,152, an increase of $1,046,672; surplus, $10,881,313, a decrease of $2,116,921.

HOLDING TELEPHONE MESSAGES FOR DELIVERY.—The Postmaster-General of Great Britain is said to be considering the feasibility of adopting an arrangement by means of which a telephone subscriber, on payment of a small annual charge, may have messages from callers who ring up during the subscriber's absence from home taken down by the operator at the exchange and forwarded on his return. The system is in operation in France.

New York Telephone Company's Statement.

The New York Telephone Company has submitted to the Public Service Commission a statement of its receipts and expenses, as ordered by the commission in the New York City rate case. The report shows the income of the company to have been as follows:

	1912.	1913.
Telephone operating revenue	$26,162,280.86	$28,056,423.07
Operating expenses	12,983,429.90	14,335,453.51
Net telephone revenue	13,983,429.96	13,720,969.56

From the net revenue are deducted uncollectable operating revenue and taxes assignable to operations, leaving a balance of $11,730,974.39 in 1912, and $11,873,433.70 in 1913. Other deductions made reduce the net revenues to $10,603,251.57 in 1912, and $10,635,271.87 in 1913.

Convention of National Independent Telephone Association.

The seventeenth annual convention of the National Independent Telephone Association was held in Chicago, January 13, 14 and 15, and was attended by about 300 persons.

President Manford Savage of the association took as the subject of his address the "Conservation of the Stockholders of Operating Companies." He dwelt upon the changes necessitated by the progress of the times and referred particularly to the new telephone era.

Mr. Wm. Fortune, president of the Indianapolis Telephone Company, Indianapolis, Ind., made an informal address on the subject of the income tax law.

A banquet was held at the Hotel La Salle on the evening of January 14. No speeches were made, but an interesting vaudeville entertainment, cabaret and other features were provided by the entertainment committee. A feature of the decorations was a large illuminated Independent Telephone shield conspicuously displayed in the hall.

Officers were elected as follows: President, N. G. Hunter, of Wabash, Ind.; vice-president, C. Y. McVey of Cleveland, Ohio; secretary-treasurer, F. B. MacKinnon, of Topeka, Kan. It had been announced that Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, would be present to explain as far as possible the plans of his company to carry into effect the recently announced toll-line policies of the Bell Company. Mr. Kingsbury, however, was unable to attend, but sent a message in which he stated that his company was working out the details of the plan. "There are many complications," he stated, but we shall do what we can to make the operation of the plan a complete success. Our attitude is to do much and do it as well in the way of co-operation along the lines proposed as we consistently can, and not as little."

New Long-Distance Exchange Opened in New York.

At 10 p. m., January 24, the long-distance operating room of the American Telephone and Telegraph Company was transferred from 15 Dey street to the company's new building at 24 Walker street, New York.

At a given signal the connections were duplicated in the Walker street building, and at another signal they were disconnected from the Dey street building without any interference of traffic.

The new long-distance office is the largest in the world, and is located to serve, most conveniently, exchanges in New York City and suburbs, and in other surrounding cities. In this office conversations may be had with Chicago, Milwaukee, Omaha, Denver and, within the year, it is hoped, with San Francisco.

The equipment is the most improved and modern known to telephone art. The switchboards and testboards occupy three floors of the Walker street building, extending from Walker street through to Lispenard street.

There are 350 employes in the long-distance office, of which number 250 are on duty at one time during the busy hour, between 10:30 and 11:30 a. m. In this one hour one-sixth of the entire business of the day is done. At the start, about 15,000 outgoing

and incoming calls will be handled in this office each day.

There are attractive and comfortable retiring rooms, up-to-date dining rooms and a hospital for the use of operators who become indisposed during the tour of duty.

Among the groups of circuits which center at this office are eighty-eight circuits to Philadelphia, thirty-five to Boston, ten to Albany, twelve to Pittsburgh and three to Chicago. The circuits to Philadelphia are underground all the way, and there are also underground circuits available between New York and Baltimore, New York and Washington and New York and New Haven.

Delicate electrical apparatus is provided to detect trouble on the circuits with accuracy and dispatch. Toll tickets are distributed, by means of pneumatic tubes, from the operators who take the calls to those who complete them.

There is a training school for operators in three divisions: A lecture room, a study room and a practice room, where there is equipment similar to that used for commercial work, from which the operators can gain experience. The course of training requires about two months before the students become regular operators.

The cost of this new equipment is approximately $500,000.

RADIO TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company, New York, is on a trip of inspection to the Pacific Coast, where he will visit the company's high-power stations, etc. He will be absent until the middle of February.

LIVES SAVED BY WIRELESS.—Mr. William Marconi states that between 3,000 and 4,000 lives have been saved at sea by the use of wireless.

WIRELESS IN MEXICO CITY.—A German wireless telegraph company has contracted to erect a wireless station in Mexico City, Mex., to enable provisional president Huerta to maintain communication with the Federal troops in various parts of the country.

QUENCHED SPARK.—It is claimed that by the use of the quenched spark in wireless telegraphy a higher spark frequency is obtained; shorter aerials may be used because of the increased radiation; a greater percentage of the energy is rendered available for radiation; and tuning is greatly facilitated.

WIRELESS ON FISHING VESSELS.—The owner of a large fishing fleet at Lowestoft, England, will install Marconi wireless apparatus on board the principal vessel of the fleet, which will keep in touch with the other vessels of the same fleet during the whole of each fishing expedition off the East Coast.

WIRELESS IN STRAITS OF MAGELLAN.—The seven tubular masts, each 269 feet high, are in place at the wireless station at Punta Arenas, Chile, and it is expected that the station will be ready for operation in a short time. Two of the masts have been in temporary use and communication was had with the Falkland Islands, and with vessels in the Straits of Magellan.

WIRELESS IN THE ARCTIC.—The Marconi Wireless Telegraph Company is engaged on the construction of new wireless telegraph stations in the Arctic Circle at Ketchikan and Juneau. At Ketchikan the plant will be fifty kilowatts in capacity, and will be capable of working with Seattle, 600 miles to the south, and with Juneau, 200 miles further north. The Juneau station will have a ten-kilowatt transmitter.

WIRELESS IN GEODESY.—As the result of protracted observations conducted between the Eiffel tower in Paris and the Government station at Arlington, Va., it has been ascertained that the difference in longitude between those stations is 279 feet greater than had been supposed. The stations are 3,835 miles apart, and the time occupied by the wireless signals in traversing this distance twice is estimated at 0.063 second.

WIRELESS MESSAGES EXCHANGED WITH TRAIN ON LACKAWANNA.—Wireless messages were successfully sent and received January 22 between a special train on the Delaware, Lackawanna and Western Railroad, which carried 500 members of the American Society of Civil Engineers from Hoboken to Nicholson, Penn., and back, and the *New York Times*. The train's speed was from fifty to seventy-five miles an hour in the open country.

WIRELESS POSITIONS.—Any operator who holds a first or second-class commercial wireless operator's license or who can pass a Government examination for these classes of licenses and wishes to enter the wireless service, should send his name and address to Mr. W. D. Terrell, radio inspector, Custom House, New York, stating the minimum salary he would accept. Mr. Terrell occasionally has calls for operators for steamers with other than the Marconi equipment.

RADIO FROM WASHINGTON TO MANILA, DIRECT.—Recent experiments at the Arlington, Va., radio station showed that it was able to pick up messages sent from a Poulsen arc set of radio instruments at Honolulu, and tests recently conducted at San Francisco with a Poulsen set demonstrated that messages could be sent direct from San Francisco to Washington. Engineers in charge are planning to establish radio communication direct from Washington to Manila.

DANGERS OF OIL-GAS EXPLOSION BY WIRELESS SPARKS.—Mr. A. J. Tyrer, acting commissioner of navigation, Washington, D. C., has directed all radio inspectors to be rigid in their examination of wireless on tank vessels and others carrying material which might be set afire by sparks. "You will pay particular attention," said the order, "to the insulation of the antennæ to metallic rigging or equipment of the vessel in which currents may be induced by the action of the radio apparatus and to the wiring and electrical equipment of the vessel in which currents may be induced so as to cause sparks to jump between wires or between small gaps."

RADIO STATIONS OF THE UNITED STATES.—Mr. W. D. Terrell, Government radio inspector, New York, states that Supplement No. 1 to the list of radio stations of the United States, edition of July 1, 1913, has been issued by the Department of Commerce, covering all additions and alterations to October 1, 1913. The new supplement contains twenty-seven pages and can be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at ten cents per copy.

SHIP WIRELESS IN NEW ZEALAND.—The Governor of New Zealand has made regulations to take effect on July 1, providing that any steamship registered in New Zealand and carrying passengers, which is engaged in the foreign or intercolonial trade, and any home-trade steamship authorized to carry not less than 150 passengers at sea, will not be allowed to leave a New Zealand port unless she is equipped with a wireless telegraph installation having a radius of at least 100 miles and carries a skilled operator.

INTERNATIONAL CONGRESS ON SAFETY AT SEA.—The work of the revision committee of the International Congress on Safety at Sea, held recently in London, England, was finished January 19. Among the results of the deliberations, the American wireless systems were approved by the European delegates. This gives control of the apparatus and the supervision over the operations of the employes to the American Government, whatever the nationality of ships may be, whenever the latter are coming into or departing from American waters. This agreement preserves intact the private code signals or any country reserves for war. Only one code will be used for any distress call. This will assure its being understood by all ships within range.

Wireless Clubs.

The Wireless Club at Massachusetts Institute of Technology, Boston, has elected officers as follows: president, A. R. Morton; vice-president, D. R. Husted; secretary, R. E. Curtis; treasurer, H. W. Lamson.

The Falls City Amateur Wireless Club has been organized in Louisville, Ky. Mr. Wallace W. Smith, 190 Pennsylvania Avenue, is secretary.

Tropical Radio Telegraph Company.

The Tropical Radio Telegraph Company operates and controls the radio stations at New Orleans, La., and Burrwood, La., and on twenty-two steamers of the United Fruit Company. The power of the New Orleans station is fifty kilowatts and that of the Burrwood station is two kilowatts. In addition to handling the usual radiograms to and from ships at sea, the New Orleans station is the terminus of the radio service between the United States and Central and South America, connecting with the fifty kilowatts station at Swan Island, 850 miles south of New Orleans. Mr. George S. Davis is general superintendent of the Tropical Radio Telegraph Company, with headquarters at New Orleans, La.

Brown Relay for Wireless.

The relay invented by Mr. S. G. Brown, of London, England, for amplifying feeble currents in submarine cables and in telephony, has also been employed to a considerable extent in wireless telegraphy to reinforce the currents at the receiving end. The relay for this purpose differs in some respects in design from the one employed for telephony, but the main principle is the same, the secondary contacts being made by a reed, the tension of which is balanced by a magnet. Mr. Brown has also given considerable attention to the design of a sensitive telephone, particularly for receiving wireless telegraph signals. Instead of the usual diaphragm, he employs one of conical shape, made of very thin aluminum sheets about 0.002-inch thick, the center of which is fixed to the end of an adjustable reed which is acted on by the receiver magnet. The diaphragm is held in position by a paper or collodion edge. This has the advantage over the ordinary diaphragm that the diaphragm itself is far less rigid and consequently more sensitive. The natural period of vibration of the system can be adjusted by means of the reed. The arrangement also represents an improvement of the magnetic circuit over that of the ordinary receiver and enables the air gap to be adjusted with accuracy. In place of one central hole in the earpiece, several smaller holes are employed. With these telephones very much smaller currents can be heard than with the ordinary types. Experiments have shown that their substitution for ordinary telephone receivers increases the range of audibility by the equivalent of five miles of standard cable.

A description of the Brown relay was published in our issue dated February 16, 1913.

Associated Press Headquarters to Move.

The general offices of the Associated Press will, on May 1, be moved from the Western Union Building, at 195 Broadway, to 51 Chambers street, New York. The change is made necessary on account of the demolition of the old telegraph headquarters at 195 Broadway to make room for the new building which is to be erected on the site.

Old-Timers' Organization in Seattle.

About seventy old-time telegraphers in Seattle, Wash., held a reunion in that city recently, and a permanent organization will likely be effected. The territory to be covered by the association will include the northwestern portion of Washington.

A YOUTHFUL OPERATOR.—Albert Brock started as a messenger for the Western Union Telegraph Company at Austin, Tex., at the age of thirteen years, and a year later became a good typewriter operator. Mr. O. D. Parker, manager of the office, states that young Brock has worked hard and deserves great credit.

Mr. W. J. Doherty, Miles City, Mont., writes: "Here are two cartwheels to roll the AGE into 'old cow town' for ensuing year."

Telegraph and Telephone Age

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CABLE ADDRESS: "Telegage," New York.

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

NEW YORK, FEBRUARY 1, 1914.

The Importance of Life Insurance.

Much of the misery and suffering in the world is due to the thoughtlessness and improvidence. "Take no thought for the morrow" is too real to many people and the morrow comes with trouble and want, through neglect. It is a universally recognized principle that since man must earn his living by work, he should reserve a part of his earnings to support him through the periods of sickness or other misfortune. This principle is applied very rigidly in business activities, and there is no reason why it should not be applied to private affairs.

Many men possess the strange notion that to save something to tide over the storms of life is a form of parsimony, and never give a thought that those depending upon them are the real sufferers in case misfortune overtakes them. The management of private affairs, of course, concerns the individual alone, but every man should be taught the necessity and importance of economy. Economy should be practiced with judgment, however. There is as much danger of becoming too economical as there is of becoming improvident, and in these matters, as in all others, the middle course is the only safe one to adopt.

There are many operators throughout the country with families that never think of making provision for the comfort and maintenance of their dependent ones in the event of sickness or death. This is not always due to indifference, but rather to thoughtlessness. They are frequently of a charitable nature and tend to practice unduly the belief of bearing a share of the burdens of others as well as their own. The sharing of others' burdens is, of course, a very commendable trait, but the admonition, "charity begins at home," should also be considered. Operators and other employes of telegraph and telephone companies who do not practice the habit of laying aside a portion of their earnings, as a reserve for times of distress, should give thought to this important subject. Many of them may say: "It takes all I can earn to live," but it is sometimes questionable whether this is true. If a man makes this excuse so as to justify his extravagances, then there is hope for reformation. Sometimes a little lesson on economy will give such persons an understanding of the subject that they had not before, and put them in the way of becoming independent.

The main point we wish to bring out is that every employe should endeavor, by all means possible, to provide for those depending upon them in case his income is stopped by death. The practice of making up purses for the relief of distressed families of deceased operators is too common and is, to a great extent, inexcusable, because it is avoidable. Every operator, or employe, if he has a family depending upon him for support, should be required to take out some life insurance for their benefit.

Some of the cable companies have always insisted that their employes carry some life insurance, and the effect of this policy has been to build up a self-respecting and self-reliant corp of employes that cannot be excelled anywhere in the world. If all employing companies should make a similar requirement one of their rules, the result, no doubt, would be highly beneficial to employer and employe alike.

Cases are brought to our attention almost every week where well-known operators die penniless, wholly through their improvidence. Their families did not have sufficient means to give them a decent burial, so their associates and friends, in numerous cases, have to be called upon for donations for that purpose. In one recent case personal effects of the deceased were offered for sale in order to help meet the emergency. This man had been frequently advised and urged to take out a life insurance policy, but neglected to do so, giving the excuse, "What is the use? I am a healthy man and will outlive those depending upon me." This is not an exceptional case; there are hundreds of others throughout the land. It behooves every employe, therefore, especially those who are married and have families to support, to give this matter serious thought and take action upon it. There are very few men, indeed, who cannot pay a small amount of their earnings toward life insurance. The knowledge that those dependent upon them will have something left to take care of them has a wonderful effect in building up character and a spirit of independence and self-reliance.

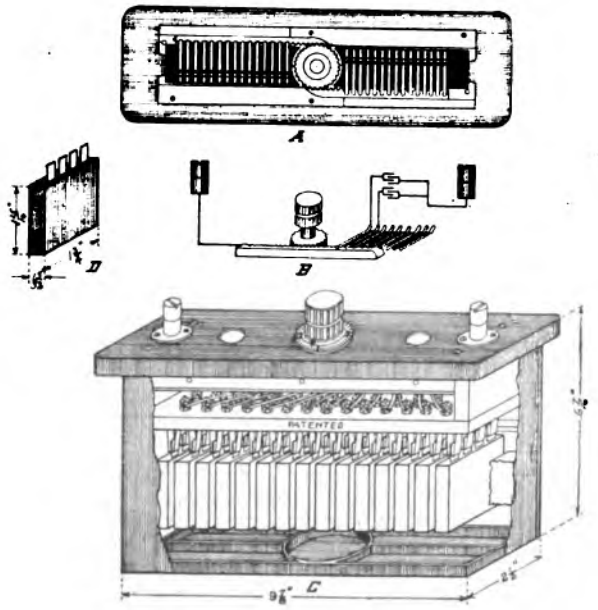
TELEGRAPH IN HAWAII.—The Mutual Telegraph Company, of Honolulu, H. I., will, on February 1, reduce its tolls for messages to island points. It will also discontinue the minimum charge hitherto in force.

Postal Telegraph-Cable Company's Adjustable Condenser.

BY J. F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The type of adjustable condenser herein described was devised some time ago for use in connection with multiplex circuits, but no description of it has heretofore been published. It has been thoroughly tried and gradually improved so that it now appears in the form illustrated, which is probably its final shape.

When the writer was a chief operator twenty years or so ago and had to "balance" about forty quadruplexes and duplexes between seven and eight o'clock each morning he found that the worst stumbling block in the way of quick work was the old-fashioned condenser with its numbered peg-holes. The various combinations of pegs and holes were a "put down 6 and carry 2, gee but this is hard to do" sum. Some years later when it fell to



SKIRROW ADJUSTABLE CONDENSER.

his lot to design apparatus the condenser problem was attacked and an endeavor made to eliminate mathematics as a factor in adjusting condensers. The condenser described is the result.

In designing the new instrument, rolled type units were utilized to gain the advantages of economy, reduced size and sectional unit construction.

The condenser (C) as now constructed consists of fifteen small units (D). Each unit case contains two 1/10 microfarad condensers of Siemens-Halske make. There are thus thirty condensers of a combined capacity of three microfarads. The units are snapped into position in spring clips in such a manner that they can be instantly withdrawn when desired. The clips are wired to flat spring fingers, the free ends of the fingers being in line with but slightly below the surface of brass rack bars. The rack bars shown at A in the illustration are moved horizontally by a pinion gear actuated by an insulated knurled knob. Fifteen spring fingers contact with one bar and fifteen with another bar. The thirty contact fingers form the connections to one side of each of the 1/10 microfarad condensers. The other thirty terminals of the condensers all connect to a single binding post. (See B.)

When the gear is rotated by its knob one of the rack bars picks up finger No. 1. The other rack bar next picks up the first finger on its side. The first bar then picks up the second finger, then the second bar its second finger and so on until all the fingers are in contact with the two bars. In this way the entire condenser capacity is connected through the bars and thence to a binding post.

A pointer under the knob rotates over a scale from zero to three divided in tenths, indicating the capacity connected to line. In operation all that is necessary is to turn the knob until the pointer is at zero and then to gradually cut in capacity by rotating the knob until the desired results are secured. The scale may be consulted if desired to ascertain the capacity connected.

The condenser units are of low cost and in the event of a breakdown can be replaced locally in a few moments' time. Tests are easily made to determine the location of any unit of low insulation. The outside case of the condenser is of sheet steel supported upon an iron frame and the size and weight of the whole condenser is about one-third that of the plate type condensers formerly used. The new condenser does away with the need of returning condensers for repair and reduces the first cost of transportation. The cost of repairing leaky or burned-out condensers of the plate type is so high that such repairs are seldom worth while.

The new condenser is provided with removable markers to indicate the set or the position on the set to which it is connected. The diagram shows an outline of connections and gives the dimensions of the units and the complete condenser.

This type of condenser has proved in practice to be a time and money saver. Balances on multiplex circuits can be secured in much less time than formerly and many shipments of defective condensers back and forth are avoided. In this connection as an indication of time-saving possibilities it may be noted that on a circuit such as New York-San Francisco with say five repeaters, thus including twelve duplex sets, one minute saved per day at each set in balancing may save twelve minutes of circuit time.

THE BAUDOT SYSTEM IN ENGLAND.—Successful experiments have been made between the London and Birmingham telegraph offices with an elaboration of the Baudot duplex instrument, by which it is possible to make a single wire carry twelve messages simultaneously, says the London *Electrical Review*. Hitherto the limit has been eight simultaneous messages in practical working. The Baudot system is to be adopted between London and Glasgow and Liverpool.

Course of Instruction in the Elements of Technical Telegraphy.—LVI.

(Continued from page 44, January 16.)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

The Quadruplex (*Continued*).

We will now consider the action of the Smith arrangement (Fig. 75). Let an electromotive force of, say, 300 volts, be applied to the two lines at the point J, and let these two branches have a resistance of 3000 ohms each, then, assuming, in the first place, that the distant station is on ground, and that a balance between the main and artificial lines has been obtained, there will be no difference of potential at the terminals of condenser C, which, consequently, will receive no charge whatever from the home battery. This is evident from the fact that the resistances of M L and A L are equal, and the condenser terminals being equally distant from the point of application of the battery, the electrical pressure at the main line terminal of the condenser must be precisely the same as that at the terminal connected with the artificial line.

The resistance of R and R^1 being 600 ohms each, and the total resistance of each line 3,000 ohms, the fractional part of the total resistance overcome at each condenser terminal is $\frac{600}{3000} = \frac{1}{5}$. A corresponding fraction of the E. M. F. having been expended in overcoming this resistance, the potential at each condenser terminal is 1/5 of 300 = 60 volts; 300 — 60 = 240 volts.

We will now assume that the distant station has cut in his battery and presented to line an opposing electromotive force of similar value to that at the home station, *viz.*, 300 volts positive potential.

Each end of the main line is now at the same potential, and, assuming a perfect state of insulation, the potential at all points along the main line is the same. The pressure at the M L terminal of condenser, C, is, consequently, 300 volts. But, as the end of the artificial line is to ground, the fall of potential in that branch remains unchanged and the potential at the A L terminal of the condenser is still 240 volts. Hence, the latter receives a charge, due to the difference of potential of 60 volts, from the point of higher potential, *viz.*, the M L terminal, and, in charging, sets up a momentary current in the extra coils of E C in a direction assisting the magnetization of the core; that is, in the same direction as that in which the current is traversing the A L coils. Now, at the moment of reversal of the distant pole-changer, when the battery is momentarily short circuited, the condenser will discharge, through E C, in a direction opposite to that taken by the charging current, and will tend to demagnetize the core of N R, and thus shorten the moment of no magnetism in the relay, since the condenser, by its discharge, leaves the core of N R in a condition to become promptly magnetized with an opposite polarity by the ensuing reversal of current, whose energy would otherwise be partly used up in changing the pre-existent polar conditions. When the reversal has been completed, or as soon as the negative pole of the distant battery is put to line, the potential falls from 300 above, at the home station, to 300 below zero at the distant station, the zero point now being at the center of the circuit. The M L terminal of the condenser is now at 180 volts, while its A L terminal remains at 240 volts, leaving a difference of potential of 60 volts between the two. But the condenser will now receive its charge from the artificial line terminal, which is at a higher pressure, or electrical level, than the corresponding M L terminal, consequently, the induced current will traverse the extra coil, E C, in a reverse direction to that taken by the previous charging current.

When the proper connections are made, the direction of the condenser currents due to a charge of either polarity will always be such as to assist and strengthen the magnetism excited in the neutral relay by the regular currents.

On the other hand, the direction at discharge will always tend to quickly deprive the relay of its previously existing magnetism. By the Smith device, the "time constant" of the relay is reduced, that is to say, the time required to neutralize and reverse the previous polarity, as well as raise the succeeding polarity up to the degree of strength requisite to hold the armature closed, is considerably shortened, and, consequently, the tendency of the relay to open, or kick, during this period of low magnetic intensity is diminished.

A disadvantage of this particular device consists in the necessity for the "Smith box," or set of resistance coils, represented by R and R^1 (Fig. 75), which adds about 1,200 ohms to the length of the circuit, and, therefore, with a given battery power, reduces the strength of the working current.

(To be Continued.)

The Western Union Multiplex.

Mr. Donald Murray, of London, England, inventor of the Murray multiplex printing telegraph, who is in New York, gave an interesting description of his system and its possibilities in an interview in the *New York Times* of January 25.

Mr. Murray said his system is based on the Baudot, a French system, invented about forty years ago, and widely used in Europe. The principle of the Baudot system is that a number of operators, working on a single wire, are by automatic interruptions of the current given in turn control of the line. The Murray invention does away with the five keys of the Baudot system and the necessity of learning their intricate combinations. The operator uses a typewriter keyboard and does not need to listen for his turn. The machine prints directly on the delivery form and automatically pages up for the next message. With the new keyboard and transmitter messages can easily be transmitted at the rate of forty-five words a minute.

"Printing telegraphy," said Mr. Murray, "is an old story. This is more than printing telegraphy—it might be called super-telegraphy. It is going to make as big a change in the telegraph situation as the linotype has made in newspaper offices.

"Since the invention of the electric telegraph, over four hundred printing telegraph patents have been taken out in the United States alone. Yet, except for the Hughes printing telegraph, the French Baudot system and the stock ticker these devices have been of little practical use, and at any rate in America the Morse key still reigns supreme.

"Now the speed of the stock ticker is only thirty or forty words a minute, and its use is confined to cities. The Hughes printing telegraph, so widely used in Europe, prints only thirty or forty words a minute, and it prints them on a tape, which must be pasted to telegraph blanks before delivery.

"During the past twelve or fifteen years many inventors have been at work on rapid printing telegraph systems. Prof. Henry A. Rowland, of Baltimore, invented an apparatus for transmitting eight messages simultaneously on one telegraph wire and printing them in page form ready for delivery. This system is not now in use, for it showed no saving of labor compared with the Morse key. Then there is the Buckingham-Barclay Automatic Printing Telegraph, which is still in use on about sixty telegraph circuits of the Western Union. It has achieved only limited success, and within a year or two it will be supplanted by the new multiplex printing telegraph. The Western Union purchased the United States rights of this from me two years ago."

"Before you can understand the difference between the Murray system and that now in use," said Mr. Murray, "you must understand the two fundamental principles of printing telegraphy—the automatic principle, and the multiplex principle. The automatic systems are based on the English Wheatstone automatic system and the multiplex systems on the French Baudot multiplex system.

"In the automatic telegraph systems the messages are first prepared in the form of perforated paper tape. This tape is run through an automatic transmitter that transmits the signals at high speed over the telegraph wire to the distant station, where they are printed at high speed by automatic mechanism.

"In the multiplex systems the work is not done at a high speed. Instead, an instrument called a distributor is used at each end of the telegraph line to give the line successively for a portion of a second to each of several operators. These distributors contain steadily revolving contact arms, which revolve in synchronism so that when the contact arm at Station A points to the 1 o'clock position the corresponding contact arm at Station B will also point to the 1 o'clock position. If the telegraph operator sends a signal into the line at the 1 o'clock position it is received at the other end of the line also in the 1 o'clock position, and so on for all the positions around the clock.

"With these distributors it is possible to have six operators at each end of the line, each sending his signal in turn. The signal is swept into the line at Station A, and then swept out of the line at Station B, into one of six printing machines, which print the signals. The operator works at a speed of only from thirty to fifty words a minute; but as there are several operators using one telegraph wire almost simultaneously the number of messages transmitted per hour may be very high.

"I saw several years ago that the multiplex system was proving its superiority over the automatic system for all ordinary telegraphic work. But I also saw that the multiplex system had its serious limitations, and that it was desirable to add to it the advantage of the automatic system. So I developed the Murray multiplex printing telegraph, taking the French Baudot system as a basis and adding to it machines with typewriter keyboards for preparing messages in the form of perforated paper tape, as in automatic systems. I provided each keyboard operator with a separate automatic transmitter of his own. This was done by the inventor of the Baudot system, but not satisfactorily, and his arrangement never came into general use.

"In the Baudot multiplex the operators send messages by means of five keys, much like Morse keys. At the receiving end of the line the messages are printed on a paper tape, the speed of each transmission being thirty words a minute. I have raised the speed to forty or fifty words a minute for each transmission, and provided automatic machines that print the messages in page form at the receiving station. I have added another new feature—a reperforator at the receiving station, by means of which messages sent over the telegraph wire are reperforated automatically at the receiving station and this perforated paper tape is used to retransmit the message on to another city. The messages are printed direct in page form simultaneously with the perforation of the paper tape. Two years ago the Western Union Telegraph Company bought the United States rights of my system and handed it over to the Western Electric Company to be developed to suit Western Union conditions.

The apparatus has only recently been put into practical use.

"The Western Union has a circuit between New York and Boston equipped with the apparatus, and eight messages are being sent simultaneously on one telegraph wire and printed ready for delivery at the other station. Although it has been in use only two months, New York and Boston are already exchanging nearly 3,000 messages per day of nine and a half hours. This is more than double the previous record of the Western Union, and it is considerably below the record that is to come.

"The Rowland system also transmitted eight messages simultaneously on one wire, but it transmitted the messages direct from a typewriter keyboard instead of by perforated paper tape. So when the Postal Telegraph Company tried it on several circuits a few years ago it was found that the output and the saving in labor were not sufficient to make it practical and it was withdrawn from use. The Rowland is the only completely developed high-capacity multiplex system that can be compared with the new Murray multiplex.

"The Baudot multiplex printing telegraph was invented about thirty-five years ago by M. Emile Baudot, a French telegraph official. It has been developed and improved extensively, and its use has spread all over France. In addition, the leading capitals of Europe are now all linked by the Baudot system. It is used also in Russia, India, Brazil, and other countries. The traffic between London and the continent of Europe is handled almost entirely by the Baudot system. In France the Baudot gives a maximum of six transmissions on one wire. On one wire between London and Birmingham, by means of what is called the duplex balance, the British telegraph engineers have obtained with the Baudot eight transmissions on one wire at thirty words for each transmission. Five thousand messages have been exchanged in one day between London and Birmingham by this Baudot installation. The British messages, however, average only twenty words, while the American messages average thirty words. So the Western Union Company transmitting three thousand thirty-word messages a day, has, after only two months' practice, nearly equaled the output of the octuple Baudot between London and Birmingham. When the Western Union operators have grown accustomed to the new apparatus they will easily break the British record.

"A few weeks ago," said Mr. Murray, "the British Post Office established a twelve-channel Baudot between London and Birmingham, and twelve messages are now transmitted simultaneously on one wire between those cities. This is the world's record. The speed on each channel is 30 words a minute, the total speed for the line being 360 words a minute.

"Before long, however, the world's record will pass to this side of the Atlantic. In the case of the Western Union, the development will be either to increase the speed of each transmission or the number of the transmissions. Possibly the Western Union will send 12 messages simultaneously on one wire at a rate of 40 words a minute, giving a total speed of 480 words a minute. This will give an output on one telegraph wire per day of nine and a half hours of 5,000 American messages, which is equivalent to about 7,500 British messages. This is a figure far beyond any previously accomplished by any telegraph system.

"Of course 480 words a minute is a low rate of speed compared with that of the automatic dot and dash systems by which 2,000 words a minute have been transmitted on one wire. But these systems waste time and labor and do not print the messages. There is much delay with them, and the number of messages handled per day has never corresponded with the speed of transmission. With my system, however, there is a large saving of labor and there is practically no delay.

"In one sense there is nothing new about this 'super-telegraphy.' It is based on principles that are well known and well tried. It has developed from the work of the last thirty years, but the results are certainly revolutionary. Beyond a doubt this is the ideal system of telegraphy. It has been a battle between the English automatic principle and the French multiplex principle. The French have won, but the English and American engineers have now snatched from them the fruits of their victory.

"Do not think that this 'super-telegraphy' is a mere speculation. The machines are actually made and they are in use by the Western Union Company. There is no question about their working well.

"Here are some of the features of the Murray multiplex printing telegraph. There are perfectly free type-writer keyboards upon which typists can work as rapidly as they can strike the keys. By working on the keyboard they perforate paper tape with holes representing letters. If the typist makes a mistake he can instantly correct it before transmission, so that no trace of the error or the erasure appears in the printed message at the distant station.

The perforated tape passes directly from the perforators into automatic transmitters, one for each operator, and these transmit the letters at a uniform speed of from forty to fifty words a minute. The typist does not need to pay any attention to the transmitter, as it starts automatically as soon as there is perforated tape available for it to transmit, and as soon as the perforated tape is used up the transmitter stops automatically.

"In New York and in Boston, in the Western Union offices, there are now four keyboard perforators and transmitters and four typists. There are also four printing machines in each of these cities to print the messages in page form, and four attendants to tear off the messages and check and time-stamp them ready for delivery. Instead of four there may be six transmissions in each direction simultaneously on one wire.

"At the receiving end of the line the messages, when required, may be reperforated in the form of tape identical with that used for transmitting them. This reperforated tape at the receiving station is

produced at will by the operators at the sending station. The way in which this works out is as follows: Many telegraph messages go from city A through city B to city C, or even to city D. In the conditions hitherto prevailing in the United States and other countries such messages have had to be retransmitted by human operators. This entails much waste of labor and increases the likehood of errors.

"When the Murray apparatus is used, if a sending operator in city A is given a message for city C which must go through city B, he depresses a certain key on his keyboard which perforates a particular signal in the tape. This signal starts the reperforating mechanism at the station in city B, so that the message is not only printed in page form, but is also reproduced as perforated paper tape. At city B the perforated tape message, measuring about eighteen inches long and three-quarters of an inch wide is torn off, pinned to the printed message, and passed on to another circuit running to city C. The perforated tape is slipped into a transmitter and the message goes through automatically without further attention to city C.

"As soon as a sufficiently large number of circuits has been equipped with the new multiplex machines it will be possible to send a message automatically through several cities to any important point in North America. This will certainly be possible in a few year's time. A still more interesting possibility of the next five or six years is the transmission of the same messages by the same perforated paper tape over ocean cables and by wireless. There are technical difficulties in the way but there is reason to believe that these can be overcome. Engineering experts intimately acquainted with Atlantic cable work believe that this is. possible Messages will be exchanged between New York and London simply by playing on a typewriter keyboard.

"If the messages are to be retransmitted they will be reproduced as perforated tape ready for automatic re-transmission, as well as being printed in page form. In fact in the course of twenty or thirty years all the great cities of the world will be linked in this way so that a message once typed in any great city will go through to its destination in any other great city without any human intervention except that necessary to transfer the paper tape from the receiving mechanism of one circuit to the transmitting mechanism of another. It is possible that in this way four messages will be sent simultaneously over the Atlantic cables instead of two, as at present.

"Of course there are obstacles to the success of this. For one thing, the Tower of Babel blocks the way to some extent, but I have arranged a keyboard which meets most international requirements. In any case, most of the business of the world is now conducted in not more than two or three languages, and these present no difficulties in the way of universal automatic transmission of messages.

"Also, the Western Union Company in order to avoid any question of infringement on my automatic patents which are in other hands, has developed the machine it is using along lines of its own, which suits the Western Union, but which are not so well adapted to foreign requirements as the machine I have designed for that purpose."

"In three ways," said Mr. Murray, "it saves labor. There is a perfectly free typewriter keyboard, on which the typist sends messages at the greatest speed possible to her fingers. Then the transmitter is entirely automatic. There is no need of a human attendant, as in the case of the old style automatic printing telegraphs, to put the perforated paper tape into the transmitter. The third great labor-saving feature lies in the reperforation and automatic re-transmission of the messages.

"The number of errors in telegrams is greatly reduced by this multiplex system. Obviously there is small chance of error when an operator has to strike a key only once for one letter instead of several times, as he does when he uses the Morse key. Also the fallible human operator takes part in the process only once. He strikes a key on his keyboard and the rest of the telegraphic process is purely automatic and mechanical. Actual statistics show that the mechanism is much more accurate than the human operator.

"Of course the Murray multiplex is useful only on lines between large cities where there is plenty of traffic. For small cities and branch offices single printers and keyboards of a simpler character designed by other inventors are provided. These will be placed in large offices, hotels and corner drug stores for the transmission of telegraph messages to and from the head telegraph office in every big city. Any person who can use a typewriter will be able to send a telegram on these instruments. It is more satisfactory than the telephone, for it is more accurate. There is, for instance, much less risk of confusion between letters and figures. Then, too, messages sent from a local office will be received at the head telegraph office in the form of perforated paper tape ready for retransmission on one of the big multiplex circuits. With the telephone no such thing is possible. As I said, these machines are in use and in a year or two they will be familiar sights in every hotel and corner drug store.

"The new Murray multiplex shares a remarkable feature with its parent, the Baudot system. It is possible to string several small towns on one wire, so that each can communicate with each of the others at the same time, on one wire. It is possible to have much more complicated chains of communication arranged in this way, five or six towns being joined by one wire, and also to have wires branching from one centre to a number of local stations, but disturbances on aerial telegraph wires render this for the present impracticable.

"To link three towns by one wire is not difficult, and it is frequently done in France by means of the Baudot system. The Western Union will do it in a year or two. When the telegraph traffic of the country is transferred to underground cables, as has already been done in Great Britain, line disturbances will be a thing of the past. Then, complicated chains of communication will be possible in

America, and this will contribute materially to the speed and accuracy of the handling of telegraph traffic.

"Delay in the transmission of telegrams is greatly reduced by the multiplex system. When the Morse system is used the most that can be done on one wire is to have two transmissions in each direction by means of the Edison quadruplex. With a system which provides eight and ten, or even twelve channels on one telegraph wire, instead of four, it is obvious that the facilities for handling telegrams are greatly increased. The new multiplex has all the advantages of the Morse key—quick transmission and quick correction of errors. There is no risk of telegrams accumulating and waiting their turn when there are eight or more channels available instead of four, and when the operator can send a hundred messages in an hour instead of about fifty messages an hour, with the Morse key and sounder.

"Telegrams will be sent with more speed and accuracy than ever before, and, of course, so far as the operators are concerned, their work on the typewriter keyboard is much easier than on the Morse key, and they are relieved of the labor of reading and typewriting the signals from the Morse sounder. The girl operators on the multiplex, working on the line between New York and Boston, enjoy their work. Still, considerable skill and some months' practice are required to operate the typewriter keyboards to the best advantage.

"A few highly-skilled typists can transmit 150 messages an hour, and the average operator, after a few weeks' practice, can transmit sixty messages an hour. This is as much as a highly-skilled Morse operator can do after twelve or eighteen months' practice. Any person can transmit messages at a low speed. After one or two hours' practice on the keyboard any skilled typist can work on the keyboard rapidly at once.

"When I sold my United States rights to the Western Union two years ago, the Murray multiplex existed only in skeleton form. It was taken up by the Western Union and the Western Electric Company engineers and developed to suit Western Union conditions. I have come over from London to see the progress made, and it has been interesting to me to note how skillfully the work has been done.

"It has been supervised by Mr. G. M. Yorke, general superintendent of plant, of the Western Union, with his assistants, G. R. Benjamin and W. A. Houghtaling, in conjunction with C. E. Scribner, chief engineer of the Western Electric Company, and his assistants. One of these, A. F. Dixon, has shown remarkable ingenuity in overcoming various practical difficulties. An important problem in getting a new system like the Western Union multiplex into satisfactory commercial operation is that of fitting it to actual traffic requirements. Mr. H. A. Emmons, the Western Union expert in this particular subject, has this matter in hand."

A more technical description of the octoplex system will be published in a later issue.

Annual Meeting Serial Building Loan and Savings Institution.

The twenty-ninth annual meeting of the Serial Building Loan and Savings Institution was held at 195 Broadway, New York, January 20. Secretary E. F. Howell stated that the increase in the assets during the year 1913 was over $93,000 and that there were fewer members in arrears, and for less money at the end of 1913 than at the end of 1912. The business of the association never was in a more healthy condition than it is at this time.

The fifty-eighth semi-annual statement for the six months ended December 31, 1913, shows the following results:

ASSETS.

Cash on hand	$ 14,901.27
Mortgages	669,450.52
Stock loans	10,367.00
Real estate	14,965.38
Real estate contracts	9,372.44
Advances	3,640.25
Furniture	400.00
	$723,096.86

LIABILITIES.

Instalment shares	$179,625.57
Savings shares	191,755.47
Income shares	262,685.83
Juvenile shares	1,527 73
Due on loans	16,235.80
Borrowed money	30,700.00
Surplus earnings	28,080.26
Undivided earnings	12,486.20
	$723,096.86

The election of officers resulted as follows: President, Ashton G. Saylor; Vice-President, Henry W. Pope; Secretary, Edwin F. Howell; Directors, T. M. Brennan, G. W. Blanchard, Wm. J. Quinn, M. J. O'Leary, T. E. Fleming, C. A. Kilfoyle, J. F. McGuire, W. B. Dunn, F. D. Giles, C. G. Ross, A. O. Wallis, M. J. Kenna.

TELEPHONE AND TELEGRAPH EXHIBITS AT SAN FRANCISCO EXPOSITION.—A moving picture auditorium, seating 300 persons, to be erected within the Palace of Liberal Arts, at the Panama-Pacific International Exposition, at San Francisco, next year, for the illustration of the features of the telephone and telegraph service and for the demonstration of the long-distance telephone, is to constitute a part of the exhibit of the American Telephone and Telegraph Company and the Western Union Telegraph Company. Among the exhibits will be the original forms of telephones, transmitters, laying and splicing of underground and submarine cables, simultaneous telegraphy and telephony, multiplex telegraphy, stock tickers, operation of cable instruments, transmission of time signals, etc.

MR. D. B. VAN EVERY, of the Los Angeles District Telegraph Company, Los Angeles, Cal., writes: "I thank you for continuing my subscription, and trust you will keep me in good standing on your list by sending me a bill each year when it is due, as I wish the subscription continued."

Thomas Ahearn, Ottawa, Canada.

BY JAMES GRANT, IN TORONTO "EVENING NEWS."

Mr. Thomas Ahearn, of the firm of Ahearn and Soper, Ottawa, Ont., is one of the magnates of that city, and who, like his partner, is one of the important business men of Canada. In Ottawa one hears the name of Ahearn and Soper mentioned on an average of three times a day. Men wonder whether Ahearn and Soper are interested in this or that project, or, if not, why not; and if the firm is indeed interested, then there is never any further argument as to the merits of that particular deal. The two men who control the Ottawa Electric Railway, the Ottawa Electric Company, the Ottawa Gas Company, the Ottawa Car Manufacturing Company, the Ottawa Land Association and half a dozen other interests, and who are on the directorate of big concerns like the Westinghouse (Canadian) Company, and who achieved all these things simply by hard work and co-operation, are

THOS. AHEARN, OTTAWA, CANADA.

naturally looked upon with pride and respect by the people of Ottawa.

Mr. Ahearn's father kept a blacksmith shop at the Chaudière Falls on the banks of the Ottawa, but he never grew rich. When little Tom Ahearn was big enough he began to look for work, which he found with the local telegraph company as a messenger. All day, and often in the night, it was the boy's duty to carry little yellow envelopes containing missives to the various people in Ottawa, to Sir John Macdonald, to leading merchants and politicians, and when, after delivering the messages there came intervals of rest in the telegraph office, the boy hung over the telegraph keys, listening to the beating brass on brass and the clicking out of strange messages. "I'm going to be a telegrapher!" he announced to an operator one night; and in a year he was.

As an operator he went to New York in 1873, where, after he had won for himself a reputation as one of the best operators in "the little old city," he was promoted to the fabulous salary of $90 per month. He was then eighteen years old and he was entrusted with the sending of Government messages and the receiving of important work from Washington. To-day, if you should happen to be walking around in New York with Mr. Ahearn you would probably see him point to the statue of Morse in Central Park and remark, with a chuckle: "I gave five dollars to help build that monument. Five dollars was a lot of money to me in those days, but telegraphers, in those days, at all events, took a pride in their profession, and they honored the man who had created it.

But Ahearn came back to Ottawa ere long and became manager of the old Dominion Telegraph Company. Soper at that time was manager of the Montreal Telegraph Company. That is how they met. They were both devoted to the then rather young science of electricity, and its practical application to the needs of the day. They became interested in the telephone business and in the installation of electric bells, etc. They started in a small way and made money. Soper was the business manager, Ahearn was the practical man. It made a good team. For a long time they did small contracts and made small profits, but when the Commercial Cable Company wanted a telegraph wire strung along the cold, bleak coast of Nova Scotia they let Ahearn and Soper undertake the work. They did, and gave satisfaction.

One day the Ottawa Railway Company, a horse-car affair, was put up for sale. A Toronto firm was given an option on it, but could not see the use of putting up $5,000 to own such a property. Ahearn and Soper had more faith in their city. The moment they knew that the other men had allowed their option to lapse, they sent over a marked check for $5,000 and closed the deal within a few hours. That was about 1890. People laughed. But the Ottawa Electric Railway has paid dividends regularly and generously, and has cut a "melon" or two worth while. The result of this purchase was more important even than that, however. It resulted in the harnessing of the Chaudière Falls and the electrification of the road. The new management proved that electric cars could be successfully operated in winter despite the abnormally heavy snow-fall in Ottawa. From owning the railway it was an easy step to the electric light company and the gas company, and from these to the many other enterprises in which the two men are now interested.

They sit opposite one another at a great desk in their office in Ottawa, a telegraph line connects them with all the other offices outside their building in which they are interested. One is a sort of Beau Brummel; the other is a neatly-dressed, jolly sort of man, with a comfortable manner and a big heart shining quietly behind his eyes.

Thomas Ahearn is one of the big men of Canada, because he is one of the men who had faith in his town, which is equivalent, to some extent, to having faith in the nation. He is part boy still; he loves to play a practical joke on some one; he loves to remember kindnesses with other kindnesses; he loves New York, and goes down there frequently.

He loves his old telegraph key, and if one knew the Morse code and could operate a key, and wanted to send a message to Mr. Ahearn in the way he would most like, it would be to make a connection somehow with the wire which runs into his own house, and telegraph it.

Mr. Ahearn was born in Ottawa, June 24, 1855. He is an extensive traveler, having gone around the world twice in opposite directions, and a recent letter from him shows that the beauty of his handwriting has not diminished a particle.

Atlanta Telephone and Telegraph Society.

A meeting of the Atlanta Telephone and Telegraph Society, Atlanta, Ga., was held in the Hotel Kimball on the evening of January 6, and was attended by about 430 members and visitors, the latter including the commercial, traffic and plant superintendents of the divisions other than Atlanta, and Mr. Leland Hume, vice-president of the Cumberland Telephone and Telegraph Company, Nashville, Tenn.

The speakers of the evening were Mr. G. J. Yundt, chief engineer, and Mr. W. H. Adkins, general contract agent of the Southern Bell and Cumberland Telephone and Telegraph Companies; Mr. H. C. Worthen, general manager of the Southern Division of the Western Union Telegraph Company; Mr. Leland Hume and Mr. M. P. Speir.

After the regular business of the meeting the entire gathering adjourned to the dining room, where a "Dutch lunch" was served and an entertainment given, consisting of vocal and instrumental music, by talent within the society and by several cabaret performers engaged for the occasion.

The entire meeting was voted a great success; not only were the talks enlightening and entertaining, but the entertainment and lunch were all that could be desired.

The Universal Telegraph Alphabet.

BY T. J. RICHARDSON, TORONTO, ONT.

The story of the Atlantic Cable, as written by Chas. Bright, and the magnificent endeavors of men like Morse, has made telegraphy a wonder in America. Speaking lately to an old timer, eighty-one years of age, and for fifty years engaged at telegraphy, gave me the impression that these are the pioneers we wish to give honor to-day.

Webster's authorized dictionary, also born on the Continent, has defined and made the English language as beautiful as the Spanish. The Morse alphabet has almost that same place in our affairs. I have conversed with men of French and Spanish origin, and they also highly commend the Morse in preference to Continental. While the latter has cemented the European tongue and holds it together, the Morse alphabet does the same thing in America, and whereas the one system is, no doubt, preferable to those in the old land, the Morse alphabet is universally loved by all American operators.

[What our correspondent states may be all true, but why not cement the telegraph tongues of the world by adopting one universal alphabet? The tendency of all human activities in all lines is toward unification and the time will, no doubt, come when all the peoples of the world will be united as one family—in language, dress and thought. This transformation will require many generations, of course, but all the signs point toward that result—the brotherhood of man. We did not expect that everyone would agree to our proposition, and we are glad to hear what others have to say on the subject. If the matter is to stand or fall on the basis of sentiment alone, then the Morse (American) alphabet will not be disturbed, but if practical requirements of international business intercourse demand uniformity in the language of correspondence, sentiment, we fear, will have to yield. The only change involved is the substitution of the Continental characters for the spaced letters of the Morse alphabet, and the numerals. The Continental alphabet is, essentially, Morse in its make-up, and it can truthfully be said that it is more scientific.—EDITOR.]

Prof. Elihu Thomson on Wireless Transmission.

Prof. Elihu Thomson, of Lynn; Mass., gave a lecture on "Wireless Transmission of Electrical Energy," at a joint meeting of the New York Electrical Society and the New York Company's Section of the National Electric Light Association, on January 19. He advanced an interesting theory to account for the relative difficulty in transmitting in daylight at high frequency, as compared with nighttime, or low-frequency transmission, which was based on the ionization by sunlight which sets free negative charges, thereby diminishing the value of the impulse received at the distant point. When the frequency is high a positive wave reaches the territory of free negative charges before these have time to become dissipated, and they combine with an equal number of positive charges, thus further weakening the wave.

Professor Thomson said that by raising the voltage and thus increasing the amplitude of the wireless wave longer-distance wireless communication can be obtained. The corona loss which now occurs on antennæ with high voltages can be eliminated by constructing large-diameter cylindrical towers with large balls supported at the top.

He stated that he believed efficient transmission of energy for industrial purposes would always require a conductor core to guide the energy to its destination.

Professor Thomson said that the General Electric Company had tried to establish wireless signaling between Lynn, Mass., and Schenectady, N. Y. The work was not very successful, the topographical condition of the intervening territory evidently interfering with transmission. He stated, however, that a message got through occasionally, coming, perhaps, down the Hudson River and around by the water route via Cape Cod to Lynn.

Review of Progress in Radio-Telegraphy and Telephony in 1913.*

BY JOHN L. HOGAN, JR.

The year just closed has seen marked progress in the unification of radio-telegraphic practice by a tendency toward the use of better methods of transmission and the partial abandonment of obsolete instruments. While by far the greatest number of messages and existing stations are involved simply in the ship-and-shore traffic, there are being installed and developed in competition with wire and cable telegraph "wireless" spans over great stretches of land and sea. Radio service continues and seems ever to extend its beneficent work in the protection and saving of lives at sea; and in 1913 the effectual enforcement of legislation requiring that each station constantly maintain an operator on duty has resulted in rescues of several ships whose fate would otherwise have been, at the best, uncertain. In this work, however, all is not yet what it might be, since, except in a few notable instances, the emergency equipment installed aboard most vessels, and upon which absolute dependence must be placed when accident disables the ship's power supply, is of the ancient and ineffective induction-coil type. The federal radio inspection service of the Department of Commerce has done much toward securing and upholding a moderately high standard of utility among shipboard installations, but cannot immediately insist upon too rigid application of all good service criteria. By law, every ship transmitter, whether the regular or emergency outfit, is required to be capable of signaling 100 miles under average day-light conditions, but it is a matter of common knowledge that the letter of this ruling is often reached only by most adroitly taking advantage of the favorable times for demonstration transmission. When there is reached a still better co-operation between shipowners, the radio companies and the Department of Commerce, it is probable that the spirit underlying the legislation will be met, to the vast benefit of service and the further safeguarding of those at sea. If, at the same time, the restraint and punishment of vicious experimenters and the encouragement of legitimate and useful activities on the part of amateur operators can be increased, it seems likely that there will be caused no more suffering, such as that which, only a few weeks past, was brought about by the criminal and unfounded report of accident to the steamer "Rio Grande" sent broadcast by some unknown radio degenerate.

In addition to the normal ship-and-shore communication and to competitive radio-telegraphy which now bridges both the Atlantic and the Pacific, a number of special applications of space signaling have been undertaken. The governments of France and the United States have been experimenting between Paris and Washington, direct by wireless, in securing exact data for comparing the velocity of grounded electromagnetic waves to that of light, and several railroads are attempting to establish reliable communication with moving trains and to adapt the radio service for emergency train dispatching in event of serious wire trouble. The military uses of the art have undergone development, with especial emphasis upon signaling from aeroplanes when under way and on the design of simple and portable apparatus for field telegraphy. In some cases, plants primarily intended for a single use are actually utilized in other ways; for example, immediate construction of the long-discussed British imperial chain of stations has been urged on the ground that they are expected to be of the greatest utility in connecting England's scattered possessions when cables may be cut, yet the normal and peaceful occupation of the tremendous installations is to be the transmission of private toll telegraph correspondence.

The courts, in both their criminal and equity branches, have contributed toward the progress of radio transmission. Some ten or twelve patents are the basis of infringement suits which have been prepared for or have reached final hearings during the year, and two patents have been sustained in the Appellate Division of the Federal Circuit Court. The adjudication of these, together with decisions which are looked for in the near future, will do much toward settling the painfully involved patent tangle which has so long vexed radio engineers of the United States. In litigation of another sort the activity of the post-office authorities has brought to book a third group of men who were alleged to have used radio-telephony and telegraphy as a basis for fraudulent stock manipulations.

In the engineering work of radio transmission essential data are being determined continually, although new problems seem to present themselves for solution as fast as the older ones are put aside. Completion of the navy's high-power station at Arlington, Va., near Washington, has given opportunity for investigation of the relative values of sustained-wave and grouped-wave-train transmitters under some sets of conditions, and information on this, as well as on the comparative values of several classes of receivers has been gained by a long series of trials. New speculations have been advanced as to absorption and other phenomena which appear to accompany transmission of earthed waves over great distances, and not only have various theories been proposed but several organizations are taking steps toward almost world-wide simultaneous observations of signals and disturbances in such ways that the resulting data should be of vast assistance in arriving at and demonstrating accurate transmission theories. Design, in general, shows a trend toward standard practice, since various types of apparatus have been in use sufficiently long to show their respective advantages and faults, and, unless further patent complications arise, it seems likely that the products of all manufacturers will become much alike in general principles at least. Standardization through the year has not been confined to a process of evolution in the instruments themselves, since the loose usage of the art's nomenclature has been attacked by the Institute of Radio Engineers, with the result that a "Standard Report" of preferred symbols, terms and definitions is soon to be issued.

* From *Electrical World*

The year 1913 has been quiet in so far as issue of wireless patents is concerned. Important disclosures as to generators of sustained radio-frequency alternating-currents, amplifiers and general receiving methods have been made; but there has been a satisfactory lack of the detail patents, having little or no value, which were so common only a few years ago. Enough inventions have been announced to show a definite trend in the international development of radio-telegraph apparatus, and this is toward signaling with sustained waves wherever possible. The tendency toward the use of continuous forced radiation in conjunction with receivers acting to produce musical "beat" tones by interference between two inaudible frequencies of current is shown, especially in design of plants intended for communications over great distances, where economy in antenna and other investment becomes markedly important. In smaller stations, for shipboard use, or for transmission of only a few hundred miles, waves occurring in regular groups of comparatively high frequency and so producing a musical tone at the receiver are becoming nearly universal practice where the ability to signal continuously in spite of atmospheric disturbances is required. Where minimum first cost is of the greatest importance and the best class of service is not required, it is customary to rely upon the older types of slow-spark apparatus for distances of 100 miles or 200 miles.

Transatlantic radio-telephony has again come forward in widespread announcements through the press, but investigation of the two claims made has shown one of them to have been based upon an erroneous translation of "telegraph" and the other to refer to the transmission of a simple musical tone, such as might be used in telegraphy. This is not much nearer to actual speech transmission than were the promises which linked Denmark, France and the United States in 1906 and 1907. In its serious development, however, radio-telephony has gained impetus during the past year through the work of European investigators on methods of generating practically continuous waves and modulating them in accordance with vibrations of the voice. Well-authenticated records of transmissions over several hundred miles are available. The practice of this art seems likely to develop in two directions, one pointing toward distortionless speech transmission over greater distances than can be reached commercially by wire or cable, and the other toward short-distance signaling between radio stations which need communicate only occasionally, and at which, therefore, a Morse operator involves a prohibitive expense. For long-distance trunk "line" work by radio it is necessary to develop uniformly operating means for modulating the large amounts of radio-frequency power now available from single machines. For small-set service there must be produced an inexpensive, simple and reliable generator of waves suitable for space telephony. At the present time, work is being directed along both these lines, so that it is not too much to hope that commercial radio-telephony will become an accomplished fact within the next few years.

The Duties of a Press Operator.

Upon entering the editorial rooms, about the first thing to be heard, says the Duluth *News Tribune*, is the rapid-fire clicking of the telegraph instruments. Following this up, you will usually find stuck away in some remote corner, one of the most marvelous features of the business. Sitting up to a small table, a pile of copy paper on his left and the resonator containing the "sounder" in a direct line with one ear, is the operator, the fingers of both hands dancing swiftly over the keyboard of a typewriter.

After you have stood and watched him grind out a yard or two of news, which doesn't take long, without any apparent effort whatever—if the news is fresh and "hot" he won't even know you're there—you will wonder what manner of man he is who will take money for doing that.

And, in a general way, this is what is happening and how it is brought about.

News of all descriptions is sent by cable and innumerable other methods to the principal offices of the press association from every section of the globe. In the main offices a staff of editors prepare the stories and file them with the sending operators, who flash them in every direction. And then comes the receiver.

To begin with, he must be able to read the Morse alphabet by "sound" with the same ease and certainty as the ordinary man knows what to say when his friend asks: "What'll you have?" In addition to this, which may be termed "straight" telegraphing, he must have the Phillips code at his finger-ends in every sense.

To go further, the operator must be an expert typist, in order to do what is expected of him. Thus, while you are watching him idle away the time he is manhandling an assortment like this:

Ld 27—Rnwd fitg exbykns tdy wh ws agn rpd as a posy wi ocur un nx wkif at all. Dr Daneff o Bulgaria tdy ifmd t ambdrs gathrd at t fgnofs 5 bikn kfe wi ho in abeyne thr dtmn to end t gathrgs.

Washn 27—t scotus tdy cmfd t stc o fv ys d pen impsd on j thorton ross, a bnkr o portland ore, ross was cnvctd o stealg sx 228tnd o sta fnds.

After the receiving operator has instantaneously performed three distinct functions, *i. e.*, read the Morse, translated the code and put it down, spelled out and punctuated, the above jumble appears in this form, ready for the printers.

London, Jan. 27—Renewed fighting in the Balkans to-day, which was reported as a possibility, will not occur until next week, if at all. Dr. Daneff, of Bulgaria, to-day informed the ambassadors gathered at the foreign office that the Balkan conference will hold in abeyance their determination to end the gatherings.

Washington, Jan. 27.—The Supreme Court of the United States to-day confirmed the sentence of five years in the penitentiary imposed on J. Thornton Ross, a banker of Portland, Ore. Ross was convicted of stealing $228,000 of state funds.

The operator deals with every variety of reading matter that appears before the public, to say nothing of what disappears into the waste baskets.

Dinner of Association of Broker Telegraphers.

The Association of Broker Telegraphers, composed of operators employed by brokerage firms in New York's financial district, celebrated its fifth anniversary January 13, with a beefsteak dinner at Shanley's. The occasion was primarily social, but there was evident much earnest thought and practical business sense in the numerous brief speeches of the evening. The attendance made a new high record in the association's always successful entertainments.

Among the speakers were J. Frank Howell, formerly a telegrapher, and now head of the firm of J. Frank Howell and Company; H. C. Conklin, of Harris, Winthrop and Company; W. W. Speer, of the firm of E. and C. Randolph; Sefton Tranter, of Hayden, Stone and Company; John E. Hoey, member of the Consolilated Stock Exchange of New York; W. E. Gilbert, of N. L. Carpenter and Company; J. M. Dempsey, of Shearson, Hammil and Company; S. J. Callahan, of G. Edward Graff and Company; R. M. Irwin, of Wrenn Brothers; C. L. Hall, of Miller and Company; J. E. Lynch, of Newberger, Henderson and Loeb; W. E. Egan, of J. B. Colgate and Company; J. F. Carroll, of C. I. Hudson and Company; James A. Griswold, of Josephthal, Locheim and Company; C. C. Youmans, of Trippe and Company; Edward A. Kane, of Thompson, Towle and Company; James F. Halpin, of Walker Brothers and Company; Thomas Ruddy, of Finley, Barrell and Company; J. B. McKeever, treasurer of the association, and many others.

Mr. Howell sketched his experiences in Wall Street, spoke optimistically of future business prospects there, and paid a high tribute to the telegraph operator from the standpoint of an employer.

Mr. Thomas L. Mahan, chairman of the Board of Governors of the Association of Broker Telegraphers, reviewed the association's activities during the past five years. He emphasized the value of the governing board's crusade against the bill to increase the transfer tax, the anti-futures trading measure and similar agitations inimical to legitimate business in the "Street." Outlining the oncoming responsibilities of the association towards the interests of its members, Mr. Mahan declared himself emphatically opposed to Government ownership of the telegraph. A national system of wires, he stated, would place the brokerage circuits at the mercy of governmental autocracy. The speaker pointed out that all wires would be subject to levy by whatever expediency might arise in the mind of a Federal official; wire leases would be a farce, and there undoubtedly would be a secret service espionage onerous and annoying to the customers.

Going into the wider field of the commercial operator, Mr. Mahan depicted a significant picture of Uncle Sam as an employer. He said, in part:

"A large part of the present agitation for Government ownership of the telegraph lines is irresponsible, most of the clamor coming from the unthinking, who imagine that it is but a short and natural step from the Post Office Department to a Department of Telegraphs.

"In the first place, the mail system itself is cumbersome and unprofitable. There is not the slightest doubt in the minds of efficiency experts but that private capital could run the Post Office Department with better results than does the Government, with one cent letter postage instead of two, and on a higher wage scale.

"Indeed, it is only the extremely low salaries paid the mail employes which enable the department to avoid a deficit. The minimum rate for a mail carrier is $800 per year. And for this he first must serve a term of probation, averaging three and one-half years, during which period he is fortunate to be actively employed one-fifth of the time. That means, actually, $160 a year. A commercial telegrapher can earn more than this in 'extra' employment.

"There is no overtime money in the mail service; the maximum salary for mail carriers is $1,200 a year; there are no vacations, no pensions and no pay during illness.

"But the Post Office Department has been so often used as an illustration of the disadvantage of Government ownership for the employe, that it is, perhaps, well to introduce another branch of Uncle Sam's activities. There is a certain city where the cheap restaurant is a feature, establishments with coffee-and-rolls for three cents, and like economies of low-grade food and unattractive service. These places are daily crowded with educated, skilled workers who are there simply because hard necessity compels.

"The name of this city is Washington, D. C., and those half-fed, respectable drudges are the clerks in the departments.

"It is with this class, and not the mail-carrier, that the Government-owned telegraph operator would compare.

"Incidentally, the first result of a national telegraph system would be the closing of the competing office in each city, with consequent throwing out of employment of thousands of operators. Uncle Sam has absolutely no sentiment where the interests of minor employes are concerned.

"With two companies in the telegraph field, there is competition not only for business, but for the services of telegraph operators. Under Government control there would be no effort made to obtain either messages or labor."

Dinner to T. & T. L. I. A. Delegates.—The committee in charge of the subscription dinner to the delegates attending the annual meeting of the Telegraph and Telephone Life Insurance Association, in New York, on March 11, are much gratified at the response already received. A special souvenir menu card has been arranged for and professional entertainers have been engaged for the occasion. The dinner will be held in The Fifth Avenue, Fifth Avenue Building, Fifth avenue and Twenty third street. An enjoyable evening is expected. The subscription list will close February 15. Mr. T. E. Fleming is in charge of the arrangements.

Edison-BSCO Type 452 Cell, 450 Ampere Hours' Capacity.

EDISON BSCO PRIMARY BATTERY

THE life of a set of **EDISON-BSCO** cells in transmitter service is regulated by the current flow and time circuit is closed per day.

For example, on a transmitter that is in constant service twelve hours daily with a current flow of .2 ampere, one set of 400 ampere hour renewals will last six months, during which time the cells require no attention. This illustration would apply to busy 'phones such as central switchboards or railway dispatchers' circuits.

On the same service a set of gravity cells would consume two charges of bluestone, besides frequent cleaning of the zincs. Twenty sets of ordinary dry cells would be needed to furnish current for an equal period. It is evident, therefore, that the **EDISON-BSCO** cells reduce battery maintenance to the minimum.

Where the service is not so heavy as in the cases cited above, the **EDISON-BSCO** 200 ampere hour cells should be used. On a transmitter taking .2 ampere, and used on an average of three minutes twenty times a day, these cells will show a life of approximately three years.

Aside from the advantages accruing from the use of a battery free from constant attention is the fact that the **EDISON-BSCO** cell is ideally suited in every respect for transmitter service.

Catalog on request.

The Cheapest Form of Battery Energy.

TRADE MARK
Thomas A Edison

THOMAS A. EDISON, INCORPORATED
247 LAKESIDE AVENUE, ORANGE, N. J.

EDISON-BSCO
Complete Renewal showing the all-in-one assembled element.

THE RAILROAD.

MR. WILLIAM KLINE, formerly and for many years superintendent of telegraph of the Lake Shore and Michigan Southern Railroad Company, with headquarters at Toledo, Ohio, has suffered a second stroke of paralysis and is reported to be in a very serious condition.

MR. WILLIAM BENNETT, superintendent of telegraph, of the Chicago and Northwestern Railroad Company, Chicago, Ill.; W. F. Williams, superintendent of telegraph of the Seaboard Air Line, Portsmouth, Va.; L. S. Wells, superintendent of telegraph of the Long Island Railroad, New York; J. F. Caskey, superintendent of telegraph, Lehigh Valley Railroad, South Bethlehem, Pa., together with Mr. L. B. Foley, superintendent of telegraph of the Lackawanna System, New York, made a trip to Scranton on January 24, on a Lackawanna express train equipped with wireless telegraphy with the object of looking into the advantages of the wireless telegraph system on moving passenger trains. While in Scranton the party visited a moving picture show, where they saw on the screen a view of a Lackawanna express train in motion, with the wireless operator at work.

TEST STATION TRANSFERRED.—The wire-testing station at Sedalia, Mo., on the Missouri Pacific Railway, has been transferred to Jefferson City, Mo.

Wireless and Printers on Railroads.

BY G. H. GROCE, SWISSVALE, PA.

It may be of interest to know that the Union Switch and Signal Company, Swissvale, Pa., was one of the early investigators in the field of wireless control of signals on railroads, and some of its engineers are now working on the problem. Up to the present time, however, the wireless system of train control has not, in the judgment of the company's experts, shown that unfailing efficiency which is necessary. The company has trial installations of its train control apparatus on the Pennsylvania Lines West, on the Delaware, Lackawanna and Western and on the New York, New Haven and Hartford railroads and their experience with these installations—all of which are of an electrical or an electro-pneumatic nature—has led them to put their name to their apparatus of that kind for general use. It may be that the future development of the art will bring them to a similar approval of the wireless, but that time has not arrived.

Two years ago the Union Switch and Signal Company took up the work of developing a telegraphic printer, which might answer to the calling needs of the railroad companies. On the manufacturing side a part of the apparatus used in signaling is not far removed from the building of a printer. The Wright printer which had been in service on the lines of the Postal Telegraph-Cable Company, and had failed to meet all of the requirements, was brought to Swissvale, where Mr. J. E. Wright and Mr. Nelson are giving their undivided attention to its development. The first important step was to develop a reliable transmission. In this, Mr. Wright's familiarity with the various systems used in machine printing—both in the United States and abroad—stood him in good stead. The long years of trial of the Baudot system of transmission appeared to have culminated in a sort of general admission of its superiority. The apparatus for its adaptation to our American idea of a printer needed something additional, and this was furnished by Mr. Wright—the patents only lately being granted. In order to get something with which to test this new system of transmission, the old Wright printing machine was rebuilt and used, and to it was added a new translator, designed by Mr. Nelson. In his design of this important piece of printing mechanism, Mr. Nelson turned out a storage feature differing from anything previously developed or recorded.

In May, 1913, a duplex set of these machines was installed on the wires of the Pennsylvania Lines West, where it is now working. The machine was installed for the purpose of testing the new transmission with the two principal features mentioned as the distinct object of trial. The old design of machine was too complicated to be successfully used in the railroad field, but it has performed its task so well that it has been allowed to remain in service. In the meantime, we found in the engineering force of the company Mr. L. V. Lewis, who spent three or four years in the development and operation of the Rowland printer, and Mr. Wm. Zabel, who had had years of experience in the development of computing machines and ordinary typewriting machines. These men were put to work on the general development of a machine which will be simple mechanically and reliable in operation. A description would require too much space, but it may be of interest to state that a final trial has been made at the shops of the two designs of machines which we had carried to an actual printing test, and the manufacturing department now has the device in charge.

We will have a set of our latest machines in actual operation out of New Orleans at the time of the annual meeting of the Association of Railway Telegraph Superintendents, May 19.

Papers for Railway Telegraph Superintendents' Convention.

Mr. M. H. Clapp, superintendent of telegraph of the Northern Pacific Railway, St. Paul, Minn., as chairman of the Topics Committee of the Association of Railway Telegraph Superintendents, sends us the following list of papers and subjects that have been arranged for to be read at the annual convention of the association at New Orleans, La., May 19:

"The Fitting of Applicants for Telegraph and Telephone Service on Railroads," by J. B. Sheldon, Superintendent Telegraph, Union Pacific, Omaha, Neb.

"The Organization for Clearing Storm Troubles, Including the Providing of the Necessary Material, Poles and Wires on Railroad Right of Way," by J. C. Hubbard, general supervisor of lines, Western Union Telegraph Company, New York.

"The Organization of Gangs, Including Plans for Boarding the Men," by M. B. Wyrick, division plant superintendent, Western Union Telegraph Company, Dallas, Tex.

"Unit Costs of Railroad Pole Line Construction, How Obtained and How Used," by V. T. Kissinger, superintendent telegraph, Chicago, Burlington and Quincy, Chicago, Ill.

"The Use of the Printing Telegraph on Railroads," by Archibald Wray, assistant superintendent telegraph, Chicago, Rock Island and Pacific, Chicago, Ill.

"The Transposition of Wires for Railroad Telephone, Physical and Phantom Circuits," by C. A. Robinson, engineering department, American Telephone and Telegraph Company, New York.

"Maintenance of Telegraph and Telephone Equipment," by M. B. Overly, engineer telephone department, Cleveland, Chicago, Cincinnati and St. Louis Railway, Indianapolis, Ind.

Mr. P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill., is secretary of the association.

ALTERNATING-CURRENT RAILWAY SIGNALS.—The General Railway Signal Company, Rochester, N. Y., has issued a handsome pamphlet containing a very complete description of the alternating-current signals on the Southern Railway. The pamphlet is artistically illustrated with views, showing the signals in the various positions, and the apparatus controlling the signals, together with diagrams of track wiring, etc. Mr. W. H. Potter, Washington, D. C., is superintendent of telegraph of this railway.

TELEPHONE ON INTERCOLONIAL RAILWAY.—The Hall Switch and Signal Company, New York, is installing a telephone circuit with eighteen stations, equipped with Gill selectors, and its latest type of telephones, between St. John and Moncton, N. B., on the Intercolonial Railway, a distance of ninety miles.

President Wilson on Trusts and Monopolies.

President Wilson, on January 20, read a message before Congress on trusts and monopolies, as a subject for additional legislation. Following are extracts from the most prominent passages of his address.

In the matter of monopolies, opinion seems to be coming to a clear and all but universal agreement.

The masters of business on the great scale have begun to yield their preference and purpose in honorable surrender.

The Administration is purposing not to hamper or interfere with business as enlightened business men prefer to do it, or in any sense to put it under the ban.

No measures of sweeping or novel change are necessary.

Administrations' program is founded upon the conviction that "Private monopoly is indefensible and intolerable," and these are its items:

Laws which will effectually prevent such interlockings of directorates of great corporations, as result in making those who borrow and those who lend practically one and the same. Sufficient time should be allowed in which to effect these changes of organization without inconvenience.

Business men recognize the great harm done to many great railroad systems by the way in which they have been financed and their own distinctive interests subordinated to the interests of the men who financed them and of other business enterprises which those men wished to promote.

The country is ready to accept a law which will confer upon the Interstate Commerce Commission power to regulate the railroads' financial operations. We cannot postpone action in this matter without leaving the railroads exposed to many serious handicaps and hazards; and the prosperity of the railroads and the prosperity of the country are inseparably connected. This will be a very important step toward the necessary separation of the business of production from the business of transportation.

Methods of monopoly and of hurtful restraints of trade can be explicitly forbidden by statute in such terms as will practically eliminate uncertainty, and the law itself and the penalty made equally plain.

Business men desire the advice, definite guidance, information, and publicity which can be supplied by an administrative body—an Interstate Trade Commission.

Such a commission would be an instrumentality for doing justice to business where the processes of the courts or the natural forces of correction outside the courts are inadequate to adjust the remedy to the wrong in a way that will meet the circumstances of the case.

Every act of business is done at the command or upon the initiative of some ascertainable person or group of persons. These should be held individually responsible and the punishment for illegal acts should fall upon them.

Other questions remain which will need very thoughtful and practical treatment. Holding companies should be prohibited, but what of the controlling private ownership of individuals or actually co-operative groups of individuals?

Shall we require the owners of stock, when their voting power in several companies which ought to be independent of one another would constitute actual control, to choose in which of them they will exercise their right to vote?

Private individuals who claim to have been injured by combinations should have the right to institute suits for redress upon the facts and judgments entered in suits where the Government has upon its own initiative sued the combinations complained of and won its suit. The statute of limitations should run against such litigants only from the date of the conclusion of the Government's action.

Until these things are done, conscientious business men the world over will be unsatisfied.

Tropical Telephone Troubles.

The telephone companies operating in the Canal Zone have peculiarly severe climatic conditions with which to contend, says Mr. C. P. McConnell in the *Western Electric News*. As a result, apparatus which operates satisfactorily in the United States sometimes develops trouble in the more humid climate of the tropics.

The telephone occupies a very important place in the work of the canal, says Mr. McConnell. The telephone and telegraph lines of the Panama Railroad follow the course of the canal. There are six common battery exchanges located along the canal from Colon on the Atlantic side to Ancon on the Pacific side.

The principal cause of the troubles met with in the tropics is the excessive amount of moisture with which the atmosphere is continually charged. It is this high humidity which makes it difficult to maintain proper installation in telephone apparatus, and as a result, special precautions are necessary to render switchboard cable, cords, coil windings, and the like, capable of withstanding the dampness. The use of switchboard cable with enameled wire conductors has eliminated a great deal of the trouble, and moisture-proofed cords and coils have further reduced the amount of leakage and corrosion which previously was of frequent occurrence.

The exchanges in the Canal Zone use electric heaters in the terminal rooms, and lamps in the switchboards, in an effort to keep the apparatus as dry as possible.

In regard to outside equipment, the life of all materials is much shorter than in a more temperate climate. Almost all metal parts exposed out of doors are subject to rapid deterioration. Rubber and textile insulation on wires is also affected very rapidly. In fact, there seems to be hardly a material which is exempt from these deteriorating influences. It has been found, however, that much less trouble is experienced with magneto apparatus, than with common battery apparatus in the way of leakage and electrolytic corrosion. The reason for this is that potential stands on the common battery lines continually and only during use in the case of magneto apparatus.

Insects are great pests in the tropics, and frequently do serious injury to telephone apparatus. The most serious trouble is caused by the termite, or "white ant."

On account of this insect trouble, many of the telephone companies use iron poles in preference to wooden poles. In the Canal Zone a very satisfactory substitute for wooden poles has been found in old iron rails, which are set in concrete, several lengths being bolted together to gain the desired height. Creosote acts as a deterrent to insect attacks, and is used wherever possible.

Mr. H. L. Woods, of the American Telephone and Telegraph Company, Buffalo, N. Y., writes: "Telegraph and Telephone Age is surely of vital importance to me. The January 1 issue was a good one."

Insulating Copper Wire by Aluminum Oxide.

That surface film of oxide, the formation of which it is impossible to prevent on aluminum used in any practical application, is the chief cause of the difficulty of soldering and welding aluminum, but, on the other hand, it is very useful in insulating aluminum conductors, says *Electricity* of London. In such applications as field coil windings for motors and electro-magnets, etc., bare aluminum wire can be used very conveniently and successfully. The surface layer of oxide forms sufficient insulation for moderate potential differences, and has the advantage of being fireproof and occupying much less space than the equivalent fibre or textile insulation.

Mr. L. W. Chubb, of the Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa., has recently patented a method for rapid and efficient electrolytic formation of aluminum oxide on aluminum wire, which method depends upon the same principle as is used in aluminum valve rectifiers, *viz.*, that an insulating oxide film, capable of resisting a comparatively high potential difference, forms over the surface of an aluminum electrode when the latter is used as anode in a solution of ammonium borate or phosphate. A very thin film is sufficient to resist the potential difference existing between the turns of suitably arranged field coils and other windings.

In small motors and telegraph, telephone and other electrical apparatus requiring the use of much small-gauge wire, the comparatively large percentage of the total winding space occupied by cotton or silk insulation, where such is used, is a serious matter; moreover, the cost of providing such insulation is very considerable. Bare aluminum wire, insulated only by its oxide film, could often be used in such cases, were it not for its comparatively high electrical resistance. The latter consideration demands the use of copper conductors and a method has recently been patented whereby copper wire can be insulated with a film of aluminum oxide, the latter being deposited electrolytically.

Metallic aluminum cannot be electro-deposited satisfactorily, but aluminum hydroxide can easily be deposited as a firm coherent coating on copper and then converted to aluminum oxide by the application of moderate heat.

The Telegraph a Stepping Stone to Higher Things.

On several occasions we have referred to the wide and liberal education conferred by the telegraphic career and how some operators have passed from the telegraph ranks to other spheres of usefulness. The manager of a telegraph office in an Eastern city recently received the appointment of manager of the local high school football team, and he will put the team on its feet and start it on a career of conquest. The wide range of knowledge imparted by telegraphic experience is truly wonderful.

MUNICIPAL ELECTRICIANS.

WILLIAM H. WOOLVERTON, aged seventy years, president of the Gamewell Fire Alarm Telegraph Company, New York, and a former telegrapher, died in Augusta, Ga., January 21. Mr. Woolverton's business career began at the age of fifteen years, when he became a telegraph operator with the Pennsylvania Railroad at Willmore, Pa. Among his coworkers were Andrew Carnegie, Thomas M. Carnegie, the late Thomas T. Eckert and David H. Bates. With other railroad men Mr. Woolverton organized a publishing company which began the publication of *The Official Railway Guide*. He was president of this company at the time of his death. With the late Edward Holmes and other capitalists he organized the first telephone company in New York. He served continuously as a director of the Metropolitan Telephone Company and its successor, the New York Telephone Company, for more than thirty years. He became vice-president of the Gamewell Fire Alarm Telegraph Company about 1890, and had been its president since 1909. He was connected, officially, with various corporations, and was a member of some of the most important clubs.

POLICE TELEGRAPH SYSTEM IN ST. JOHNSBURY.—It has been decided to install a police telegraph system in St. Johnsbury, Vt.

BRIDGEPORT'S FIRE ALARM SYSTEM.—The question of placing the fire alarm telegraph wires in Bridgeport, Conn., underground is being agitated.

UNDERGROUND FIRE ALARM WIRES IN HARRISBURG.—The wires of the new fire and police alarm system being installed in Harrisburg, Pa., are being placed underground. Mr. C. E. Diehl, superintendent of fire and police telegraph, has the work in charge.

PHILADELPHIA'S FIRE ALARM SYSTEM.—Complaint is made that the Philadelphia fire alarm system is twenty years behind the times, and, it is stated, loses twenty seconds on each alarm of fire. The one thousand firemen and officers, it is asserted, are needlessly aroused out of bed on an average of two or three times a night on account of the present system. It is known as the "joker" system.

OBITUARY.

R. J. OTT, father of Mr. L. A. Ott, of the Postal Telegraph-Cable Company of Texas, Dallas, Tex., died at McDade, Tex., January 8. Mr. Ott was well known to the telegraph fraternity in Tennessee, Georgia and Texas.

DENNIS MAHONEY, aged sixty years, father of Rev. B. J. Mahoney, formerly a telegrapher at Troy for the Associated Press, and now secretary of the American College at Rome, Italy, and of Mr. John J. Mahoney, of the American Telephone and Telegraph Company, Troy, N. Y., died in Rensselaer, N. Y., January 26.

R. N. DYER, aged fifty-six years, of New York, for many years patent attorney and chief counsel for Mr. Thomas A. Edison, died at his home in East Orange, N. J., January 13. Mr. Dyer fought the famous patent case of the incandescent lamp through all the courts to the United States Supreme Court, where he won a victory for Mr. Edison.

INDUSTRIAL.

THE FRANK B. COOK COMPANY, Chicago, Ill., has issued a pamphlet descriptive of the Corwin semi-automatic telephone system. It is a very exhaustive statement of the advantages of the system, and is acompanied by many illustrations of apparatus and the wiring plan.

ELECTRICAL MEASURING INSTRUMENTS.—Messrs. Foote, Pierson & Co., New York, the well-known manufacturers of general electrical apparatus, have just published a catalogue, covering their complete lines of measuring, testing and scientific instruments. The catalogue includes condensers of all types, faradmeters, galvanometers of all types, galvanometer shunts, slide wire or meter bridge, resistance boxes, photometers, etc. Besides being instructive as to the constructional features of the apparatus, the catalogue is educational, inasmuch as it discusses and illustrates some of the principles involved in many of the instruments. The catalogue is well illustrated. The firm's laboratory is equipped with a complete set of Reichsanstalt standard resistances, which, in connection with its other instruments of comparison, makes its testing equipment most complete. With such an outfit

available the firm is able to guarantee the utmost accuracy in its instruments.

Vibroplex Patents.

Mr. J. E. Albright, of New York, who is the sole selling agent for the Vibroplex and Mecograph keys, announces elsewhere in this issue that another injunction has been granted against infringers of the Vibroplex and Mecograph patents No. 812,183 and 842,154. He also announces that legal proceedings are being taken against other infringers, and that further injunctions will undoubtedly be granted.

Until recently the patents controlling sending machines of the Vibroplex and Mecograph class were not vigorously defended by their owners, and, as a result, quite a number of people thought they saw a "royal road to wealth" by the manufacture and sale of such machines to operators. This was not, however, because the fundamental patents had not been previously upheld in the United States Circuit Court of Appeals in New York. Recently the ownership of the Vibroplex and Mecograph patents passed into the same hands. Injunctions have been obtained against infringers in Chicago and St. Louis, and legal proceedings will be taken against all infringers of the patents. Mr. Albright states, however, that he has no desire to cause hardship to those who have unwittingly purchased infringing machines, and that if any of those who have made this mistake will take up the matter with him promptly he will make arrangements that will relieve them from the danger of legal proceedings on terms that will be mutually satisfactory. He states, however, that every infringing manufacturer will be driven out of the field, and kept out. Some of them are already paying heavily for their piracy, and others will also be called upon to do so if they continue to infringe.

Life Tests of Telephone Transmitters.

The problem of maintaining the high quality standard of telephone transmitters necessitates the carrying on of tests to determine the life of these instruments and the stability of the granular carbon used in them. The method used in the Western Electric Company's transmission laboratory at New York is one in which an attempt is made to reproduce the actual conditions under which the transmitter works when in service.

The transmitters are assembled in a standard common battery substation circuit and mounted in a sound-proof box. They are talked into at regular intervals by receivers, mounted directly in front of the mouthpiece. They are spoken into for a short period of time and then allowed to rest for a similar period. Thus, the transmitters are subjected to the heating and cooling effect which they get in service.

At the beginning and end of the conversation the transmitters are automatically jarred, to reproduce the removing and replacing of the receiver on a desk stand.

A repeating phonograph furnishes the talking current for the test. The carriage of this phonograph also operates the sequence switch arranged to open and close the circuit through the transmitters and to cut the agitating receivers in and out of circuit.

Increasing Transmission Speed of Long Telegraph and Telephone Lines and Cables.

The Intercontinental Telephone and Telegraph Company has in its office at 80 Maiden Lane, New York, a complete equipment of its apparatus for the improvement of transmission over long telephone and telegraph lines and submarine cables. This method is the invention of Dr. G. Musso. He neutralizes the effect of the electrostatic capacity of long lines and cables by a special treatment to the impulse or wave, and obviates the distortion of the wave by impressing on it a distortion opposite in character to the distortion that would be caused by the capacity of the cable, so that the wave reaches the distant end of the line or cable in the right shape. Good articulation is obtainable over a 3,000-mile artificial telephone cable, and on a long submarine telegraph cable it is possible to increase the working speed three or four times that attained at present. In high-speed telegraphy corresponding advantages are claimed for the system.

Philadelphia Electrical Aid Society.

The annual meeting of the Electrical Aid Society of the City of Philadelphia was held in the evening of January 14. The following officers were elected for the ensuing term: President, A. G. Strickland; vice-president, C. A. Huver; recording secretary, W. E. VanArsdall; financial secretary, R. C. Murray; treasurer, James H. Wilson. Executive Committee: Frank E. Maize, John A. Chapman, Andrew S. Weir, Edward T. Aitken. Trustees: George J. Wells, Thomas C. Fee, R. H. Conway.

Following is synopsis of the annual report:

Receipts, 1913		$7,146.81
Disbursements:		
Death benefits	$300.00	
Sick benefits	5,239.00	
Expenses	1,324.39	6,863.39
Reserve Fund, balance		9,566.78
Membership		1,141
Number members sick during the year		155

After business was dispensed, all sat down to a banquet, which was followed by a dance.

T. & T. L. I. A. Assessments.—Assessments 562 and 563 have been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of E. Duval, at Richmond, Mich.; Dr. Z. T. Miller, at Pittsburgh, Pa.; W. Mackenzie, at Slateford, Pa.; T. E. Heffren, at New York; C. A. Cadmus, at Troy, Ohio; C. Glasser, at New York; J. A. McGlinchy, at Boston, Mass.; I. VanDusen, at Rahway, N. J.; E. G. Bon Durant, at Marinette, Wis.; C. Bauer, at Albany, N. Y.; J. W. Apeldorn, at Secaucus, N. J.; E. W. Allen, at Wheatfield, Md.; W. Searles, at Buffalo, N. Y.; A. D. Thomas, at Valdosta, Ga.; J. A. McGee, at Quincy, Ill.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

Among recent visitors were Mr. C. C. Adams, vice-president, New York, and J. W. Sullivan, chief operator at Buffalo, N. Y.

CHICAGO WESTERN UNION.

The twenty-fifth anniversary of the Chicago Telegraphers' Aid Society will be celebrated by an informal dancing party, Wednesday evening, February 4, in the "Red Room" at the La Salle Hotel. The committee wishes the co-operation of all to make this a banner event. This is the first reception that has been given by the aid society for a number of years.

Mr. John J. O'Rourk, assistant chief printer of the Wheatstone department of this office, who was severely injured in a street car accident several weeks ago, is doing well at the Presbyterian Hospital.

PALM BEACH, FLA., WESTERN UNION.

The offices in the Royal Poinciana and the Hotel Breakers at Palm Beach, Fla., have opened for the winter tourist season with Mr. William W. Scott again manager this year. The force consists of Mr. Richard Jones, of Atlanta, Ga., wire chief, Mr. Michael Foley, of Bar Harbor, Me., bookkeeper, Mr. Joseph L. Thomas, of Union Hill, N. J., delivery clerk, and Operators Mitchell Williams, Hot Springs, Va.; Rufus L. Lee, Washington; Raymond Aldrich, New York; James J. Murphy, New York; Michael Dacy and James A. Abbott of Detroit, Mich.

HOUSTON, TEX., WESTERN UNION.

Mr. W. A. Logan, formerly auditor for the Postal Telegraph-Cable Company of Texas, but recently from the office of B. P. Hancock, division traffic superintendent, Dallas, succeeds Mr. A. J. Ivey as chief operator. Mr. Ivey has left for the Pacific Coast to take up another line of business.

OMAHA WESTERN UNION.

William A. McElroy, aged seventy-two years, traffic chief in this office, died January 6. In 1857 the late James D. Reid appointed him manager of the Batavia, N. Y., office of the New York, Albany and Buffalo Telegraph Company. He was in the railway service for several years and afterwards became connected with the Western Union in this city. He was traffic chief here for twenty years.

Among recent visitors at this office were: Messrs. Newcomb Carlton and Belvidere Brooks, vice-presidents G. M. Yorke, general superintendent of plant; W. N. Fashbaugh, general superintendent of traffic; J. C. Nelson, manager messenger service, New York; W. J. Lloyd, general manager, Mountain Division, B. L. Brooks, division traffic superintendent, Denver, Col.; C. R. Fisher, general wire chief.

The office of the traffic superintendent of this district has been moved from Omaha to Denver, and District Traffic Superintendent J. P. Barnhart is now located in Denver.

W. Salisbury, district plant superintendent, who broke his right arm two months ago, is making good progress.

J. W. Dudley, chief operator, has returned from Kansas City, where he went on business.

The use of roller skates by the Omaha check force has proved a success. A saving of from one-half to five-eighths of a minute delay on each message is effected.

J. J. McDonough, formerly late night traffic chief, has left for New Orleans, to resume duty with the Marconi wireless interests.

Telegraph and Telephone Age

No. 4. NEW YORK, FEBRUARY 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Present Status of Telegraph Operators. Opportunities for Advancement Never So Great.

This subject was suggested after reading the following communication:

"I wish you would tell me upon what grounds the TELEGRAPH AND TELEPHONE AGE bases its expressed conclusions that operators to-day have greater opportunities for advancement than ever before, in face of the fact that machine telegraphy is fast replacing Morse operators in every large office. Just look at the long 'waiting lists.' Do they suggest prosperity? If opportunity really is knocking, why don't you put us wise?"

The pessimistic viewpoint taken by this correspondent is, unfortunately, endorsed by quite a number of unthinking operators. We say "unthinking," because that word itself explains quite accurately just why they are not self-wise to the actual situation. Operators of this class, as a rule, fail to rise above the desk, because they have worn their thinking caps so little that they have never learned to realize the fact that "persistent thinking" is the only key that will open the door to progress.

To prove this assertion, let us take each sentence of the correspondent's letter separately, and see how quickly a few well-directed "thinks" will dispel the gloom and, to use his own words, "put us wise."

The first part of the letter indicates that he believes machines are fast replacing Morse operators. If he had first given the subject proper thought he could have been led to investigate the matter before jumping to conclusions. It would only have been necessary for him to have asked his manager for such information, as the pay-roll shows just how many operators are employed. The fact is machines have not displaced operators in any of our offices. In New York, where machine telegraphy is most extensively employed, the number of Morse operators employed was never so great as at the present time, nor has the average salaries of operators holding steady positions ever been higher than they are to-day. Wire and division chiefs are paid from three to seven dollars a week more than they received ten years ago for the same service.

The average salary of quadruplex attendants, repeater chiefs and traffic chiefs have also improved for the simple reason that the right kind of talent is hard to find. There is, therefore, a stronger inducement than ever before for operators to strive for these positions. This is particularly true in regard to finding men capable of handling the various systems of automatic telegraphy. Why not begin now and make a study of them? The first employes who acquire such knowledge will naturally be the first selected for the work. This is opportunity No. 1, and at present it is knocking loud and constantly.

"What does the long waiting list suggest?" To tell the truth it suggests many ugly facts that some operators would rather not have mentioned. There is probably not one "old timer" on the list that has not, at one time, and probably many times, held a steady full-hour position. If he is now on the waiting list, it is because he either failed to hold on to his position and work his way up, or lost it for "cause." No one can say that the company ever discharged a regularly assigned operator in any of our large offices as long as his work was satisfactory and he broke no rules. Of course, waiting lists all contain the names of many operators who are thoroughly reliable and above reproach, who have been forced to return after futile attempts to better their circumstances in another line of business, a necessary change of climate, or changed home environments. The waiting list also suggests, and in fact proves, the old saying that a rolling stone gathers no moss. The wanderlust's dream of a short-cut to betterment is, as a rule, the cause of his final undoing. Where one such succeeds temporarily, dozens pay dear for their errors of judgment. There is probably not one operator on the waiting list to-day who might not have succeeded beyond his fondest hope had he early realized that permanent success depends

solely upon bettering one's position, and not upon obtaining a better position.

To better one's position one must study electricity and keep thinking. The waiting list operator has time to burn, so to speak. Why not utilize the idle hours spent in the smoking room in reading technical books on electricity, instead of sleeping or lounging around? No regularly assigned operator has such an opportunity. Here is opportunity No. 2. Who will hear the knock, now that attention has been called to the rapping?

What makes operators' chances for advancements particularly encouraging just now is the radical changes made in the method of switchboard operation wherever the new pinjack type supersedes the old peg-springjack switchboard. In every such office the operator and the wire chief start on almost equal footing, so far as a knowledge of its patching circuits and operation is concerned. Each must start as a beginner. It is new to both. The same inducement exists whenever a new automatic telegraph system is installed. Some one must handle it after the experts place it in order, and, as it is obviously new to all alike, why let the opportunity to fill that position go by? Try to realize the fact that in every such case the company is actually seeking far and near for some one to do that work and often find the task very discouraging, not because the position is difficult, but because so few operators are in a state of readiness.

OPPORTUNITIES FOR WOMEN OPERATORS.

One of the unaccountable wonders of the age to-day is why women telephone and telegraph operators have never been awakened by the unusually loud rappings opportunity has been making on their doors for many years. Not long ago an official of the Western Union Telegraph Company asked the writer if he knew of any women operators who possessed any knowlegde of electricity and telegraph apparatus. After thoughtfully considering the matter neither of us could recall the name of a single woman operator who had made a study of electricity, although we went back forty-five years. Possibly, there may have been exceptions, but if there were, they hid their light under a bushel, so far as their employers were concerned.

When the fact is considered that in practically all large telegraph and telephone centers the staffs of the "city line" department and the central telephone exchanges are made up of women almost exclusively, their blindness to the opportunities offered for advancement seems unaccountable. Why should men do all the testing and fill most of the higher-paid positions? Electricity is no harder to understand than medicine, law, and other callings which modern woman has shown herself capable of engaging in. Our advice is to study electricity and let your managers know that you aspire to a position of importance. This is opportunity No. 3, and half has not been told.

Telegraph and Telephone Patents.

ISSUED JANUARY 20.

1,084,657. Cover for Telephonic Apparatus. To G. H. Nash, Highbury, London, England.

1,084,822. Loud-speaking Attachment for Telephones. To H. W. Prance, London, England.

1,085,069. Telautographic Apparatus. To G. S. Tiffany, Summit, N. J.

ISSUED JANUARY 27.

1,085,124. Printing-telegraph Receiver. To G. S. Hiltz, New York.

1,085,142. Selective Signal Transmitter. To M. Levison, Chicago, Ill.

1,085,454. Automatic Switch. To F. R. McBerty, Antwerp, Belgium.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, February 10:

American Telephone and Telegraph Co.	119⅞
Mackay Companies	83¾
Mackay Companies, preferred	69
Marconi Wireless Tel. Co. of Am.	5¼
Western Union Telegraph Co.	62

PERSONAL.

MR. THOMAS A. EDISON celebrated his sixty-seventh birthday on February 11.

MR. F. H. TRICKLE, Eastern Division traffic chief of the Associated Press, New York, is spending a vacation in Bermuda.

MR. W. T. SMITH, traffic manager, General Postoffice, London, England, will retire this month, after a service of forty-five years at that office. He was for many years superintendent of the Central Telegraph office.

MR. FRANK F. FOWLE, the well-known telegraph and telephone engineer, New York, is one of the three receivers agreed upon by both sides in the minority stockholders' suit against the Central Union Telephone Company.

MR. E. H. HOGSHEAD, of the Western Union Telegraph Company, Meridian, Miss., and a well-known old-timer, is the author of an interesting article in the Meridian *Dispatch* about the capture of an African king by slave-traders and brought to America. The king was returned to his native country through the efforts of a Dr. Cox, whom the king had befriended in Africa, the two having met by chance in Mississippi.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. H. MACKAY, president of this company, arrived from Europe on the steamer "France" on January 31.

MR. EDWARD REYNOLDS, vice-president and general manager of the Postal Telegraph-Cable Company, left New York, February 9, for an inspection trip through New England, visiting the smaller cities in the northern part of Massachusetts and continuing his inspection trip of a year ago. He will visit every postal office in the system in due time. His trip through New England will occupy one week.

MR. E. KIMMEY, district superintendent, New York, is absent on a business trip through New York state.

MR. M. M. DAVIS, electrical engineer and chief engineer of telephones of this company, New York, is on a business trip through the South.

MR. J. H. WILSON, assistant manager at Philadelphia, Pa., has been appointed manager vice Mr. J. A. McNichol, transferred at his own request to his former position of night chief operator. Mr. Wilson entered the service of this company in June, 1895, as manager of the North Coast offices, from Long Branch to Sea Girt, N. J. He returned to Philadelphia in October, 1895, and opened the office in the Bourse, remaining there as manager until September, 1908, when he was appointed cashier. He held this position until November 30, 1913, when he was appointed assistant manager, becoming manager on February 5.

MR. E. A. SIFERD, manager of the Lima, Ohio, office of this company, has been promoted to the management of the Toledo, Ohio, office.

MR. C. S. DEAN, manager of the Princeton, N. J., office of this company for the past fifteen years, has resigned to engage in other business.

VISITORS.—Among recent executive office visitors were: Messrs. S. H. Flint, manager, Bridgeport, Conn.; M. L. Barnes, manager, Troy, N. Y.; A. W. Rinehart, manager, Pittsburgh, Pa.; T. N. Powers, chief operator, Chicago, Ill.

MANAGERS APPOINTED.—Managers have been recently appointed as follows: R. L. Gray, Marietta, Ga.; W. L. Stotts, Garden City, Kan.; J. P. Creighton, Lafayette, Ind.; J. E. Lewis, East Liverpool, Ohio; C. A. Cable, Piqua, Ohio; J. H. Shaffer, Zanesville, Ohio; C. B. Van Keuren, Lima, Ohio; E. M. Parrish, Gainesville, Ga.; J. C. Benson, (Mackay office) Greenville, Tex.; C. R. Etheridge, (Mackay office) Taylor, Tex.; W. A. Relf, Alexandria, La.; F. M. Gullic, Leavenworth, Kan.; P. D. Learned, Eaton, Col.; L. K. Hannah (Mackay office), Waco, Tex.; Merritt Hilton, San Bernardino, Cal.; E. C. Lewis, Camden, S. C.; R. J. Herlihy, Plant City, Fla., and Miss M. D. Hilliard, Hot Springs, Ark.

NEW LINES.—This company is erecting a new six-wire line along the Union Pacific Railway, between Cheyenne, Wyo., and Salt Lake City, Utah. Hitherto the wires have been carried on the poles of the telephone company.

MANAGER MARTIN, OF NASHVILLE, IN CARTOON.—The *Nashville Tennessean*, Nashville, Tenn., of February 2, contains, under the caption, "Nashville Business Men," a cartoon of Mr. A. P. Martin, manager of the Postal Telegraph-Cable Company's office in that city. It shows Mr. Martin at the key, sending a telegram, and other sketches show him as starting as a messenger; out horseback riding and hunting.

MAGNETIC CLUB DINNER.—The next dinner of the Magnetic Club will be held at the Broadway Central Hotel, New York, at 6:30 p. m., April 15. There will be little speech making but an excellent musical and vaudeville entertainment.

THE POSTAL TELEGRAPH ELECTRICAL SOCIETY of New York held its second semi-annual dinner on February 10, at Voll's Alhambra Cafe, 126th street and Seventh avenue. There were fifty-three members present, among them being Mr. D. McNicol and Mr. A. J. Eaves, of the electrical engineer's department.

The Situation in the Telegraph-Telephone Separation.

Since our last issue nothing of importance has developed in the situation regarding the separation of the American Telephone and Telegraph Company and the Western Union Telegraph Company, in accordance with the plans announced by Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, in our issue dated January 1.

The work of arranging the details of the separation is receiving due attention, but it has not been sufficiently advanced to warrant public announcement. In the meantime much interest is manifested in all quarters as to how the telephone company will dispose of its Western Union stock, but until some official programme is agreed upon, acceptable to the Government, nothing definite can be announced.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. A. G. SAYLOR, general manager, New York, is making a trip through the eastern division, and will visit Buffalo, Elmira, Binghamton, Scranton, Wilkes-Barre and Bethlehem.

MR. G. E. PALMER, formerly chief operator at San Francisco, Cal., has been appointed traffic engineer of the Eastern Division, with headquarters at New York.

MR. S. W. ATKINSON has been appointed assistant division wire chief at Denver, Col.

MANAGERS APPOINTED.—Managers have been appointed as follows: H. L. Bader, Oxford, Ohio; V. O. Elkins, Rushville, Ind., vice E. Bowen, transferred; E. W. Titus, Vincennes, Ind., vice J. R. Clark, resigned; M. G. Wort, Hicksville, Ohio; J. T. Curtis, North Vernon, Ind., vice C. B. Delaney, resigned; F. J. Decker, Olney, Ill., vice W. E. Raling, resigned; L. J. Ludlow, West Carrollton, Ohio; McLaren Fox, Fairfield, Ill., vice F. J. Decker, transferred; E. Bowen, Bridgeport, Ill.; L. R. Scholl, Columbus, Ohio, vice S. M. Dunlap, resigned; R. M. Pollock, Gallipolis, Ohio, vice J. C. Francis, resigned.

T. H. O'MARA, aged forty-four years, formerly chief operator at Buffalo, N. Y., died in that city January 29. He was in the Western Union service for twenty-seven years, beginning as a messenger.

S. I. AVERY, aged ninety-one years, formerly clerk in the auditor's office, died in New York, February 4. He was on the pension roll for several years.

THE NEW OFFICE IN BUFFALO.—The new building of the New York Telephone Company, Buffalo, N. Y., in which are located the new quarters of the Western Union Telegraph Company, was formally dedicated on February 2 and was open to public inspection all of last week. The dedicatory ceremonies included an interchange of greetings by

telephone between Mayor Fuhrmann, of Buffalo, and Lieutenant-Governor Fitzgerald, of Colorado, at Denver. The operating room of the Western Union Telegraph Company was greatly admired by the many persons who took advantage of the opportunity to inspect this modern telephone and telegraph plant.

DINNER OF MORSE ELECTRIC CLUB.—The winter annual dinner of the Morse Electric Club, New York, will be held at the Hotel Knickerbocker, Broadway and Forty-second street, Saturday evening, February 21. A number of prominent gentlemen will be guests of the club on this occasion. Tickets may be obtained of Mr. R. J. Murphy, 195 Broadway, at $3.00 each.

THE CABLE.

TRANSMISSION OF PICTURES BY ATLANTIC CABLE.—It is announced in Berlin that Prof. Korn's selenium method of telegraphing photographs was recently perfected to a point which makes it highly probable that the transmission of pictures across the Atlantic cable will be accomplished this year.

CABLE PROPOSALS FOR SIGNAL CORPS.—Captain Chas. S. Wallace, Signal Corps, United States Army, Washington, D. C., is advertising for proposals for eleven miles of paper-insulated submarine, armored-type cable, to be furnished in one-mile lengths. Proposals will be received until February 24.

RAPID CABLE SERVICE BETWEEN LONDON AND COLOMBO.—By the use of the new cable of the Eastern Telegraph Company between Penang and Colombo it is now possible to transmit a message from Colombo to London within an hour, and in some cases messages for Ceylon dispatched in London have been received in Colombo within thirty minutes. Press dispatches sent from London at 10 a. m., Greenwich time, now reach Colombo in time for publication in the evening papers. This is rapid work when it is remembered that 10 a. m. in London is equivalent to 3:30 p. m., Ceylon time.

THE PROPOSED BRITISH STATE-OWNED ATLANTIC CABLE.—According to a London dispatch the Dominion Royal Commission's approaching visit to Canada is expected to give great stimulus to the movement for an Atlantic cable, owned jointly by the Government of the United Kingdom and the various Dominions in order to meet the widespread demand for reduced cable tolls. The Commission's second interim report denounces the Pacific Cable Board for thinking more of covering its deficit than of increasing its usefulness. It says: "To spend two millions sterling on a state-owned cable and then leave it comparatively idle during two-thirds of twenty-four hours is neither commercial politics nor common sense."

Lecture on Cable Development.

On the evenings of January 27, 29 and 30, there were held at the general office of the Western Union Telegraph Company, 195 Broadway, meetings of Groups 1, 2 and 3, respectively, of the Commercial Department of the Metropolitan District.

The feature of each meeting was an illustrated lecture presented by Mr. C. W. Kay, manager of the 8 Broad Street branch of the Western Union cable system. Mr. Kay, who is a stereopticon expert, made a masterly delivery, and brought his audience to a high pitch of enthusiasm by explaining the history of the Atlantic cable by means of photographic reproductions, covering the entire period from the several unsuccessful attempts to lay the first cable, through its different stages of development, vividly portraying the trials and many vicissitudes that the promoters experienced, until its present high state of efficiency was finally attained.

Associated with Mr. Kay in the development of this highly educational feature is Mr. T. F. Hull, district commercial manager of the territory south of Liberty Street and west of William Street. Great credit is due these gentlemen for the initiative and zeal so ably displayed. It may be safely said that never before in the history of the cable service has a similar task been undertaken by any employe or set of employes and brought to such a successful issue.

Emergency Repairing of an Atlantic Cable Under Trying Conditions.

It is generally believed that to repair a submarine cable requires highly developed equipment and the employment of expert labor, but the following incident shows that common sense and resourcefulness may be relied upon to meet an emergency in case modern appliances are not available.

The recent gale along the eastern Atlantic Coast caused heavy seas off Cape Ann, Mass., the big waves disturbing the Commercial Cable Company's Rockport-Canso cable and developed a fault in it. The fault was located quite close to Rockport, but as the company's repair steamer, "Mackay-Bennett" was at the time on the other side of the Atlantic Ocean, General Superintendent F. B. Gerrard, at New York, determined to attempt to effect repairs with such appliances and assistance as might be found around Rockport and Gloucester.

No special cable lifting or repairing devices were available, but Mr. Gerrard found a lighter on which he mounted a derrick, and after making a few essential changes in her rig and constructing some necessary apparatus he was ready to undertake the task. He lifted and examined the shore end of the cable for a distance of three miles, where he found the fault, which, as was surmised, was caused by chafing on the rocky bottom. The damaged section was cut out and a new splice made, and the cable was restored to service, the entire work, from the lifting to the finish, being accomplished in one day, in bitterly cold weather.

Practical cable men will appreciate the feat of lifting and examining three miles of thirty-three-ton cable under such conditions.

The New Anglo-German Cable.

The new four-wire Anglo-German submarine telegraph cable, laid in September, 1913, between Mundesley, in Norfolk, England, to the island of

Norderney, off the northwest coast of Germany, is briefly described and illustrated in *The Postoffice Electrical Engineers' Journal* for January.

The cable is connected to the repeater station at North Walsham by four copper wires, each 150 pounds per mile, but this section of five miles will shortly be replaced by an underground lead-covered, paper-insulated cable, having the same size of conductor. On the German side the cable is continued to the mainland, and thence, by underground, to the cable repeater station at Emden, with similar gauges of gutta-percha-covered conductors.

The new cable from Mundesley to Emden is 274 nautical miles in length; each core has a resistance of 1,753 ohms, and a capacity to earth of ninety-three microfarads. Each conductor consists of a central solid wire, surrounded by twelve smaller ones, giving a total weight of 180 pounds copper per nautical mile.

This is the sixth four-wire cable working direct between England and Germany.

THE TELEPHONE.

MR. BAYARD L. KILGOUR, vice-president and general manager of the Cincinnati and Suburban Bell Telephone Company, Cincinnati, Ohio, has been elected president of the company, to succeed his father, Mr. John Kilgour, resigned.

MR. EDWIN N. CLARK has been appointed secretary and treasurer of The Southern New England Telephone Company, New Haven, Conn., to succeed General A. H. Embler, retired.

MR. L. N. WHITNEY, general manager of the Central Union Telephone Company in Indiana, with headquarters at Indianapolis, has resigned, to become commercial superintendent of the New England Telephone and Telegraph Company at Boston, Mass. Mr. Whitney is a graduate of the Massachusetts Institute of Technology, class of 1896.

MR. G. C. CAUTHEN, formerly assistant manager of the Western Union Telegraph office at Norfolk, Va., and more recently statistical and general clerk in the office of district commercial superintendent J. S. Calvert, Richmond, Va., has been appointed manager of the Southern Bell Telephone and Telegraph Company's exchange at Griffin, Ga., vice A. C. Leidy, transferred to Valdosta, Ga.

C. H. SPHAR, aged forty-seven years, inspector associated with the division wire chief, Western Union Telegraph Co., New York, died in Rutherford, N. J., January 23. Mr. Sphar entered the service of the Western Union Telegraph Company in Chicago, Ill., in 1891, as an operator, which position he held for about six months. He showed marked electrical and mechanical ability and was transferred to mechanical work in connection with the maintenance of the Wheatstone system, and from the latter position he was promoted to that of wire chief, which he held until he became associated with the Long Lines Department of the American Telephone and Telegraph Company in 1895 as assistant wire chief in Chicago. He remained with that company until October 31, 1910, when he was appointed to the position which he held at the time of his death.

TELEPHONE RATES IN LOUISIANA.—The Louisiana Railroad Commission is to be petitioned to order the Cumberland Telephone and Telegraph Company to reduce its rates throughout Louisiana to the rates in force in 1906, and that night service be put on at a reduced rate to conform to the night-letter system of the Western Union Company.

TELEPHONE DISCOUNTS IN NEW YORK.—After February 1, the New York Telephone Company will allow a discount of 10 per cent on charges for local service to New York City subscribers served under message-rate contracts, written at current standard schedules. The discount will continue in effect until permanent rates have been established, following an appraisal of the company's property; or, until a change of rates is made by any authority having jurisdiction to do so.

CANADIAN NOTES.

WIRELESS TRAFFIC IN CANADA.—A total of 272,088 wireless telegraph messages containing more than four million words, were handled by the Canadian Government during the past year at its coast stations. There are now forty wireless stations in the Dominion.

CANADIAN PACIFIC TARIFF BOOK.—The Canadian Pacific Telegraph tariff book has been issued. In order to conform to the requirements of the Board of Railway Commissioners of Canada, the size is made eight inches by eleven inches, which is different to that of any tariff book issued for many years. The entire work was done under the direction of Mr. J. Fletcher, superintendent of traffic, and reflects great credit on the manner in which he has carried out the details. One great advantage in printing on pages of this size is, that the book is much thinner than it would otherwise be, there being only 368 pages.

RADIO TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, has returned from a trip to the Pacific Coast, where he inspected all of the high power stations of his company.

MR. "JACK" R. BINNS, the well-known wireless operator, who achieved fame in connection with the sinking of the steamer "Republic," January 23, 1909, announces his marriage engagement to Miss Alice A. Macniff, of Brooklyn, N. Y.

LARGE WIRELESS STATION IN MARION, MASS.—The Marconi Wireless Telegraph Company has obtained options on 150 acres of land in Marion, Mass., on which it will erect a large wireless station.

LARGE INCREASE IN WIRELESS BUSINESS.—According to a report made on February 2 by the Bureau of Census, at Washington, D. C., 285,071 wireless messages were sent during 1912, netting the companies $669,158. In 1907 only $106,571 was derived from this source. The increase during this period was therefore 600 per cent.

QUENCHED SPARK SYSTEM.—The quenched spark system of wireless telegraphy, as manufactured by Siemens Brothers and Company, Woolwich, England, has been installed on over ninety British vessels. Of special importance is the fact that with

quenched-spark installations no sound-proof cabin is necessary, any suitably situated cabin being able to accommodate the apparatus. Another important advantage with this system is that twice as much energy is radiated by the quenched spark, as by the open spark, and with quenched spark radiations the electrical oscillations, on conversion to sound waves in the receiving station, give rise to a musical note, which can be heard over natural electric discharges or "atmospherics," even when these are as much as ten to fifteen times as intense as the incoming signals.—London *Electrical Review.*

German-American Wireless.

On January 28, Emperor William of Germany sent a wireless message to President Wilson over the route of the Atlantic Communication Company, between Eilvese, Germany, and Tuckerton, N. J. The Emperor's message read: "I send you my best greetings, hoping that the wireless communication will become a new link between our countries." This was the first message transmitted over the new route, the distance between the two stations being 4,062½ miles. The Goldschmidt high-frequency system is used. The message was sent from Tuckerton to Washington by land lines.

Another Wireless Operator Lost at Sea.

The steamer "Monroe," of the Old Dominion Line," was run into and sunk by the steamer "Nantucket," of the Merchants' and Miners' Line, off the Virginia Capes early in the morning of January 30, resulting in a loss of forty-one lives, including the senior wireless operator, F. J. Kuehn. Kuehn performed an heroic act in taking off his life preserver and placing it around a woman passenger. After seeing her safely away, he missed his footing and fell overboard. He swam for a while in the ice-cold water, but before aid could reach him, he sank. He was twenty years of age, and lived in New York.

Safety of Life at Sea.

A convention has been drawn up by the International Conference on Safety of Life at Sea, recently held in London, embodying the conclusions arrived at, and, if ratified during the current year, it will come into force on July 1, 1915.

The convention provides for the institution of an ice patrol service in the North Atlantic, under the control of the United States Government, which will keep vessels informed as to the position of ice, by wireless telegraphy.

All merchant vessels, whether steamers or sailing vessels, engaged upon international voyages, and whether they carry passengers or not, if they have on board fifty or more persons, must be provided with wireless telegraph apparatus, and a continuous watch is to be maintained by all such vessels, unless automatic apparatus is devised to render the presence of an attendant unnecessary. The wireless plant must have a range of at least 100 miles, and an emergency apparatus must be provided, unless the main installation is situated in the position of maximum safety.

Wireless Rates to be Reduced.

Mr. John Bottomley, vice-president of the Marconi Wireless Telegraph Company of America, New York, announces that a reduction of one-third in the present wireless rates will be made after the completion, some time this year, of the series of high-power wireless stations stretching nearly half-way around the world.

The Honolulu station, and those at Belmar and New Brunswick, N. J., are in an advanced stage of completion.

In a test of the Belmar station, on February 2, communication was had with the stations at Clifden, Ireland, Glace Bay, N. S., Cape Cod, Mass., and other points.

Radio Licenses and Secrecy.

The Department of Commerce, Bureau of Navigation, Washington, D. C., has issued a general letter to radio inspectors and examining officers, in which it is stated that it has come to the attention of the Bureau that several operators holding operators' licenses under the Act of August 13, 1912, have not taken the oath of secrecy, as required by the International Radiotelegraphic Convention and the Department of Commerce regulations.

The attention of licensed operators should, the letter states, be invited to the fact that the license is not valid until the oath of secrecy has been executed. Radio inspectors may recommend the suspension of the licenses of operators in cases where oaths of secrecy have not been taken. Where practicable, radio inspectors or examining officers should not affix signatures to the licenses until the oaths have been properly executed.

The attention of radio operators holding licenses should also be invited to the service record on the back of the form. Operators should make every effort to have the service record properly filed in by their employers, as the record will be an important factor in determining whether or not an applicant will be re-examined for a renewal of license, and in determining whether an applicant is eligible to take the examination for the "Extra Grade" license.

OBITUARY.

G. M. Deeth, aged seventy-eight years, a telegrapher during the civil war, died in Cumberland, Md., January 30.

James E. Griffith, a former telegrapher, and in later years engaged in editorial work in Boston, died in that city on February 1.

Edward A. Hamilton, aged fifty-seven years, a former Western Union operator at Buffalo, N. Y., died in Utica, N. Y., February 2.

Charles E. Wineland, aged sixty-three years, operator for the Western Union Telegraph Company at Kansas City, Mo., died on February 4.

Thos E. Goode, aged sixty-seven years, an old-time telegrapher, and a native of Virginia, but who has lived in Alabama since the close of the war, died at Tuscaloosa, Ala., January 18.

Care and Training of Postal Telegraph Messengers.

An example of how a large corporation endeavors to care for and develop character and manliness in a small army of boy employes is afforded by the Postal Telegraph-Cable Company, with headquarters in New York, says *The Christian Science Monitor*. It is a big undertaking to attempt to produce useful and capable men from boys whose opportunities for education have been limited, and who are practically without training, but this corporation has taken up the task in a whole-hearted manner and such minute care is given even to minor details that a boy is benefited immeasurably during his service as a messenger.

Mr. M. F. Geigle, manager of these boys—and there are several hundred of them—the man who has charge of their welfare, who employs and discharges, and whose duty it is to reprimand or punish, is kindly mannered, firm, yet gentle, able to win a boy's confidence. Mr. Geigle himself having commenced as a messenger boy, and worked his way up step by step to the manager's chair, knows just the conditions under which the boys work. On the other hand, the boys feel instinctively that he is their friend, not merely an employer, and to him they go confidently for assistance in any difficulty. Having just the right man to handle the boys is counted an essential factor in their success.

From the time the boy makes his application, every precaution is taken conscientiously by the company to safeguard him, and to insure compliance with the laws governing child labor. The boy's statements concerning his home are verified, and his age, since every boy between the ages of fourteen and sixteen must have a working certificate from the municipal board of health. If he has been previously employed, his references are carefully investigated. The full information then is entered upon a card and filed in an index, and with this knowledge, the manager takes the boy in hand and begins his training as a messenger.

A neat appearance and courteous manners are recognized by this company to be valuable business assets. The rules immediately presented to a new boy stipulate that his uniform must at all times be in perfect condition, must be clean, in repair, buttons all on, and coats to be kept buttoned. The company provides as many changes of uniforms as are needed to keep the boys up to the standard in appearance, for which each boy pays a small weekly rental. Three tailors are employed constantly to keep the uniforms clean and in repair. In the summer, washable blouses are provided instead of coats. The company maintains free baths for the boys, with free towels and soap, all of which are at the boys' disposal both in the morning before going on duty and in the evening after the day's work is finished.

Each boy is instructed in simple matters of courtesy, and these are incorporated in the rules of the company and their observance is insisted upon. The boy is taught to remove his cap, and he is specifically instructed when and where and with whom this courtesy should be observed. He is made to feel that he is identified with an important commercial house, and that his deportment should be such as to be worthy of the position he occupies. Further, the boy knows that if he does not endeavor to conduct himself as the company desires, it is reported to the manager and entered upon the index card, and this adverse entry counts against him when the time comes for some boy to be promoted. In this practical manner the boy is taught that good manners really amount to dollars and cents.

The company also maintains a small library for the use of the boys, a former messenger acting as librarian. Every boy in the messenger service is entitled to the free use of this library, and is permitted to borrow books, as in city libraries. During the winter months the books are widely read, showing that the boys appreciate this opportunity afforded them for self-betterment.

The company desires to assist every boy to fit himself for something better, if the boy cares to do so; and to further this object, a typewriter is placed in the messengers' waiting room and any boy is at liberty to practice upon it while waiting for calls. Also a telegraph instrument has been installed, with an inside connection, so that any boy may learn telegraphy, and carry on communication with another boy at the end of the line in the same room.

Every care is taken during service to protect the moral and physical welfare of the boys. Between the ages of fourteen and sixteen, they are not permitted to work after seven o'clock in the evening. Boys for night service are drawn from the older ranks.

Especially commendable work which Mr. Geigle performs is in training his boys to be men. A messenger boy is subjected to many experiences which rarely come to the boy employed in a business house. The boy's honesty and integrity are tested hourly by the very nature of his service, and he himself is subjected to the wily approaches of those who would profit by his commissions. Thus, the boy is compelled to be doubly fortified, first entrenched within his own consciousness lest he be tempted to do wrong; and secondly, he must be ever watchful for the temptation from without, which would ensnare him and despoil his employers.

Among several hundred boys, it sometimes happens that one is not so careful or particular in some matters as he should be. This lapse is reported to the manager, and the boy comes before him for explanation. A boy is never discharged for a first offense, unless it be of a very serious nature. Instead, the manager talks it all over with him in the desire to be helpful rather than harsh, and the boy is given an opportunity to try again in another location, from which reports also are made. Should the boy fail, even a second time, to progress satisfactorily, he is given still another trial, with the earnest, patient counsel of the manager, who does everything in his power to bring out the boy's best qualities and enable him to retain his position. For any boy who is discharged is beyond the reach of this assistance.

Sometimes these boys find money or other valuables in the streets or public conveyances, and they promptly turn in such articles or return them to the owners. One instance was cited, where two boys found some Southern Pacific bonds. The name of the owner appeared on the papers, and the boys at once took the bonds to him. Their integrity was rewarded with $50 each. On another occasion, a boy found a check for $175 payable to cash. He returned it promptly to the owner, and received $5. Another little fellow found $12 in bills in an "L" train, and turned it all in to his office.

It is the policy of the Postal Telegraph-Cable Company to make promotions from its messenger ranks. If a junior clerk is needed, a boy fitted to fill the position is selected, and given the opportunity to "make good." Managers for the various Postal offices about New York are chosen from the messengers. Some of the stenographers now in the company's employ also began in the messenger ranks. Within the past six months, forty-six boys in this company have been promoted from messengers to other positions.

Postalization of the Telegraph and the Telephone.

In his speech before the House of Representatives in Washington, favoring the postalization of the telegraph and the telephone, Hon. David J. Lewis, of Maryland, stated that a private business is managed to secure a profit, while the rule of public financiering is to render services at the lowest price consistent with efficient service, with no motive in acquiring riches.

Regarding operative efficiency, Mr. Lewis said:

"There is a widespread conviction that public operation is inefficient; that is, that employes will not work as earnestly for the public as when supervised by the self-interest of a private employer. Doubtless this is true in some kinds of employment. But there is a broad and fundamental exception; it consists of those monopolies in which the quantity of work to be done by each employe can be systematically measured out in advance and assigned to him each day. Such, for example, is the rural and city carrier with his scheduled route and deliveries, and so almost the whole postal service. Such, too, are the tasks of telephone and telegraph operators and messengers, for when the flow of traffic becomes known the working capacity of each in number of calls and of telegrams per hour may be determined in advance, and the failure of a delinquent to "make good" practically checked. So this objection of malingering does not apply to the postal institution, whatever its merits when applied to some other public employments.

"That this distinction proves true in practice," he said, "is seen in the case of the telephone. The product per average employe of the Bell System in 1912 was 58,000 calls, while that of the public telephone employe in Norway in 1910 was 147,000 calls.

"Where the work is not standardized and the amount of the product required, or the task cannot be specifically defined, the self-interest of a private employer may be necessary to make the laggard do his part. But the point I make is that a régime of postal monopoly in the telephone and telegraph services permits of defining the tasks, so that society, as a model employer, can give the worker proper conditions and yet so organize and direct him as to secure a greater average product than the private employer.

"If, in spite of our distances and non-density of population," he continued, "we can have mail piece rates among the very lowest, who, in the face of our marked postal efficiency, our experience with the parcel post and the intimate relationship of the telephone and telegraph monopolies, cannot see that our Postal System could give us as low rates for the telephone and telegraph as other countries?

"Of course," said Mr. Lewis in conclusion, "I think all will agree with the statement of Judge Moon, chairman of the Committee on the Post Office and Post Roads, that there is no question as to the right of the Government to acquire the telephone network. It will not be necessary to take over the telegraph lines. Both telegraphic and telephonic messages go over the same wires simultaneously where the communications have been postalized. My judgment, after a year's study, is that the telephone network should be condemned and appropriated and the properties taken possession of by the Postmaster-general, say, as of January 1, 1915, the rates to be gradually reformed as experience developed the wisest way. The interurban network represents approximately 200,000 miles of pole line and 3,000,000 miles of wires; the local about 16,000,000 miles of wires and 8,000,000 telephones."

A Clever Messenger.—James Bingham,, a messenger for the Postal Telegraph-Cable Company in Syracuse, N. Y., has proved himself to be resourceful in emergencies. He had a telegram for a newspaper reporter, ordering a "story" for a New York newspaper. The boy located the reporter in a moving-picture show, but as the lights were turned down, and the proprietor did not know the man, the problem was to get at the reporter without interrupting the show. The proprietor told the boy that the lights would not be turned on for forty minutes, but the boy insisted on finding his man, as his orders to deliver the message were imperative. Finally, he suggested to the proprietor of the show that a slide be made, reading "Telegram for Mr.....220.....Avenue. Messenger waiting at the door." This was done, and the announcement made on the screen. The reporter immediately went out and found the messenger and received his telegram.

Telegraphs and Telephones in Siam.—There are sixty-five telegraph offices in Siam, together with eighty-six at the railway stations open for private telegrams, and there are 733 telephone subscribers.

Regulations for Destroying Records.—The Interstate Commerce Commission has issued a pamphlet containing regulations to govern the destruction of records of telephone, telegraph and cable companies, also including wireless companies.

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

NEW YORK, FEBRUARY 16, 1914.

Large Increase in Number of Electrical Students.

It is very encouraging to note the large increase in the number of students of electricity among the telegraph fraternity in this country. We are in daily receipt of letters from all sections from students who desire further light and information on the subject of articles published in our columns, and one noteworthy fact about these inquiries is that they bear evidence that the students are going to the roots of things. They show real, serious work; there is no superficiality whatever. This is one of the most commendable features, and, apart from the pleasure and satisfaction derived by the student in increasing his practical knowledge, he is becoming more valuable to himself as well as to his employer.

Practical knowledge in any line of industry has a value that is measurable in dollars and cents. Although the value may not always be immediately realized, yet it is there potentially. It is like a piece of property, a factory, for instance. It has a market value and some one may come along and find the property useful for his purpose, and he buys it. So it is with knowledge; it is ready for use at all times when wanted.

That the engineering articles published in this journal are appreciated is evident from the number of inquiries received concerning the subjects dealt with. These employes who are now storing up knowledge will, of course, be selected to fill higher positions as vacancies occur, and, no doubt, some of them will become shining lights in their profession some day. The success of the individual depends upon his own efforts, and too much care and attention cannot be given to the acquirement of knowledge. The foremost men in the world, in all lines of activity and thought, are constant students; they are learning something new every day, and as their mental horizon widens their pleasure and satisfaction in life increases correspondingly.

It is a pleasure to know that so many telegraphers are so earnest in their desire for knowledge. In its acquirement they are not only building up their own characters, but also that of the great interests they represent.

The Universal Telegraph Alphabet.

The suggestion contained in our issue of January 16, respecting the adoption of the universal telegraph alphabet in America for practical reasons, does not seem to meet with any hostility. The only expressions of dissent come from those who would have things remains as they are, purely on sentimental grounds. Those who take such a position, as a rule, have not weighed the advantages of a change, and have not adduced a single good reason in support of their position, other than, "the Morse alphabet is good enough for us, because Morse himself devised it." When Professor Morse constructed his telegraphic alphabet, he did not and could not foresee the changed conditions that would be brought about by the use of the telegraph in the course of time. In all progress, things and methods have to be changed to meet new conditions, and in the telegraphic world to-day, both theory and practice are being revised and brought into harmony with modern requirements.

With all respect and due reverence for the fruit of Professor Morse's own labors, we think that the practical world of to-day demands that every obstacle to the free exchange and interchange of intelligence between the peoples of the earth should be eliminated, so that operators in one part of the earth can interpret the language of operators in other parts of the earth. The tendency in all human activities is toward unity, and no obstacle should be allowed to stand in the path of progress.

We would like to have some expressions of opinion for or against the proposition, so that the sentiment toward it may go on record.

Ex-President Taft on Public Ownership.

Ex-President W. H. Taft, at a banquet in Toronto, Ont., on January 29, warned the Canadians against public ownership of public utilities. He said in part: "Let me warn you to act with care in the operation of your great public utilities. Public ownership may be all right; I don't know. But I do know that public operation of the people's needs is a mighty dangerous thing to dabble with. The business of governing bodies and councils is not to operate; their business is to attend to the affairs which concern them, and they have no right to invest sums of money in utilities while more needed things are left in want. Let them who think otherwise try it in a small way," he said, "and let them who would rush ahead do so and then foot the bill, for I warn you again that a high tax rate is not a pleasant platform on which to come before the electorate."

Report on Government Ownership of Telegraphs and Telephones.

A report on the country's telephone and telegraph systems was submitted to the United States Senate on January 31 by the committee appointed by Postmaster-General Burleson to investigate the propriety of government ownership of telegraph and telephone lines. The committee's recommendations are thus set forth:

"That Congress declare a Government monopoly over all telegraph, telephone, and radio communication, and such other means for the transmission of intelligence as may hereafter develop.

"That Congress acquire by purchase, at appraised value, the commercial telephone network, except the farmer lines.

"That Congress authorize the Postmaster-General to issue, in his discretion and under such regulations as he may prescribe, revocable licenses for the operation by private individuals, associations, companies, and corporations of the telegraph service and such parts of the telephone service as may not be acquired by the Government."

The committee points out that if the postal service, with 64,000 offices and 290,000 employes, were merged with the various telephone services, with 50,000 offices and 200,000 employes, a considerable saving would be effected through the transfer of telephone offices to postoffice buildings. There would also be a material reduction in the manner of employes, and with automatic and semi-automatic equipment rapidly approaching perfection a still further reduction in operating force would be made.

As to financing the project the committee expresses the opinion that no difficulty would be encountered. It sets up the theory that "as the extension of the securities of the superseded companies by Government acquisition would be likely to create a demand for an equal amount of other securities, it would be but natural that a large amount of bonds issued from time to time by the Government would be purchased by the former holders of telephone securities."

"The telegraph and telephone systems," the report states, "have long been recognized as necessary adjuncts to a complete postal service. As with all other privately controlled public utilities, these facilities have been extended in our country only in proportion as the service to be performed has insured substantial dividends to the stockholders. Under private ownership, therefore, the telegraph and telephone are for the classes. Under Government ownership, through the postal machinery, which is conducted in the interest of the whole people and already reaches every man's door, the benefits of these facilities could be extended to the masses.

"It is obvious that the longer the acquisition by the Government of these facilities is deferred the greater will be the cost. Moreover, it is economic waste to permit private enterprise to build up vast properties that must eventually be taken over by the Government in resuming its constitutional monopoly, at a cost out of all proportion to the value of the parts of such properties that may be utilized to advantage in the postal system.

"According to the best available data the telegraph plant of this country in 1912 included 247,000 miles of pole line, carrying about 1,800,000 miles of wire, The capitalization of the land wires segregated is estimated at $150,000,000; including the ocean wires and submarine cables, the capitalization probably would amount to $220,000,000. So far as the public generally is concerned, the entire telegraph service is owned and operated by two companies, their lines practically duplicating each other in most sections of the country.

"Telegraph facilities have not been extended to the small towns and villages along with the Government postal facilities, nor has the cost of the service been reduced in the inverse proportion that would seem to be warranted by the increasing volume of business transacted. Neither has the volume of business in this country, in proportion to the population, been as great as in countries where this facility is owned and operated governmentally. This fact unquestionably is attributable to prohibitive rates, and the failure of the companies to extend the service to territory which promises small profits."

"The use of the telephone in all walks of life," the report continues, "is steadily increasing, while the use of the telegraph is relatively stationary and therefore decreasing.

"The telegraph companies have already lost, for the most part, the short-distance business, owing to the development of the toll telephone service, and they probably will lose much of the long-distance business when the toll rates become adjusted on a cost basis.

"This was undoubtedly foreseen by the telegraph companies some years ago, for it is understood that before the acquisition of the Western Union Company by the American Telephone and Telegraph Company, the former contemplated improvements in its system whereby the telephone would be added to the telegraph service, and this attitude on the part of the Western Union Company was an underlying reason why its property was acquired by the Bell interests.

"Telephone circuits generally constitute two wires known as metallic circuits. It is a simple and inexpensive operation to superimpose the telegraph feature on each wire. On the other hand, the average telegraph circuit in this country is a single wire, with earth return. A large percentage of this is iron wire, which cannot be used satisfactorily for long-distance telephone purposes. Therefore, to add the telephone feature to such a circuit would necessitate not only the duplication of the entire wire equipment, in order to provide the required metallic circuits, but the substitution of copper wherever iron wire is used. It will thus be seen that, although it is practicable and economical to superimpose the telegraph feature on existing telephone circuits, the cost would be prohibitive to do the reverse.

"On many of the long-distance telephone lines owned by the American Telephone and Telegraph

Company the telegraph feature has been superimposed, and the same wires are to-day carrying both telegraph and telephone communications simultaneously.

"The acquisition of the telegraph service of the country would necessitate taking over the duplicate plants of the two companies controlling this service, with their duplicate expenses of maintenance. Unquestionably, one could be made to serve the same territory. Furthermore, and of great importance, is the fact that even the entire plants of these two companies would be inadequate for the purpose of the Government, because their facilities have been extended only to profitable territory. Should the Government assume control and operate this service it would be with the object of extending the facilities in the interest of the people, and, hence, regardless of profit.

"Assuming that the poles of the present telegraph systems would sustain the increased number of wires necessary to superimpose the telephone feature, the expense of constructing, equipping throughout with copper wire, loading the same, and providing the extra circuits required, could not be estimated at less than $75,000,000. Add this to the estimated value of the telegraphic land lines ($150,000,000), and it will be seen that the cost would be equal to $225,000,000, or $25,000,000 in excess of the estimated value of the interurban and long-distance telephone network. The expense of equipping the latter system for telegraphy would involve only the cost of the instruments, and would, therefore, be negligible.

"In view of the foregoing," the report continues, "it is the opinion of your committee that it would be unwise, from a commercial standpoint, for the Government to acquire the telegraph systems of the country."

The report concludes with a statement to the effect that profit is not the aim of Government.

VISIBLE MORSE CODE FROM AEROPLANES.—A French firm has invented an ingenious method of signaling from aeroplanes. The device consists of a tube placed in such a position that a strong current of air from the propeller passes through it, and is connected by a valve with a reservoir filled with soot. This valve can be operated by the passenger in the aeroplane in such a manner as to release either a large or small quantity of soot from the reservoir into the tube. The soot, whirled out of the tube by the draught, forms in the wake of the machine long or short streaks of black, by means of which messages can be given in the Morse code. It is stated that in the course of some experiments with this device, the dots and dashes of a message were made out, with the help of powerful field glasses, more than five miles away.

MR. B. H. REYNOLDS, superintendent of the Central and South American Telegraph Company, New York, writes: "The 'bestest' to my old friend, the publisher. May 1914 be the most prosperous you ever had."

The Morse Telegraph in the Republic of Texas.

The following correspondence relating to an interesting episode in the history of the Morse telegraph, is furnished by Mr. Geo. C. Maynard, the well-known old-time telegrapher, and now in charge of the electrical division of the Smithsonian Institution, Washington, D. C.

"NAVY DEPARTMENT,
"HOUSTON, APRIL 27TH, 1839.

"SIR:

"I have the honor to present to your Excellency a copy of a correspondence of Mr. S. F. B. Morse and myself, which occurred during my residence as minister at Washington, in which that gentleman tendered the perpetual use of his electromagnetic telegraph to this republic; likewise, an original letter, accompanied by a drawing of the electromagnetic telegraph, so far as it was then completed, with a request that they be placed, for the present, in the secret archives of the nation.

"I have the honor to be your Excellency's obt. servt.,

"MEMUCAN HUNT,
"Secretary of the Navy.

"To His Excellency, M. B. Lamar,
"President of the Republic of Texas."

COPY.

"POUGHKEEPSIE, AUGUST 9TH, 1860.

"May it please Your Excellency:

"In the year 1838 I made an offer of a gift of my invention of the electromagnetic telegraph to Texas, Texas being then an independent republic. Although the offer was made more than twenty years ago, Texas, neither while an independent State, nor since it has become one of the United States, has ever directly or impliedly accepted the offer. I am induced, therefore, to believe that in its condition as a gift it was of no value to the State, but, on the contrary, has rather been an embarrassment. In connection, however, with my other patent, it has become for the public interest, as well as my own, that I should be able to make complete title to the whole invention in the United States. I, therefore, now respectfully withdraw the offer then made, in 1838, the better to be in a position to benefit Texas, as well as the other States of the Union.

"I am with respect and sincere personal esteem,
"Yr. ob. sevt.,
"SAML. F. B. MORSE.

"To His Excellency, Sam Houston,
"Governor of the State of Texas."

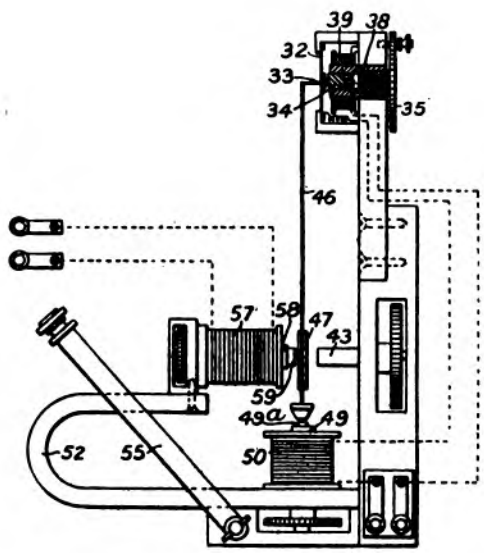
CHEAP TELEGRAM IN PLAIN ENGLISH.—An English journal offered a prize for the longest twelve-word telegram and the winner's messages which was accepted by the telegraph officials and transmitted at the regular rates (twelve cents), read as follows: "Administrator-general's counter - revolutionary intercommunications uncircumstantiated. Quartermaster-general's disproportionableness characteristically contradistinguished unconstitutionalists' incomprehensibilities."

New Telephone Relay.

BY SAMUEL WEIN, NEW YORK.

Dr. J. Schiessler, of Haragasse Bäden, near Vienna, Austria, has recently been granted letters patent (British) for a telephone relay that has some uncommon features and on account of the novel principle involved will be of interest to telephone engineers.

This relay is shown diagrammatically in the accompanying illustration, in which a spring blade, 46, is vibrated by the line currents in the magnet 57, and actuates the microphonic contact 33, 34. The local circuit passes through the magnet 50, the microphone contact, and the magnet coil 39. The hollow core 38 acts on the magnetic disk 33 to increase the vibratory effect of the diaphragm 32, and the magnet 50 controls the oscillation of the



NEW TELEPHONE RELAY.

blade 46. A further adjustable magnet 43 may be employed. Adjustable cores 49a, 59 are placed inside the hollow cores 49, 58 of the magnets 50, 57. The magnets are mounted on the poles of the horseshoe magnet 52, which is provided with a magnetic arm 55 for adjusting the magnetic circuit. The microphone contact is adjusted by the screw 35.

In a modified form the spring blade is provided with actuating-magnets and microphones on each side, the magnets then being tubular and mounted on a ring. This instrument is suspended on two steel pivots.

The apparatus may be used as a telephone transmitter by replacing the magnet 57 by a mouthpiece, the transmitter diaphragm being connected to the armature 47 by an aluminum wire.

The materials suitable for use as microphonic contacts are pyrites, blendes, glances, Muntz's metal, delta metal, yellow metal, an alloy of a metal such as platinum iridium, or osmium iridium, a paste of graphite, silundum or selenium with litharge or chloride of magnesium or chilled and polished steel balls.

Control of Weather by Electricity.

Sir Oliver J. Lodge, on January 22, gave a lecture before the Institute of Electrical Engineers, London, England, in which he suggested the possibility of controlling the weather to some degree by electricity. If clearing weather, he said, was due to electricity, it might be imagined that man could acquire some control over the electrification of the atmosphere. If it was desired to produce rain, why not send up a kite to reach the clouds? He believed that if enough electricity were discharged into the clouds the drops would behave there as they did in the laboratory; they would coalesce, and, once that had happened, the process might be repeated and cause a shower. When rain was wanted, the lecturer said, negative electricity should be sent up, and if fine weather was wanted, positive electricity.

An Excellent Book on Telephone Construction and Installation.

"Telephone Construction, Installation, Wiring, Operation and Maintenance" is the title of a book by W. H. Radcliffe and H. C. Cushing, jr., which is intended for the amateur, the wireman and the engineer who desires to establish short telephone lines. It is also intended for the guidance of the contractor in building small exchanges in factories, mills or small towns. It is written in plain, everyday language, and a knowledge of the telephone and its application is not prerequisite, as the book explains everything in the simplest manner.

The authors are both well known writers on electrical subjects, and have the great advantage of knowing thoroughly what they write about, both being electrical experts.

The book has 125 illustrations, which are very clear and helpful in the study of the text matter. The construction of the various instruments are explained in detail and well illustrated, and the merest novice cannot fail to gain an understanding of them. Chapters are devoted to inspection and maintenance of telephone instruments; testing telephone line wires and cables, and wiring and operation of special telephone systems.

After a study of this book one will have gained a very good practical working knowledge of the telephone and its applications. The best part of the work is the clear manner in which the construction of the instruments is explained, and this gives the student a sure foundation to build upon. Unless one knows how the instruments are constructed, it is extremely difficult, if not impossible, to gain a reliable understanding of the operation of the telephone. This is the first thing a person should learn, and this book will be found very helpful in acquiring such knowledge.

The price of the book is $1.00 per copy. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. L. S. Miller, manager of the Western Union Telegraph Company, Ithaca, N. Y., writes: "TELEGRAPH AND TELEPHONE AGE is a valuable piece of literature to me."

Course of Instruction in the Elements of Technical Telegraphy—LVII.

(Continued from page 73, February 1.)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

To Balance a Quadruplex.

RESISTANCE BALANCE.

Request the distant station to ground and remove the home battery from the relays by reversing the lever of the ground switch. Any currents on the line now must be due to induction, or crossfire, from neighboring wires, and the armature of P R (Fig. 74) will, provided the crossfire be slight, remain stationary. Adjust P R until the armature is equidistant from the pole-pieces and remains on whichever side it is placed by the finger, and then close No. 2 key and "cut in" at the ground switch. The full home battery is now to line, and the rheostat resistance must be adjusted until the currents in the main and artificial lines are equal, when the P R armature will remain on either stop as before. Note the resistance in R required to bring this about, and reverse the pole-changer by closing No. 1 key. If the armature now loses its neutrality, readjust the resistance in R until the tongue is again neutral, and note the altered resistance in R. Compare this resistance with the resistance required with the opposite pole to line, and if the difference be not very marked take the average resistance of both poles and call it the resistance balance.

Should the line be much affected by crossfire it will be found that after the line has been grounded at both stations, the P R armature is in a state of vibration, and it will be impossible to adjust it so that it will remain at rest on either stop.

In this case it is evident that a resistance balance will be obtained when the armature vibrations remain unaffected by the home battery.

Turn up on the adjusting screw until the vibrations come light. Cut in at the ground switch and put the long end of the battery to line by closing No. 2 key. Obtain a balance as before, by noting the resistance required with each pole to reproduce vibrations similar to those obtained with the line grounded. When the "on ground" vibrations exactly correspond with the "cut in" vibrations, a resistance balance will be established.

STATIC BALANCE.

To obtain a static balance close No. 2 key and request the distant station to open his transmitter. The home polar relay is now energized by an excess current of 1 (Fig. 74), and if the static effects can be compensated for at this time there will not be much likelihood of any disturbance when the distant long end is to line, and the relays influenced by larger currents. Turn down on P R until its local contacts are firmly closed, then make dashes with No. 1 key (keeping No. 2 closed), and arrange the condensers and their retarding resistances in C R until the static disturbances following each reversal of the pole-changer are eliminated. Then turn up very slowly while you continue dashing with your key, and, if any disturbance be felt, readjust the condensers until the defect is removed. The polar side is now ready for operation and the No. 2 side must be put in working order. Turn down the neutral relay spring until the sounder closes, then turn it up again until the armature rests lightly on the back stop. If on this delicate adjustment clicks be heard when the pole-changer is reversed, endeavor, by means of the condensers, to get rid of them. It may not be possible to entirely eliminate the disturbance on the neutral relay on this adjustment, but as long as the armature remains passive on its back stop with a slightly lower adjustment than is required under working conditions, it may be assumed a static balance has been obtained. Ask the distant station to cut in and write on both sides, and turn up on N R until the writing comes clear. See if the working of the home keys affect the received signals, if not, the quadruplex is ready for business.

FAULTS.

While a little experience is necessary to quickly locate the many ills a quadruplex is subject to, still, by carefully noting the probable causes of the most common defects which crop up, a certain amount of familiarity with these troubles may be acquired.

If the writing of the No. 2 key at the distant station comes all right on the neutral relay when his No. 1 key is closed, but not when it is open, his pole-changer is defective. Also if the writing comes all right when his No. 1 key is open, but not when it is closed, his pole-changer, as before, is the cause of the trouble. The pole-changer at the distant station will also be faulty if, when the home station grounds the wire, the incoming signals are received on both relays while he is operating the No. 1 side only, his No. 2 being closed.

When the home neutral relay does not respond to the long end of the distant station's battery, place a finger on the polar relay armature and note if the increase is felt when the No. 2 key at

the distant station is closed. If the increase be felt, the trouble must be at the home station, and the relay connections should be carefully examined.

Should you fail to find the increase when the distant long end is to line, and at the same time notice a disturbance of the balance, the trouble is in the long end of the distant battery.

If the short end of the distant battery be open, no signals will be received on either of the home relays.

The tap wire at the distant station will probably be open when you fail to get his pole-changer reversals on the polar relay from his short end, and at the same time notice a disturbance of the balance. When the distant station complains of your signals, overhaul the pole-changer contact points, and, if no improvement, test the battery.

It can be ascertained whether the currents pass with equal strength from both poles of the home battery by opening the line at the switchboard and feeling the pull of the magnets, when the pole-changer is opened and closed, and the short and long ends put to line alternately.

The neutral relay will also show, under these conditions, the increase due to the closed transmitter on No. 2 side. If not, the trouble must be between the relay and the battery, and should be traced back from point to point.

If the trouble were due to a faulty connection in or about the line coils of the relays the preceding test would not discover it, as with the line open, the currents only traverse the artificial line coils. To guard against this, request the distant station to ground, and disconnect the artificial line and note, as before, the effects of the various manipulations of the transmitter and pole-changer on the home relays. It is a good plan to change over to another quadruplex set when any obscure trouble arises, as by doing so, the fault is located at once in one set or the other, or in the wire.

(To be Continued.)

Electrical Circuits and Diagrams.

A new edition of Norman H. Schneider's "Electrical Circuits and Diagrams," Part I, has just been issued. It illustrates and explains wire connections for alarms, annunciators, automobiles, bells, generators, gas lighting, motors, storage batteries, street railways, telephone, telegraph, wireless telegraphy, wiring and testing. The explanatory matter is brief, and the diagrams are very clear. Several minor errors appear in the book, but these do not affect the value of the work, and are self-evident.

The book should prove of wide utility for ready reference. It is bound in paper and contains 92 pages and 220 diagrams. The price is 25 cents per copy. Copies can be had of TELEGRAPH AND TELEGRAPH AGE, 253 Broadway, New York.

MR. JOS. J. FLANAGAN, manager of the Western Union Telegraph Company, Bangor, Me., writes: "I thank you most heartily for renewing my subscription, as I look forward to the coming of each issue of the AGE, and would greatly regret to miss one copy."

Sam Williams.

BY JOS. MARSHALL, SAVANNAH, GA.

In the southeast Georgia office, presided over by Colonel Arnold, there was a tall yellow negro janitor, named Sam Williams. One morning at seven o'clock Sam was waiting on the counter. A negro tendered a telegram, for Darien, and Sam was heard to say: "Go on, nigger, don't yo' know dat white gemman at Dairyann ain't turned over in he baid yet? Yo' all niggers ain't got a bit o' sense."

The sender of the telegram then said: "Well, den, please git it off soon as yo' kin." "Of co'se we will," replied Sam. "We does zackly like de folks in de country; the fust to git de co'n to de mill is de fust to git it grin'd."

The sender of the telegram left, and Sam, turning around and seeing me, struck a stagey attitude, and, with slouch hat in hand, and his feather duster in his hip pocket, said: "Cap., somebody done fake me over de 'phone dis mawnin'. About half-pas' fo' dis mawnin' de 'phone rang and when I answered it a gemmen said: 'Take dis tallygram.' "Ses I: 'I can't take no tallygram over de 'phone.' Den de gemman say: 'How come yo' can't take it?' Ses I: 'Bekase de white folks done tole me not to take no tallygrams over de 'phone; 'sides dat, it interfere wid my business; I'se dustin' up 'round heah now.' Den he say: 'Kin yo' read and write?' Ses I: 'Me read an' write? I kin read and write wid any man, but I ain't kwine to take no tallygram over the 'phone.' Den de gemman 'pear to git ve'y angry and said: 'Look heah, nigger, yo' don't know who I is, does yo'?' Ses I: 'No sah, I don't know who yo' is; who is yo'? De gemman, he say: 'My name is George Gould and I'se a director in Western Union Telegraph Company. Yo' gwine to take dis tallygram now?' Cap., when dat gemmen say he a director in de company, I drap dat 'phone and pick up de tariff book, and, sure nuff, I see de name. When I pick up de 'phone agin dat gemman was a cussin' me scan'lous, and ses: 'You black rascal, you gwine take it now?' Ses I (meekly): 'Yes, sah, I speck I'll have to take it now, bekase I done see yo' name in de book.' "

Sam, what was the telegram? I asked.

"Cap.. it was whole passel o' foolishness about he and George Dewey done got drunk on Chatham Artillery punch and he done put George to bed in de hotel, but he hissef was all right."

Who was the message to, I asked.

"Cap., I was gwine tell you about dat. I could not git de name on de 'phone. One time it sounded like a Dutch name, an' de next time like a Hightallien, an', finally, I said: 'Look heah, man, I just nachally can't git dat name; just gimme de number o' de house and I'll promise yo' he will git it all right.' " (It was on Broadway, New York, below Dey street,) "Cap., de 'phone is just nachally not fitten to take no Hightallien or Dutch names on. Me and dat San Domingo nigger, Nero, had about fix de tallygram fo' de wire when I see dat little Mr. MacCrowley come in de side do' wid a mean grin on he face, den I know direc'ly dat he had done fake me on de 'phone."

"Old Farmer" Lawton on Indian Chief Ignacio.

"Old Farmer" Lawton, of the Western Union Telegraph Company, Denver, Col., gives some reminiscences of Chief Ignacio, of the Southern Utes, who died on December 16, 1913, at the age of eighty-five years.

"In the early '70s," said Mr. Lawton, "Ouray took a number of his sub-chiefs, including Ignacio, Piah, Colorow, Douglass and Shaveno, to Washington to visit President Grant. Most of them were sullen and had but little to say, while Colorow was quite talkative, and, through an interpreter, General Grant interviewed him quite closely.

"Grant remarked that had Colorow been born a white man he would have been one of the greatest generals our country had ever known. Later, this opinion was pretty well verified, as Colorow was accused of planning and laying the trap that caused annihilation of Major Thornburg and his troop of United States soldiers, and also the Meeker massacre almost simultaneously.

"Shortly before the northern Indian uprising that terminated in General Custer's massacre," continued Mr. Lawton, "I remember handling a very long telegram from the President to Ouray that he had to have delivered 180 miles by special courier. Ouray was asked to use his influence to keep Colorow from joining the northern tribes.

"Runners were rushed out by Ouray, who three weeks later telegraphed to Washington that Colorow was back on his own reservation, where he promised to remain. Later, when we heard of the Custer massacre, many of us who had personally known Colorow could not help believing he had got far enough north before headed off by Ouray to draw pictures in the sand showing the northern tribes how to entrap Custer or any other United States army officer who might be harassing them.

"Chief Piah, generally known as the renegade chief, and his band made their home wherever hunting was good. Their last raid was in 1879, when they came to Denver, swapped their hides for the latest repeating rifles, and made a raid in the eastern part of the State, killing Louie McLean's brother at Cheyenne Wells.

They started north with several hundred horses, which were recaptured from them by the United States troops then located at Fort D. A. Russell, Wyo.

"In 1888 Piah made a friendly visit to Ignacio and the Southern Utes and on his way back north committed suicide by shooting himself. This was the first and only case we ever heard of an Indian taking that route to the happy hunting grounds.

"Colorow died the same year from pneumonia at the White River agency and was mourned greatly by his tribe and soon forgotten by the whites.

"Ignacio was the last of these original Ute chiefs. We all remember Ignacio's morose disposition and apparent dislike for anything civilized, still we have no authentic knowledge of him ever being implicated in the butchering of whites. Ignacio and the Ute tribe once owned all the fine farms and orchard tracts in Colorado."

How the President's Message was Telegraphed in the Early Days.

We, in these days of rapid progress, are too ready to assume that telegraphic feats of modern times, such as handling president's messages, etc., were not equalled in the early telegraph days. Such an assumption is erroneous, however, and many will be surprised to learn that prior to 1853 the president's message was transmitted from Washington to St. Louis and other cities in a manner the equal of which, probably, has never since been surpassed.

In the *National Telegraph Review and Operators' Companion* of July, 1853, we find the following interesting account of the rapid handling of a president's message:

"One of the most novel feats performed by the telegraph in America, is transmitting intelligence in advance of time. Some years ago, as the clerk of the House of Representatives began to read the President's message, the telegraph operator began to transmit it to St. Louis. He kept pace with the clerk, and was seldom more than a few lines behind him. At St. Louis, printers were in attendance at the telegraph office, and set it up almost as fast as it arrived. Five minutes after the peroration was delivered at Washington, the last page of the message was in the printing press at St. Louis; and a few minutes afterwards (*viz.*, at half-past twelve p. m.) boys were hawking in the streets the document which the clerk was still reading at Washington at half-past one. According to the clock, the inhabitants of St. Louis, who were over a thousand miles distant from the spot where the speech was delivered, heard it, and read it, an hour or more before those who were sitting in the hall where it was read."

From this it is evident that in those infant days of the telegraph the managers thereof were quite as alert and desirous of achieving glory as are their successors.

The Late J. W. Wilkins.

John Walker Wilkins, aged eighty-six years, who was prominently identified with the development of the telegraph in England in the early days, died in Kingston-on-Thames, England, December 18. He visited the United States in 1851, and was known to many American telegraphers. The contractor under whom he made the journey became involved with the patentee of the Morse system and his activities consequently were halted. He again visited the United States in 1874, and was chiefly occupied in prospecting silver mines.

While a young man he became associated with W. F. Cooke in the erection of English railway telegraphs. In 1845 he became resident superintendent of the Northampton and Peterborough railway telegraphs, later becoming general superintendent.

It is stated that Mr. Wilkins, in 1844, conducted tests in Great Britain which consisted in the sending of messages between the ends of wires 120 feet

apart. This probably was the first intimation that communication could be established between two distant points without the aid of metallic connections.

Mr. Wilkins's work, however, was not without a direct benefit to the present system of telegraphy. He invented, in connection with his wireless apparatus, a delicate form of detector or galvanometer or relay, identical in principle with Lord Kelvin's apparatus for long cable working. He applied it in America in 1851, where he came to assist Henry O'Reilly, of New York, who had a concession from the patentees of the Morse system for the erection of telegraphs at a royalty per mile. The relay was ultimately put aside and forgotten, only to be brought forward several years later.

Mr. Wilkins was a civil and telegraph engineer by profession and was pre-eminently a practical man. His last visit to the United States was in 1908.

A Reminiscence of Early Telegraph Days.

BY MERRITT F. ROBINSON, SANFORD, FLA.

I remember, when a boy, the first telegraph office I ever saw. This must have been about sixty years ago. It was in the rear of the store of my uncle, George Lowry, at Clarksville, Mercer County, Pa., on the bank of the Pittsburgh and Erie Canal. The name of the town has been changed to Clark by the Post Office officials; the canal has been abandoned long since and the little place is now a station on the Erie and Pittsburgh branch of the Pennsylvania Railroad. My brother-in-law, David D. Williams, was the operator. There was a big brass paper-tape receiving register, run by a weight when it was desired to receive a message, the Morse dots and dashes being indented in the paper. No one dreamed of the possibility of reading by sound. There were a couple of glass cups filled with mercury, about three inches apart. These cups were inserted in auger holes bored partly through the table on which the register stood, and were connected by a wire staple—a leg of the staple in each. As I remember it, there was no switch; but when he wanted to cut out the instrument he disconnected the wire from one side of the register and connected it with the other wire at the opposite side of the register, so the circuit would not be broken. I do not know what the mercury cups were for, unless they acted as a lightning arrester, and when lightning struck the wire it threw the mercury out and thus broke the connection. I remember on one occasion the mercury was thrown all over the room and the cups had to be re-filled. I do not remember the name of the telegraph company, but I think James D. Reid's name was printed on the message blanks, but I am not sure, as his name may have appeared on message heads later. Mr. Williams was an exceedingly affable gentleman, but he was so afraid his telegraph instruments would be put out of order he would not permit anyone to touch them. This excited my curiosity, and when there was no one looking, I not only "touched it," but learned the Morse alphabet and quietly practiced on the key until I could send very well, I thought, and was delighted with the accomplishment, although the glory was smothered by the secrecy I felt obliged to maintain. But "murder will out." One day, when Mr. Williams was away from home, I could not resist the temptation to answer the call, and not only received a message, but delivered it. Mr. Williams nearly fainted when I confessed, with tears in my eyes, of committing the crime of stealing his trade, which was considered by everybody a wonderful and mysterious accomplishment in those days. However, instead of scolding me, he congratulated me, and said hereafter I should be his assistant operator. After several years, I learned to read by sound, with the old paper register always ready to help out when it came too fast. I finally got the position of night operator at Painesville, Ohio, on the Lake Shore & Michigan Southern Railroad, and thence I went into the army as a military operator, having been recommended by the superintendent to Anson Stager as qualified for the service. After the Civil War I was manager of the Western Union office at Titusville, Pa., then the great oil-producing center, with James F. Hughes, now manufacturing and repairing electric motors, etc., at No. 62 Grand Street, New York; George A. Hamilton, who, I believe, became an accomplished electrician in New York; Martin Luce and James S. Low, were at Oil City, Pa., and George McLavey, afterwards at Little Rock, Ark., was at Franklin, Pa. Mat Herrighon was also at Titusville, and Mort McCoy was with me also at Titusville. John D. Archbold, now president of the Standard Oil Company, was an oil broker near the telegraph office, and married Annie Mills, the daughter of the landlord of the American Hotel, where we boarded. I remember we charged $1.85 for ten words to New York in those days, and T. B. A. David was our superintendent, with headquarters at Pittsburgh. I owned a jewelry store opposite the telegraph office, and always had my sign taken down every time Superintendent David visited me for fear I would get discharged if he found out I was not giving him twenty-four hours a day, instead of seventeen. I not only worked in the office all day, but took press report half the night or more. We had to take it on a loop from Erie and could not break through a button repeater at Erie, and when the line worked badly I had to compose, as well as receive, the news in order to satisfy the editor of *The Herald*. I fell in love with Anna Stevens, a telegraph operator, in the United States Telegraph Company's office at Meadville, Pa., and married her, and she is still my sweetheart, though we have been married many years and ought to forget such nonsense.

[Mr. Robinson is now one of the wealthiest and most influential citizens of Sanford, Fla., and is connected with various business enterprises in that State.—EDITOR.]

Mr. R. J. Little, manager Postal Telegraph-Cable Company, Rochester, N. Y., writes: "I need TELEGRAPH AND TELEPHONE AGE in my business."

Opportunity.

It is said that opportunity knocks but once at each man's door. However true this may be, says the Charles City, Iowa, *Intelligencer,* we know that opportunity is just now seeking the door of some likely Charles City boy, and doing it through the columns of the local press. This opportunity is in the guise of a want advertisement, seeking some wide-awake boy who will deliver messages for the Western Union Telegraph Company, and for which service he will be paid a reasonable wage and at the same time be given a chance to learn telegraphy. We have in mind just the kind of boy the Western Union people want—a boy who is alert, painstaking and ambitious—a boy with desire to get there. Such a boy as these terms designate will be given opportunity to learn the art or business of telegraphing, thus opening to himself the door of vast possibilities in the business world.

Since the writer settled in Charles City these opportunities have been offered to boys at various and frequent recurring periods, but few have ever accepted. We have in mind an almost endless procession of Western Union messenger boys passing before our eyes, many of them bright, active lads, but few with ambition to apply themselves to the acquisition of the telegraph business. We have, at frequent intervals, said to the boys of this passing procession, "Why don't you learn to telegraph?" and the replies have been smiles of disdain or impertinent rejoinder that indicated utter indifference to the opportunity offered to pick up a useful occupation with but little effort. One lad's reply was, "Oh, what's the use," as he lazed out of our hearing, and another's was, "What good would it do me?" Yet, with all this indifference, the fact remains that telegraphy offers remunerative employment to an army of men, and the ranks of this army are seeking recruits every day of the year.

The demand at this point for good and capable boys to accept employment in the Western Union offices is multiplied in the various small cities of the country and, no doubt, is met by the same indifference that characterizes the attitude of Charles City's youth—"what's the use?" or "what good would it do me?" Well, the use would be to supply a remunerative occupation to the boy who learned, and the good it would do such boy would be to make him a self-respecting, self-supporting citizen with larger possibilities than any lad would ever dream of. Thomas A. Edison started in life as a telegraph operator, hundreds of others in railway work today have started their business life at the key of a telegraph instrument. Andrew Carnegie was a telegraph operator before he entered upon his career as an iron and steel manufacturer. Many of the men who have been presidents and heads of operating departments of the great railway systems of the country entered upon their work through the door of a telegraph office. The Western Union Telegraph Company offers similar opportunities to many boys, but these boys must be alert, active and desirous to learn, and even to earn more than the few dollars paid them as a monthly or weekly stipend. Who knows but this modest three-line advertisement for a boy to deliver messages might open the door of opportunity to a successor to Thomas A. Edison, Andrew Carnegie, Thomas A. Scott, William C. Brown, or hundreds of others who have become famous in the busy world. It all depends on the boy, however, because there is no open sesame to accomplishment in this line other than hard work and rigorous application to duty every time and all the time.

Insulators in Customs Classification.

The lack of a specific provision for insulators in recent tariff acts is regarded by importers as regrettable, owing to the uncertainty attending the classification of this line by customs officers. In the absence of specific designation in the old acts, as well as in the present law, telegraph insulators have generally been relegated to the provision covering manufactures of china and earthenware. It happens frequently that the question of classification depends upon the material of chief value in the make-up of the goods.

It is claimed that the classifying officials often err in their returns, and that when the case is presented to the Board of General Appraisers the result of the Government analysis is unsatisfactory. Complaints are heard that the official analysis are often carelessly made, and the chemist's accompanying report too meagre for the Board of General Appraisers to form a proper judgment as to the actual composition of the insulators.

An instance of this kind was disclosed on January 22, when the board handed down a decision in the protest case of the W. H. Allison Company, of Detroit. Duty at the rate of sixty per cent ad valorem was taken on the firm's importations of insulators as manufactures of china or earthenware not specially provided for under paragraph ninety-three. The importers claimed duty at twenty per cent ad valorem under paragraph 480 of the old law, as unenumerated manufactured articles, or thirty-five per cent as earthy or mineral substances, under paragraph ninety-five.

The protests were submitted to the board, with a request for an analysis. This was performed by the Government chemist at the laboratory connected with the Appraiser's office at this port. The result of the test was filed by the chemist in a report which simply stated "talc and iron wire." Judge Hay, in his decision for the board, promptly overruled the claims, with the brief comment that "upon such a record it is impossible to determine the proper classification of the merchandise in question."

Wood Preservatives in Use.—Thirty different wood preservatives are in commercial use in the United States; many of them utilize creosote of one sort or another, others require chemical salts.

Mr. A. H. Koenig, Western Union Telegraph Company, Green Bay, Wis., writes: "Here's subscription price for another year. Let the T. and T. Age come to my old address here. I'm little late; my renewal subscription now past due; glad you renewed it; very many thanks to you."

The Telephone in News Service.

In recent years the telephone has become one of the most important factors in the development of the news service of the country and provides a means by which news is collected and distributed to the people in the shortest possible time.

Compared with the telegraph, the telephone method of handling news matter is much more rapid. Any amount of matter can be handled with ease, and the increased speed is secured without the sacrifice of accuracy. The work is performed by any member of the newspaper staff.

An average speed of seventy-five words per minute is easily maintained by the telephone service when the receiving is done by typewriter, whereas the speed of Morse sending on press wires using Phillips code does not average at best over forty to fifty words per minute. When the receiver takes it by telephone in shorthand a much greater speed is attained; speeds of 125 words per minute have been maintained regularly in actual service. In telephone press service entire words are transmitted instead of single letters spelling out words, as in Morse. The speed of transmission is governed by conditions at the receiving end only and not by the ability of both the sender and receiver, as in Morse hand-operation.

The telephone provides a most efficient means for the quick handling of newspaper reports or "specials." Before the advent of the telephone in the dissemination of news, it was the practice of the press associations to file copies of the specials with the telegraph companies. These specials would be transmitted over the latter's commercial wires and delivered to the newspaper by messenger. The modern method of handling this class of service is to talk the report from the press bureau direct to the newspaper with practically no loss of time. This method enables the paper to receive the last-minute news right up to the moment of going to press; this means everything to the newspaper man and eliminates the waste of specials delivered too late for the press that day.

Telephone press service has been developed to such an extent that a number of newspapers located in widely separated towns are supplied with news from a central point at the same time. A circuit is made up, reaching the desired points, and the man at the press bureau or newspaper reads the report to all of them at the same time. This circuit arrangement, which, in effect, is a private wire for the time being, also permits an exchange of news between the various papers connected.

Compared with the telegraph, the telephone provides the individual newspaper or press association with a more rapid and extremely flexible means of collecting news. It also provides an almost limitless field for the collection of news. With the telephone accessible everywhere, and instantly available, it enables the newspaper to have correspondents in every town. A newspaper correspondent in the field having occasion to report an important happening, instead of stopping to write up an account immediately puts in a telephone call for his paper, and, on getting the office, tells the story to the editor in his own way and in a few words. The editor then writes up the story in full detail. This effects a saving in both time and tolls and gives the editor a means of choking off stories of no importance, or those, which for other reasons, cannot be used that day.

A further refinement of the use of the telephone in newspaper work, and which opens a large field for future development, is in the transmission of news matter over a toll line direct to a linotype operator in the composing room. Practical demonstrations over long circuits show the perfect feasibility of handling news in this manner, eliminating the use of "copy" by the linotype operator, and effecting a further saving of time. The speed of transmission in this case is governed not by the ability of the linotype operator, but by the mechanical limitations of the linotype machine. However, a speed of from fifty to sixty words a minute can be obtained, which is better than that of a fast Morse wire with the use of code and typewriter.

Improving the Operation of Quadruplex and Duplex Circuits.

BY S. D. SWEAT, ASSISTANT WIRE AND REPEATER CHIEF, WESTERN UNION TELEGRAPH COMPANY, SAVANNAH, GA.

In an effort to better the working condition of some of our long-range bridge quadruplex and duplex circuits, I find that by merely changing the wiring on the polar relay from series to multiple I get desired results.

Although the Western Union specification ED-29-A shows the wiring of polar relays on all quadruplex sets connected in multiple and specification ED-110-A shows all duplex sets connected in series, it seems that the equipment force has now decided that the 800-ohm series connection shall be the standard arrangement for polar relays in the bridge circuit. I find that with 800 ohms in series the static is often very heavy, and on some of our circuits almost impossible to eliminate, resulting in a very unsatisfactory quadruplex. On one of our Atlanta-Jacksonville quadruplex circuits, which had heretofore never given much satisfaction on the common side, owing to the narrow working margin obtainable, I changed the bridge relay connections from series to multiple. This is a long circuit of iron and copper wires, on which we usually get a margin of about seventeen or eighteen milliamperes of current, with a heavy static discharge, and when Jacksonville-Atlanta doubles on the polar side, New Orleans comes very poor on the common side, being at times almost unreadable.

Since I changed the connections on the polar relay from series to multiple, however, the current increased from seventeen to thirty milliamperes, and we have been working the circuit this way for over a month, and have never had a "break-over" since. How do you account for the benefit thus derived, and the result being apparently the exception instead of the rule?

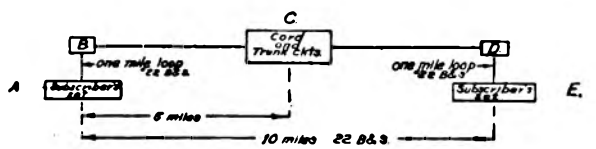
The Speech-Carrying Capacity of Telephone Lines.

BY L. C. EDDY, NEW YORK.

The safe current-carrying capacity of power and lighting circuits of different sizes of copper under different conditions of insulation may be found in text-books, etc., but the speech-carrying capacity of telephone lines and the method of determining it is not so readily obtained. This article presents, therefore, in brief form, data of practical use to telephone men.

In much the same way that the character of insulation affects the safe current-carrying capacity of a circuit, leakage, due to trees and obstructions and the loss due to operators' bridged cord circuits, ring-down trunk circuits, phantom coils, reflection, etc., affects its speech-carrying capacity. As in most cases, however, the leakage from an open-wire line due to trees and obstructions is made negligible by proper precautionary measures the normal insulation of the line is assumed to hold.

The speech-carrying capacity of a telephone circuit is known as its transmission equivalent, the latter being expressed in miles of standard cable"; in other words, the transmission equivalent of a line is the number of miles of standard cable which would cause a loss in transmission equal to the loss over the conductors or apparatus in question.



SIMPLE NON-LOADED NON-PHANTOMED LINE.

Owing to the fact that much modern telephone cable has a capacity of .072 m. f. and a resistance of 88. ohms per mile, a cable having these constants is here used as the standard. The transmission equivalent of non-loaded lines, *i. e.*, lines not equipped with inductance coils uniformly spaced along the line, may be approximately determined by considering separately the losses due to auxiliary apparatus (cord circuits, trunk circuits, etc., as previously mentioned), and adding them to the loss due to simple attenuation of the high-frequency talking current as it flows over the line wires, and the loss due to decreased effectiveness of the transmitter in cases where the direct current from the common battery is diminished by flowing over a subscriber's loop of appreciable length. If the line is loaded with inductance coils, however, the detrimental effect of leakage, bridged cords and reflection is in some cases considerably greater than when the line is non-loaded, these auxiliary losses varying with the type and spacing of the inductance coils.

In order to illustrate these facts by a specific example, consider the case of a simple non-loaded, non-phantomed telephone line, ten miles long, consisting of No. 22 B. & S. gauge cable, terminating at each end in a No. 22 B. & S. gauge subscribers' loop of one mile and relayed through an intermediate station equipped with ring-down trunk circuits midway between the terminating offices:

If there were no apparatus at "C" the simple transmission loss from "B" to "D" would be, approximately,

$$\frac{10\sqrt{\text{Mutual capacity of the wires} \times \text{their resistance}}}{2.52}$$

$$= \frac{10\sqrt{.072 \times 176}}{2.52} = 14.1 \text{ miles of standard cable,}$$

the factor 2.52 being the square root of the product of the mutual capacity and resistance of such a standard cable unit. The loss due to the bridged operator's cord circuit at "C" and the two ring-down trunk circuits could be computed, having given the arrangement and constants of the apparatus in the trunk circuit, but on non-loaded lines the approximate loss due to such apparatus in common use does not vary widely enough if properly wired to warrant detailed investigation and hence the losses due to simplified circuits of approximately the same constants are here used. Thus, the average loss due to a ring-down trunk circuit of types commonly used may, for practical purposes, be stated as about ¾ of a mile of standard cable, and the average loss due to the relaying operator's cord circuit in the middle of the line about ½ mile of standard cable. To the value previously found we should, therefore, add ¾ + ½ + ¾ = 2 miles of standard cable to determine the approximate transmission equivalent of the line between B and D, including the loss due to the two trunk circuits and the operator's cord circuit. In addition to the transmission loss of 1.41 (see appended table of calculated transmission equivalents) of the high-frequency talking currents over each of the subscribers' loops, there should be added a larger loss of about four miles of standard cable to cover the loss of direct current supplied to the transmitter from the common battery, owing to the bridged resistance of the one-mile loop and switchboard at the transmitting end; this loss allowing for the resulting decrease in efficiency of the transmitter. Inasmuch as the standard cable commonly used as the unit has a subscriber's set at each end, as in the case cited, it is not necessary to consider additional reflection losses occurring at the terminals of the circuit. For this case, therefore, it is necessary to add together only the values enumerated and the switchboard loss of approximately ½ mile at D to determine the transmission equivalent of the circuit, *viz.:*

$$14.1 + 0.75 + 0.50 + 0.75 + 1.41 + 1.41 + 4.00 + 0.50 = 23.42 \text{ miles}$$

of standard cable. The introduction of a phantom repeating coil would occasion a loss in each of the side circuits of about ¾ of a mile of standard cable.

As already stated, loading the line with inductance coils between B and D not only affects the attenuation and introduces reflection losses at B and D, due to the change in the surge impedance of the circuit in passing from AB to BC and from CD

to DE, but also alters the loss due to the auxiliary apparatus mentioned, these losses also depending on the relative location of each piece of apparatus. For this reason each case deserves a separate study, and can be more readily handled by using results of experiments or calculations on the variables in question plotted on paper.

Following is a list of the transmission equivalents of commonly used cable conductors:

Gauge.	Transmission Equivalent.	Diam. (Inches)	Capacity (m.f.)	Resistance per Loop Mile.
No. 19 B. & S.	1.00	.036	.072	88.
No. 22 "	1.41	.025	.072	176.
No. 18 "	0.89	.040	.072	70.
No. 16 "	0.705	.051	.072	44.
No. 14 "	0.564	.064	.072	28.
No. 13 "	0.500	.072	.072	22.

When the transmission equivalent of a line exceeds fifty-eight miles of the .072 m. f. cable here used as the standard, speech cannot be transmitted over it by ordinary methods; for commercial purposes the transmission equivalent should not exceed one-half of this amount.

Adjustable Condensers.

BY PAUL THOMPSON, NEW YORK.

I was much interested in the article in your issue of February 1, describing Mr. J. F. Skirrow's adjustable condenser, and, no doubt, it will prove a very useful instrument for the purpose for which it was designed, but the criticism of the so-called plate type of condenser by such a well-known authority on telegraph engineering as Mr. Skirrow is scarcely fair to the manufacturers of the plate-type condensers.

Mr. Skirrow says that the new condenser does away with the need of returning condensers for repair, and that the cost of repairing burnt-out or leaky condensers of the plate type is so high as to be seldom worth while.

Now, this statement is very misleading. Quite likely the condensers Mr. Skirrow has been accustomed to use in later years may have burned out, etc., but there are manufacturers whose condensers have been in use by telegraph companies over thirty years, and not a single one has ever been burnt out by telegraphic currents, and but very few returned for repairs due to low insulation, and those only after being in service from fifteen to twenty years.

Mr. Skirrow also says that the rolled condenser units are of low cost, and in event of breakdown, can be replaced in a few moments. This seems to me to be a plain admission that breakdowns are frequent and expected, and that, therefore, rolled condensers are not reliable for telegraphic purposes.

It may be of interest to some of your readers to learn that the so-called plate type of condensers can be made costing very little more than the rolled type, and occupying practically no more space, while they are guaranteed for a number of years against burning out or becoming defective due to low insulation. Thus, the first cost is the only cost, there being no renewals, no waste of time and no scrap heap, as with the rolled type, which is a dead loss when it becomes defective.

I remember reading in TELEGRAPH AND TELEPHONE AGE, some time ago, an article eulogizing the rolled type of condenser, in which the writer claimed that they could become short circuited many thousand times without in any way changing their capacity or insulation. This, of course, is a nonsensical statement to make. Every time the spark perforated the insulation a false signal would be registered at the receiving end.

The Importance of Life Insurance.

BY GARDNER IRVING, PRESIDENT GOLD AND STOCK LIFE INSURANCE ASSOCIATION, NEW YORK.

I was much interested in your article on "The Importance of Life Insurance," as given in your issue of February 1. Too much cannot be said on these lines in order to open the eyes of those who will not see without being impressed.

In my annual report to the Gold and Stock Life Insurance Association on January 19, I said:

"I wish I might be able to say something that would make us turn long enough from the tremendous activities of the present, to look a little into the future—the future of those we love. I might then take you to the home from which the husband and father has been removed by death, but who, while living, prepared for this contingency. We will find deep grief for the departed, but not despair in those whom he has left. Here the love lingers for him who tenderly provided for his going, and his memory cannot but be as tenderly revered. Again, I might choose that home, whose provider did not look, as we do, beyond the present, and we will too often find here the utter desolation which effaces from thought and memory everything but the struggle for existence—the struggle which begins on the very day of his departure and lasts until something has been found to take the place of that relief which he neglected to provide.

"Having viewed the conditions in these two homes are we not obligated by every fraternal feeling to see to it that our fellows carry some kind of insurance? As the Gold and Stock method of payment covers, in the form of a substantial monthly check, the period of greatest need, it would seem that our Association should be recommended to all who are eligible."

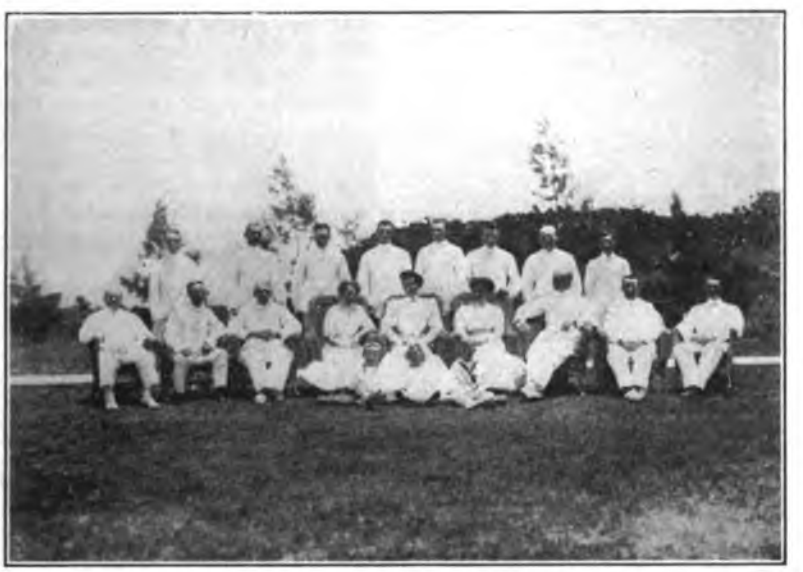
When these thoughts were written, I had in mind the same idea as expressed by you, and tried to show the difference in the homes of the insured and of the uninsured by a word-picture, thinking perhaps some one, at least, would frame the picture in his mind, and benefit thereby.

I believe the question of non-insurance, in most cases, is a matter of thoughtlessness, rather than of real neglect, and that it is only necessary to bring every one to a consciousness of the picture previously mentioned.

I am with you, heart and soul, in this good work.

Our Mid-Pacific Islanders.*

Four times a year a trim, well-equipped, sea-going auxiliary schooner, the "Flaurence Ward," sails out of Honolulu harbor, bound for the Midway Islands, Pacific Ocean, with food, supplies and mails for the little colony of dwellers on this coral patch in the middle of the Pacific Ocean—1,332 miles from the nearest land. This colony is composed entirely of employes of the Commercial Pacific Cable Company, and although far removed from the activities of large commercial cities, there is nothing humdrum about their life. They are a busy, energetic, skillful group of toilers, and have an important task to perform and they do it with the enthusiasm and zeal characteristic of the work of industrious men.



STAFF OF COMMERCIAL PACIFIC CABLE AT MIDWAY ISLANDS.

The island is one and a half miles long, and three quarters of a mile wide, and lies in the center of a coral reef eighteen miles in circumference. When this island was first occupied by the staff of the Commercial Pacific Cable Company, it was barren of all vegetation, and was composed entirely of coral sand. Since then five large concrete structures, with fine balconies, have been erected, and every modern sanitary convenience is provided, including two large windmills. After eleven years of patient, persistent and untiring efforts, which under the trying circumstances of their environment would have overcome men with weaker spirits, this little group of islanders have transformed what was probably the most sterile and desolate habitation on earth into a garden of verdure.

In place of the severe glare of the white coral sands which often caused "snow-blindness," there are green lawns, trees and other vegetation, and the myriads of various species of sea birds have been, in a large measure, superseded by domestic fowl, pigeons and hundreds of singing canaries, which thrive and breed prolifically on the island in a wild state. Since the company brought cattle to Midway, the islanders are supplied with fresh meat and milk, and the truck garden keeps the table furnished with green vegetables and some fruits.

The staff house contains a room for each of the white men, a mess room, a billiard room, a well-stocked library and music room, containing a piano, pianola, gramaphone, and other musical instruments. Outside amusements consist of swimming, boating, tennis, golf, etc.

The earlier settlers of the island had two or three unpleasant experiences when vessels specially chartered to bring food supplies were wrecked on the reef and all of the supplies lost, but, fortunately, no lives. The schooner "Flaurence Ward," in charge of Captain Piltz, is the only vessel which visits Midway regularly, and her visits bring cheer to all located there.

Mr. B. W. Colley, the first superintendent of the island, assisted by Mr. D. Morrison (now superintendent), supervised the construction of the company's permanent buildings and equipment. He spent five years at Midway Islands. Prior to that time he was employed by the Commercial Cable Company in its Atlantic service for nineteen years.

Mr. D. Morrison, the present superintendent, was employed by the Commercial Cable Company in its Atlantic service for eighteen years, and has lived at Midway Islands over eleven years.

The staff at Midway consists of (see group picture—back row, left to right): Messrs. E. Tilford, W. S. Fraser, G. Foden, B. J. Newel, D. L. Stuart, A. G. Paget, H. Norman, W. G. Pimley; (front row, left to right): J. R. Winthrope, P. J. Harwood, Captain G. H. Piltz, Mrs. Harwood, Mrs. Morrison, Mrs. Winthrope, Superintendent D. Morrison, W. Pimley, Dr. J. V. Rice. The children in the foreground are: Donald Morrison, Helen Harwood and Bobby Harwood.

* *Postal Telegraph.*

Induction.*

BY I. N. MILLER, DISTRICT COMMERCIAL SUPERINTENDENT, WESTERN UNION TELEGRAPH COMPANY, CINCINNATI, OHIO.

Induction is one of the most troublesome phenomena telegraph and telephone engineers have to deal with in working out electrical problems, and yet it has been turned to good advantage in many ways. In some cases we can get along with it and in others we cannot get along without it. If one's house has fire enough in it to set it on fire, then fire becomes a burden, but if we confine it to proper limits, so that it keeps the house at an even temperature, of say seventy degrees, then it is a blessing.

If one's eyes were given wide range, enabling us to see unaided the smallest germ and the most remote fixed star, the probabilities are they would soon destroy themselves by over strain. If electric generators were restricted in their operation, and only currents of electricity of limited quantity permitted to flow from them, then they can be applied to good use, but if the external and internal resistances in circuit are extremely small, enabling the current to rush out in great quantity, then the machine would burn itself up very quickly.

There is not an atom of matter in existence that cannot be destroyed or changed in its material form. Everything has a limit of resistance, and when that limit is exceeded the physical composition must undergo a change. Life itself can be destroyed through fright or sudden mental stress when there is no physical injury. If a small wire of poor conductivity (or high resistance, which is the same thing differently expressed) is used for conveying a large quantity of electricity the metal is instantly vaporized and disappears in the form of gas. If the reverse action occurs in the skies, that which has become volatile may be transformed again into material form and fall to the earth in the form of a meteorite.

Whenever electricity is separated into positive and negative conditions these separate conditions exercise an influence over and affect all objects within its sphere of action. This sphere is called the "field." If two wires are strung parallel upon the same line of poles and a current of electricity is passed over one of them, a momentary current is found in the second wire. This current is not continuous, but appears when the current in the first wire is established, and reappears when the first or primary current is withdrawn.

As long as the primary current continues, there is no current in the second wire. This effect that one current has in bringing into action a momentary secondary current is called "induction." One peculiarity of induced currents is that they are always in the opposite direction from the inducing current. Another peculiar feature is that as the degree of insulation increases the induction is correspondingly increased. In actual practice, telegraph wires located upon one set of poles, and crossing a dry desert where the insulation is extremely high, the induction is increased to such a degree that only one wire can be operated at a time unless artificial "escapes" are provided at the offices, thus reducing insulation and induction. All Atlantic and Pacific cables contain but one copper wire, the distance being so great that two wires located so close together cannot be operated successfully on account of the induction.

There are other obstacles besides induction that must be overcome in long cables—static charge being one of them. The Western Union Telegraph Company operates eight cables between the United States and Europe the last one completed cost $3,334,402.92. Eight new cables would cost approximately $25,000,000. If we could group eight insulated wires together and bind them in one cable, millions of dollars could be saved in construction.

This is one of the problems electrical engineers have to solve. The longer a cable is the greater will be the induction. The same troubles are encountered when wires are buried in the ground. Our engineers have made marked progress during the past few years in overcoming the effects produced by induction and it may be possible in the near future to bury wires for long distances, but at present we are practically limited to comparatively short distances.

It is estimated that signals can be sent fifty times faster over a wire located at the top of a thirty-five-foot pole than can be sent over a wire of equal length when buried in the ground. It is an interesting study to take up the subject of induction, static charge, retardation, etc.

* From the Seventh District Blue Book.

Wireless Telegraphy and Telephony.

WIRELESS TELEGRAPHY AND TELEPHONY is a recent book by C. I. Hoppough, Valparaiso, Ind. It is an up-to-date treatise on these subjects. It contains about 200 pages of descriptive and illustrative matter pertaining to wireless and more than 150 illustrations. There are sixteen chapters describing in detail the development of wireless telegraphy and telephony from its inception to its present state of efficiency. The book embraces the following subjects: Matter, Motion and the Ether; Electricity and Magnetism; Quantitative Electricity; Dynamo Electric Machinery; Electro-Magnetic Induction; Capacity and the Oscillatory Discharge of Condensers; Electro-Magnetic Waves; Early Experiments in Wireless Telegraphy; Detectors; Receiving Circuit and Tuning Apparatus; Transmitters; Spark Gaps; Aerials; Wireless Equipment and Telegraph Stations; Wireless Telephony; Wireless Operating.

Mr. Hoppough, the author, has been in the wireless field for several years, having held some of the most important positions with the United Wireless Telegraph Company. This work is not only an invaluable treatise for the amateur, but a most valuable book of reference for the wireless telegrapher.

The price of the book is $1.50 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Edison-BSCO Type 452 Cell, 450 Ampere Hours' Capacity.

EDISON BSCO PRIMARY BATTERY

THE life of a set of **EDISON-BSCO** cells in transmitter service is regulated by the current flow and time circuit is closed per day.

For example, on a transmitter that is in constant service twelve hours daily with a current flow of .2 ampere, one set of 400 ampere hour renewals will last six months, during which time the cells require no attention. This illustration would apply to busy 'phones such as central switchboards or railway dispatchers' circuits.

On the same service a set of gravity cells would consume two charges of bluestone, besides frequent cleaning of the zincs. Twenty sets of ordinary dry cells would be needed to furnish current for an equal period. It is evident, therefore, that the **EDISON-BSCO** cells reduce battery maintenance to the minimum.

Where the service is not so heavy as in the cases cited above, the **EDISON-BSCO** 200 ampere hour cells should be used. On a transmitter taking .2 ampere, and used on an average of three minutes twenty times a day, these cells will show a life of approximately three years.

Aside from the advantages accruing from the use of a battery free from constant attention is the fact that the **EDISON-BSCO** cell is ideally suited in every respect for transmitter service.

Catalog on request.

The Cheapest Form of Battery Energy.

TRADE MARK Thomas A Edison

THOMAS A. EDISON, INCORPORATED

247 LAKESIDE AVENUE, ORANGE, N. J.

EDISON-BSCO
Complete Renewal showing the all-in-one assembled element.

THE RAILROAD.

MR. R. G. GAGE has been appointed signal and electrical engineer of the Canadian Government Railways, with headquarters at Moncton, N. B.

PETER J. HUDER, aged seventy-one years, formerly operator on the Southern Pacific Sunset Central Lines, and at the time of his death the oldest employe in that service, died at Houston, Tex., January 27.

Convention of Railway Telegraph Superintendents.

The Association of Railway Telegraph Superintendents will hold its thirty-third annual convention in New Orleans, La., May 19. This meeting will mark one-third of a century in the life of the association and the thirty-third year finds the association more vigorous and progressive than ever before. The association has done much for the development of the railways of this country, and represents an arm of the industry that is growing more and more important as time passes.

The New Orleans convention promises to be one of unusual importance, and active preparations are now going forward to make it a success in all respects. A large attendance is desired by the officials because new problems will come up for consideration, and as many of the members as possible should be present to take part in the discussions and learn the latest developments at first hand.

In our issue of February 1 we printed a list of the papers to be read and discussed at the New Orleans meeting. A glance at this schedule shows a wide range of subjects and indicates an increasing expansion of the responsibilities and duties of the superintendents.

The officers of the association for this year are: William Bennett, of the Chicago and Northwestern, Chicago, president; A. B. Taylor, of the New York Central Lines, New York, and W. C. Walstrum, of the Norfolk and Western, Roanoke, Va., vice-presidents, and P. W. Drew, of the Minneapolis, St. Paul and Sault Ste. Marie, Chicago, Ill., secretary.

Mutual Investment Association.

The annual meeting of the Mutual Investment Association, New York, was held at 253 Broadway on February 1. The treasurer's report shows receipts, $7,251.40; expenses, $1,704.75, leaving a net profit, $5,546.65. This amount, divided among the 140 members, makes the value of each share on February 1, $457.05, as against $357.44, the corresponding item, on February 1, 1913.

In his report, Treasurer F. J. Kernan says:

"We have not undertaken any new lines of endeavor during the past year but our work has been extended so that a larger part of the employes of the Postal Company throughout the country have participated in its benefits.

"Our efforts to suppress the loan shark evil throughout the country have met with considerable success. Every case that has been called to our attention, where one of these so-called loan sharks was endeavoring to collect his account with special charges attached, has been taken up by us and adjusted with benefit to the debtor."

Dance of Chicago Telegraphers' Aid Society.

The Chicago Telegraphers' Aid Society celebrated its twenty-fifth anniversary by an informal dance in the red room of the LaSalle Hotel, Chicago, Wednesday evening, February 4. There was an attendance of 600 guests. The program consisted of the most select and up-to-date terpsichorean varieties. The grand march was led by Mr. and Mrs. Carl A. J. Otto, assisted by Mr. John F. Costello and Miss Myrtle Scott. The dream waltz, hesitation and fancy steps were rendered with grace and art by Mr. Jerry Fowney and Miss Mae Crowe. The event was highly successful and enjoyable.

Regrets were received from Messrs. Theo. N. Vail, president; Newcomb Carlton and Belvidere Brooks, vice-presidents, and others.

Mr. J. J. Harrington was chairman of the committee of arrangements. The officers of the society are: J. J. Harrington president; Robt. Haiges, vice-president; Alfred J. Fuller, secretary; C. H. Shell, sr., treasurer.

BUFFALO ELECTRICAL AID ASSOCIATION.—The proceedings of the twenty-seventh annual meeting of the Buffalo Electrical Aid Association, held January 14, have been issued in neat pamphlet form. The reports of the officers show the association to be in excellent condition. The association was organized February 20, 1888, and has a total membership of 350. The officers are: Wm. J. Quinn, president; E. F. Schroeder, vice-president; Jos. J. Kennedy, secretary-treasurer.

DINNER TO T. & T. L. I. A. DELEGATES.—The annual meeting of the Telegraph and Telephone Life Insurance Association will be held at 195 Broadway, New York, March 11. In the evening a subscription dinner will be tendered to the delegates of the association at The Fifth Avenue, Fifth Avenue Building. Tickets will be $2.00 each and may be obtained of Mr. T. E. Fleming, 195 Broadway, New York.

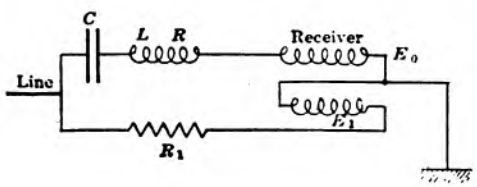
SERIAL OFFICIALS MEET AT DINNER.—The annual meeting of the advisory committee, officers, directors and counsel of the Serial Building Loan and Savings Institution, New York, was held Wednesday evening, February 11, at Farrish's Chop House, on John street, New York. The management of this institution meets once each year for the purpose of harmonizing the ideas of its promoters and instilling each one with enthusiasm for its welfare, and its success is traceable very largely to this custom.

Mr. C. S. Rhoads, superintendent of telegraph of the Cleveland, Cincinnati, Chicago and St. Louis Railway at Indianapolis, Ind., writes: "Herewith my check for current year. The number for February 1 alone is worth the year's subscription. How can you do it?"

Avoiding Telephone and Telegraph Disturbances from Single-Phase Lines.*

M. G. Girousse, engineer of telegraphs, France, discusses in *La Lumière Electrique* several methods that are available for minimizing the disturbance produced by single-phase distribution systems upon telephone and ground-return telegraph circuits. Four remedies are available, namely, the use of compensating devices, the shifting of such circuits to pole lines at least one mile distant from the high-tension route placing them underground and doubling them by adding return wires. All remedies but the first are rejected by M. Girousse as too costly. He states that for telegraph lines very satisfactory results have been obtained with the following inexpensive schemes as first tried in the latter part of 1911 on the 6000-volt, twenty-five-cycle Maritime Alps, the 10,000-volt, twenty-five-cycle Haute Vienne and the 12,000-volt, twenty-five-cycle Oriental Pyrénées single-phase systems. Since then complete installations have been made for the first two lines named, and the equipments for the Oriental, Haute and Basse Pyrénées lines will soon be in place.

As shown in the accompanying wiring diagram, use is made of a receiver wound with two coils having the same number of turns and connected differ-



CIRCUITS OF DOUBLE COIL RECEIVER.

entially. One of the coils is in series with a condenser C and a self-inductance L; the other is in series with a resistance R_1. As the telegraphic current is continuous it does not traverse the former coil, and consequently the receiver acts in the normal manner.

If the two circuits present the same resistance and the same reactance, the disturbing alternating current will divide in two parts alike in amount and phase, and consequently the receiver will not be disturbed. It is clear that these conditions are satisfied theoretically when there is resonance between the capacity C and the self-inductance L for the frequency of the disturbing current, and that R, the resistance of the self-inductance coil, is equal to the resistance R_1. When the conditions are carefully determined in advance, an arrangement of this kind will give good results without readjustment from time to time.

Telephone circuits require both good insulation and minimum inductance. The insulators should be of the industrial type with large petticoats instead of the present French type with two bells. The petticoat insulators are much easier to maintain, particularly in cleaning, and they cost little more. The insulating points on telephone circuits which leave most to be desired are the underground sections which until lately have been freely installed at crossings with heavy current transmission lines. These underground sections especially at the junctions with aerial lines, constitute the weakest points of a telephone circuit and should be avoided wherever possible.

It is also necessary to take certain precautions at the telegraph offices, for it is useless to insulate the line carefully if the office equipment suffers ground losses. To remove the interurban circuits from the bad influences due to losses either on the lines or the inside equipments, it is best to isolate the circuits by means of transformers. Excellent transformers which insulate against high-tension current are now available.

On some of the existing installations the interference with lines within the influence of induction from single-phase track circuits has been caused frequently by carbon lightning arresters. The extreme sensitiveness of these arresters is usually a valuable quality but when their nearness to single-phase circuits causes excessive operation, the particles of carbon, become detached. Disintegration causes leakage to ground which cannot be neglected. Therefore, it is desirable to replace such apparatus by arresters of either the horn or the vacuum type. This change will prevent the destruction of the arresters, but it is still necessary to provide means for avoiding shocks. If transformers were used, they would protect the office force, but they would not protect the workmen on the line. In order to eliminate all dangerous high tensions, grounding discharge coils should be installed. These coils should be of the Cailho type which are used for telegraphing on telephonic circuits. As ordinarily made, this coil is not intended to take care of the high-voltage currents induced by single-phase circuits. A modification for the latter purpose, known as the Perego coil, has given good results on the circuits of the Oriental Pyrénées lines.

M. Girousse stated that the single-phase lines as usually installed to date offer grave difficulties to telephone and telegraph circuits. It is desirable that these troubles be made negligible. While it is difficult to make the above changes on existing lines, the methods described do permit the satisfactory operation of telephone and telegraph circuits at a very small additional expense.

* *Electrical World.*

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

MUNICIPAL ELECTRICIANS.

MR. HARRY BLEDSOE, superintendent of fire alarm at Terre Haute, Ind., has been appointed chief of the fire department at that place.

MR. E. H. MURPHY, assistant superintendent of police telegraph in New York, was retired on his own request, after an active service of nearly thirty years. He entered the service in 1885 as a telegraph operator. He was formerly an operator for the Western Union Telegraph Company. He will receive a pension of $1,500 per year.

NEW FIRE ALARM SYSTEM IN ATLANTA.—The installation of the new fire alarm system in this city is approaching completion. The wires are laid underground and the fire alarm boxes are mounted on special ornamental iron pedestals, which are surmounted by red lights to distinguish them. Mr. W. C. Davenport, superintendent of the fire alarm system, has the work in hand.

Boston Aid Association Ball.

The Boston Telegraphers' Mutual Aid Association held its twenty-ninth anniversary ball in Paul Revere Hall, January 28. Mayor-elect James M. Curley was a guest.

A concert was given until nine o'clock, then came the grand march, led by President Thomas R. Melville and Mrs. Melville, with sixty couples in line.

Frank M. Kelliher was floor marshal and his assistants were C. J. Brinkman, Peter Welch and J. J. Kennedy. The aids were J. T. Hart, W. A. Connor, E. J. Sullivan, W. J. Mahoney, J. A. Molloy, Dr. Charles Malone, H. J. Finn, Dr. F. F. McVey, L. J. Malone, C. I.Mooney, E. A. Herbert, J. J. Coughlan, P. J. Molloy, H. B. Fuller, C. E. Smith, J. F. Walker, J. F. Biggane, A. H. Noble, D. J. Sullivan, C. E. Smith, P. T. Haggerty, J. J. McCarty, F. E. Dumas and J. F. Donovan.

On the reception committee were R. E. Tobin, chairman; D. Carter, J. J. Carney, J. J. Hannon, H. B. Coughlan, W. H. Sullivan, W. E. Conry, J. B. Gatins, C. A. Hart and W. J. Mahoney.

There were over 1,000 persons present. Among them were: W. Albrecht, I. Bramberg, R. F. Ahearn, J. F. Donovan, J. J. Duffy, J. J. Driscoll, D. Carter, T. Cuneo, M. Egan, H. J. Farrar, T. Gabbett, P. J. Farrell, J. J. Kennedy, H. F. Melville, J. A. Lee, E. Lyons, W. McMillan, J. D. McDonald, F. H. Nagle, G. M. Nagle, E. M. Nazzaro, J. J. Horgan, J. S. Montague, F. C. Roach, R. E. Tobin, F. B. Travis, F. T. Viles, J. F. Walker, C. N. Currier, T. B. Walsh and J. Rufrano.

MR. M. H. KERNER, the well-known old-time telegrapher of New York, who has been identified with the Western Union Telegraph interests for many years, and who was, on January 1, retired under the pension arrangement, has organized the Kerner Manufacturing Company, with laboratory and an office at 651 West 179th Street, New York. Mr. Kerner is placing on the market a specific, called "Fragrant Nazaline," which is said to destroy disease germs that enter the human system through the nose. An application to the interior of the nose, it is stated, enables one to breathe with freedom, while checking the progress of the health-destroying germs. Mr. Kerner is also handling "Eczemal," which is a soothing application for all irritating skin diseases, and promptly relieves itching. The "Rheumala Medicated Pad" is another article handled by Mr. Kerner. It is for the relief of rheumatism and malaria. The pad absorbs uric acid from the blood and is said to be very effective. Mr. Kerner is vice-president of the Society of the United States Military Telegraph Corps, and an active member of the Old Time Telegraph and Historical Association and other telegraph organizations. He will be glad to mail a copy of his booklet to all his old friends and comrades on receipt of a postal request.

SIGNAL CORPS CAMP A. W. GREELEY.—On Thursday evening, January 22, Camp Greeley, U. S. War Veterans, Chicago, Ill., installed its new officers for the year 1914, John W. Konigsmark taking his office as commander. A number of prominent officers of the Department of Illinois and members from various camps were present and the occasion, while informal, was highly entertaining. Camp Greeley is composed entirely of signal corps men who have served in Cuba, Porto Rico and Manila, and consists mostly of telegraph operators from Chicago and the State of Illinois.

Steamers With Defective Radio Equipment Not Permitted to Sail.

The United States Department of Commerce is now refusing to permit steamers with defective radio apparatus to leave United States ports, says the *Electrical World*.

In accordance with this policy, the steamer "Cedric" was boarded by United States Radio Inspector R. H. Marriott shortly before she was due to sail from New York on January 29. The auxiliary radio transmitter, which consisted of a "ten-inch" hammer break induction coil operated from storage cells, was found not to be in operating condition. After a repair to the ground lead was made the coil sparked satisfactorily, but then the hard-rubber roof insulator leading from the operating room caught fire and had to be replaced. In order not to delay the ship further, Inspector Marriott agreed to remain aboard as she passed down the bay, expecting that the necessary repairs might be completed before Staten Island was reached. Even with the new insulator installed, however, it was not possible to get a spark on the auxiliary set. An entire outfit of antenna insulators was therefore brought out on a tug by the Marconi Wireless Telegraph Company's inspector. Before these arrived at about 2:30 p. m. the operator had succeeded in getting the set working, so that it was then passed by the United States inspector. It appeared that the defective operation of the auxiliary was attributable to leakage through damp aerial insulators and that after these were dried (by sunlight and leakage currents) signaling was possible.

The steamer "Majestic," sailing on January 30, had somewhat similar trouble. During an inspection by Mr. Marriott on January 29 the auxiliary transmitter set fire to the roof insulator, which had to be renewed. On January 30, about half an hour before sailing time, it was found that the induction coil would not produce a spark at all. As in the "Cedric's" case, the United States inspector agreed to go as far out as Staten Island with the ship and to allow her to proceed from there if the coil were in repair by that time. After some labor and readjustment the operator succeeded in getting the set to spark, and the new roof insulator appeared to hold, so that the inspector was able to "pass" the equipment.

German High-Speed Printing Telegraph.

Siemens & Halske, Berlin, Germany, have issued a pamphlet describing and illustrating their new high-speed printing telegraph which has in late years been in successful use in European countries.

The tape perforator may be worked by hand by means of the ordinary Morse key. It may also be used as a receiving apparatus, thus producing punched tape at the receiving station. As a receiver it works at the rate of about eighty words per minute in Morse characters. It may also be used for Wheatstone tape. With three or four key perforators, an automatic transmitter and a receiver a speed of 200 to 1000 characters per minute on one line may be obtained. The received characters are printed directly on the tape. If required, the key perforator, in combination with the receiving apparatus, may also be used for punching tape, as is done by the transmitter.

The transmitter is to take the place of the five-key instrument now in use. It possesses one key for every two characters, as is the case in typewriting machines.

Universal Telegraph Alphabet.

BY "AN OBSERVER," MUSKOGEE, OKLA.

I read with interest your editorial article in the issue of January 16 upon the subject of a universal telegraph alphabet.

In Mexico, neither the Continental nor the Morse alphabet are used on the Government wires, a code of their own being used instead. I do not know what this code is named, but several of the letters in it are different from those in the other telegraph alphabets, which fact makes it hard for Continental and Morse operators to read.

I worked in one of the Western Union junction offices several years, and could read either alphabet, and the Mexican operators could reads ours. Their "c" is like the Morse "s"; their "s" is like our "w"; and "o" is like our "k." The Mexican "k" is made up of a dash, three dots and a dash, and their "w" is made up of two "u's" (U U). Their "z" is like the Morse "a s" and cipher is equivalent to the Morse "k a." There are one or two other differences that I have forgotten at the moment, but to a Morse operator, hearing a message in the Mexican code about the shipping of something, the word "shipping" sounds like "whipping" and Chicago sounds like "shisagk."

The Morse alphabet was used on the Mexican railways during the time I worked in the interior, which was ten or twelve years ago, and on the border five years ago.

The Government operators are appointed and classified and have to pass an examination somewhat similar to our own civil service examination. They are paid in accordance with their classification. Their pay was very poor, according to American standards, but good to them. For example, in Juarez, Chihuahua, Mexico, or in the Western Union office at El Paso Junction, the manager received from the Government $125 per month, Mexican money, which was equivalent to about $62.50 our money. The Western Union night operator received $61 American money. He was a Mexican boy, and his salary, as compared with that of the Government manager was the cause of much jealousy between them. The Western Union occupied space in the Government office.

WIRE-CUTTING ALARMS.—The British postoffice authorities have installed alarms which ring in the homes of linemen when telegraph wires are cut. Wire valued at $10,000 has been stolen from the main trunk lines to the north of England.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

The fire drill at 195 Broadway on January 28 was witnessed by a number of interested persons. The seventh and eighth floors were vacated by the employes, without the slightest confusion, in less than two minutes. The fire drill is in charge of Captain Thomas F. Clark, one of the division chief operators.

Mr. J. W. Riddick has been appointed assistant to Mr. Muller, manager of the marine department in this office.

Miss Jane Powell has gone to Bon Air Hotel, Augusta, Ga.

Mr. Charles Barrington, chief of the automatic department, Chicago, was a recent visitor here.

Mr. Joseph McCusker, dean of the East, is ill at his home at North Adams, Mass.

Mr. Maxwell Greene, Southern wire chief, has been elected master of Amity Lodge F. & A. M., New York. Mr. Greene is also secretary of the Iroquois Society.

Mr. C. G. Scott, for many years connected with the Gold and Stock Telegraph Company, died at his home in Bloomfield, N. J., on January 30.

TOLEDO, OHIO, WESTERN UNION.

Mr. Hayes A. Baars, the popular traffic chief of the Western Union Telegraph Company, Toledo, Ohio, and Miss Margaret Bossler, who was formerly employed in this office, stole a march on their many friends, and were married on January 13, at Monroe, Mich., the Gretna Green of Toledo. The couple left immediately for an extended honeymoon trip through the West, Northwest and Pacific Coast.

SIOUX CITY, IOWA, WESTERN UNION.

Mr. A. E. Rowles has returned after a visit of several months in Portland, Seattle and the West.

SIOUX CITY, IOWA, POSTAL.

General superintendent E. W. Collins, of Chicago, and district superintendent A. B. Richards, of Kansas City, were recent visitors.

MILWAUKEE WESTERN UNION.

Hugo Brown, aged twenty-eight years, night printer supervisor in this office, died on February 3 after an operation for appendicitis. He was married about a year ago.

ST. LOUIS POSTAL.

Mr. T. P. Wheeler, of this office, celebrated his sixty-sixth birthday last Christmas day, and is in excellent health. Mr. Wheeler is one of the old school of western brilliant telegraphers. His beautiful pen copy has frequently been referred to in the public press, and his telegraph work is of the highest order.

ST. LOUIS WESTERN UNION.

Mr. E. H. Moore, formerly senior assistant wire chief, has been appointed to the position of wire chief vice E. L. Morgan, who has resumed his duties as chief of the Barclay printing department.

The Western Union Electrical Club held its first regular meeting of the year on January 8 and elected the following officers: G. R. Alger, president; P. P. McGrory, vice-president; A. Turner, secretary; J. C. McCarron, treasurer. The executive board appointed by the president consists of Messrs. Gosting, Barry, Hendrie, Fallinger, Kennedy, Meinholtz, Stubblefield, Rippey and Templemeyer. Messrs. Harrigan, Putnam and Ballato constitute the auditing committee. At the meeting of the club on the evening of February 4 a lecture was given by Mr. Oreon E. Scott on the Panama Canal, illustrated by stereopticon views. The dance given by the club on the evening of January 24 was a decided success. There was a large attendance.

Fenton B. Norton, a well-known operator in this office, died at his home in Wheaton, Mo., on January 19. He was employed in this office twelve years and had been with the company twenty years.

Telegraph and Telephone Age

No. 5. NEW YORK, MARCH 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

Multiple vs. Series-Connected Bridge Relays.

In the February 16 issue of TELEGRAPH AND TELEPHONE AGE Mr. Sweat, a wire chief in the Western Union Telegraph office at Savannah, Ga., presented an article in which he stated that by merely connecting the two coils of the polar relay in multiple across the bridge, instead of in series, he was able to operate the common side of a troublesome quadruplex circuit with a degree of satisfaction never before experienced.

Lest the inference be drawn that the multiple method is thus demonstrated to be the superior arrangment, and should, consequently, be made the rule instead of the exception, the question can be settled by stating that results obtained through many practical tests and close observation, under varying conditions, has conclusively shown that the 800-series connection meets the total requirements of a quadruplex circuit in the greater majority of cases, and, probably, for that reason, was made the standard arrangement.

Realizing, however, that the multiple method offers certain advantages under some exceptional conditions, the rule is qualified, as Mr. Sweat states, so as to include the exception. However, as quadruplex attendants and students of electricity, in general, are not always satisfied with the mere statement of a fact, and prefer to have it proved, an explanation of the benefits derived by each method of connecting the coils may be of more interest to readers of this column than the mere knowledge of results alone.

With any given relay, its magnetic strength depends upon the number of times the current, flowing through the line conductor, encircles the round iron core upon which the coils are wound; in other words, upon the amperage of current the relay receives. With a given E. M. F., the magnetic strength of the relay will be practically the same whether the coils are in series or in multiple, provided there is no other resistance in the circuit than that of the coils themselves, but when the relay coils are connected in series with external resistance, as is the case when connected in the bridge for quadruplex operation, a change of coil connections from series to multiple, or vice versa, will alter the existing resistance of the quadruplex circuit, as well as the volume of current flowing through the line.

For example, when the two 400-ohm coils of the polar relay are in series across the bridge, the joint resistance of the quadruplex set is between 700 and 800 ohms; when connected in multiple, the joint resistance is less than 200 ohms. In one case, the total resistance of the circuit will be equal to that of the external circuit, plus 800 (approximately), and, in the other, the external resistance, plus 200.

Obviously, then, more current flows through the line when the polar relay coils are in multiple; hence, the neutral relay is benefited by that arrangement. On the other hand, notwithstanding a greater amount of current flows through the bridge circuit when the coils are in multiple, the polar relay really receives less energizing current than it does when connected in series; hence, the change to multiple diminishes its efficiency and the benefit derived by the neutral relay is, therefore, at the expense of the polar relay.

For example, let us assume that each of the 400-ohm coils has, say, 6,000 turns of wire, and that when connected across the bridge in series a current of nine milliamperes flows through the bridge circuit. The total amperage, or energizing current, will then be represented by $9 \times 6{,}000 + 6{,}000 = 108{,}000$ ampere-turns.

Now, suppose a change from series to multiple increases the current in the bridge circuit to twelve milliamperes. Under these conditions, as the twelve milliamperes will divide equally between the two coils, the total amperage will only be equal to $2 \times 6 \times 6{,}000$, or 72,000. From this it will be seen that no bridge relay on a quadruplex circuit can ever be as strong magnetically when the coils are in multiple as it is when they are in series. Nevertheless, on such circuits as will still provide ample operating current for the polar relay, despite the loss of amperage due to multiple connections, the change is sometimes advisable, where the neutral relay is

suffering from the effects of too small a margin of working current. This was probably the condition existing in the circuit mentioned by Mr. Sweat. The facts in the case may be summarized as follows:

In the bridge quadruplex arrangement the use of the holding coil on the neutral relay makes the common side more efficient than the polar side, with the coils of the polar relay connected in multiple. But the multiple arrangement proved to be more or less detrimental to the operation of the polar side, and with a view of increasing the number of ampere-turns, the series arrangement was tried with greatly increased benefit to the polar side, and with no serious loss of efficiency on the common side. This arrangement, it will be seen, is practically a compromise to even up matters between the polar and the common sides, and in the majority of cases it has met with the greater success.

However, as a change from series to multiple connections in the bridge invariably increases the efficiency of the neutral relay operation, owing to the increased current which will then flow through the line, it has been realized that if a type of bridge relay could be evolved that would combine the advantage of low resistance and high efficiency much would be gained thereby.

The British post-office relay, with its parallel winding, now being tried, quite nearly meets these requirements, and further experiments along that line will, no doubt, be made.

Telephone Patents.

ISSUED FEBRUARY 3.

1,085,615. Telephone System. To P. Lavery Webster and W. E. Bandlow, Dudley, Mass.

1,085,621. Telephone Signaling for Railways. To M. Lutenberger, Blocton, Ala.

1,085,916. Intercommunicating Telephonic Apparatus. To M. R. Hutchison, Summit, N. J.

1,085,974. Telephone System. To E. R. Corwin, Chicago, Ill.

1,086,147. Electrical Connection for Telephones and the Like. To J. A. Douglas, Waterloo, Ia.

ISSUED FEBRUARY 10.

1,086,832. Portable Telephone Set. To R. H. Manson, Elyria, Ohio.

1,086,869. Telephone Switching Apparatus. To G. Swope, New Brunswick, N. J.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, February 24:

American Telephone and Telegraph Co.	120¼
Mackay Companies	87
Mackay Companies, preferred	70
Marconi Wireless Tel. Co. of Am.	4⅝
Western Union Telegraph Co.	64

HIGH-SPEED TELEGRAPH SYSTEMS.—The British Postmaster-general has appointed a committee to inquire into high-speed telegraph systems.

PERSONAL.

MR. THOMAS A. EDISON and family have gone to their winter home at Fort Meyer, Fla., to be absent about six weeks.

COL. R. C. CLOWRY, formerly president of the Western Union Telegraph Company, left New York on February 21 for Jekyl Island, Ga., to be absent about three weeks.

MR. E. F. DAVIS, Associated Press operator for the Bridgeport, Conn., *Standard,* has been elected conductor of Bridgeport conclave of Heptasophs.

MISS GLADYS BELLE INGOLD, daughter of Mr. D. F. Ingold, chief operator Western Union Telegraph Company, Los Angeles, Cal., celebrated her eleventh birthday anniversary on February 7 by a party at her home in that city.

MR. JEFF W. HAYES, of Portland, Ore., a well-known old-timer and author of "Tales of the Sierras," "Looking Backward at Portland," and other works, is in New York on a business trip. He is accompanied by Mr. W. T. White, of Portland, and will return via New Orleans and Texas, about March 10.

DR. F. K. MOLL, consulting engineer, Berlin, Germany, was in New York a few days ago, and will remain in the country until March 10. He was a delegate to the tenth annual conference of the American Wood Preservers' Association, held recently at New Orleans, La. Dr. Moll makes a specialty of wood-preserving with salt solutions, especially for the preservation of telegraph and telephone poles and railroad ties.

MR. ALBION CHARLES CHATMAN, JR., a former telegrapher of Philadelphia, is now a successful stock broker in that city. Mr. Chatman is a native of Philadelphia, and has had a large experience as a

A. C. CHATMAN, JR.

telegrapher. He took up the brokerage business several years ago, and employs several operators on his leased wires. He is a kind and considerate employer, and is held in high esteem by his employes, as well as by a large circle of business and social friends.

MR. CHARLES R. UNDERHILL, electrical engineer of the Acme Wire Company, New Haven, Conn., gave an experimental lecture on "Electromagnets" before the Yale University Branch of the American Institute of Electrical Engineers, on the evening of February 11. At the request of Professor Charles F. Scott, Mr. Underhill repeated the lecture before the senior class on the afternoon of February 12. The subject related chiefly to the effects of magnetic leakage in plunger electromagnets, and Mr. Underhill showed how the ordinary laws of traction, as usually given in text-books, had to be modified on account of leakage, so that the traction may be accurately predetermined. Experiments were performed with special apparatus to prove each statement.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. E. REYNOLDS, vice-president and general manager, has returned from a business trip through New England.

MR. CHAS. P. BRUCH, vice-president, New York, made an address at the dinner of the Ohio Society, in Philadelphia, Pa., February 20, and was subsequently elected an honorary member.

MR. W. I. CAPEN, vice-president, left New York on February 21 for Florida, where he will spend a vacation. He will be absent three weeks.

MR. H. W. HETZEL, traveling auditor, has returned from a trip of inspection through the New England States.

MR. M. M. DAVIS, electrical engineer and chief engineer of telephones, New York, has returned to his office after an inspection trip through the South.

MESSRS. H. C. SHAW, electrical engineer, and T. N. Powers, chief operator, Chicago, Ill., were recent executive office visitors.

MISS M. E. STODDARD, one of the oldest clerks in the service of the auditor's office, New York, died on February 11.

MR. J. Z. HAYES, chief operator of the Detroit, Mich., office, who has been suffering from pneumonia for some time past, is now convalescing, and will return to duty in a short time.

MANAGERS APPOINTED.—Managers have been recently appointed as follows: T. C. Bibb, De Quincy, La.; D. G. Jahrs, at Sedalia, Mo.; R. W. Virden, Eaton, Col.

NEW INDIANAPOLIS OFFICE.—This company will move into its new offices in Indianapolis, Ind., toward the end of March.

MAGNETIC CLUB.—The proceedings of the twenty-fifth annual meeting of the Magnetic Club, on January 8, have been printed in neat pamphlet form. The booklet includes a brief acount of the Fall dinner at the St. Denis Hotel, on November 12, 1913, also, the interesting address of President Charles P. Bruch at the twenty-fifth anniversary dinner, April 19, 1913. The officers this year are: C. F. Leonard, president; E. P. Tully, M. R. Cockey, J. J. Whalen, W. I. Capen, vice-presidents; W. B. Dunn, secretary; J. J. Cardona, treasurer.

The Situation in the Telegraph-Telephone Separation.

On February 17 announcement was made that the American Telephone and Telegraph Company had arranged with the banking house of Kuhn, Loeb and Company, New York, to underwrite the sale of $30,000,000 of Western Union Stock held in the treasury of the telephone company.

The stock is to be offered to present holders of Western Union stock at $63 a share, and the telephone company will be paid $61 a share for it.

The sale of the shares will be accompanied by a promise that the dividend will soon be increased from three per cent to four per cent. The further hope will be held out of an increase later to five per cent if the earnings of the company continue to increase as they have in the last few years.

Attorney-general McReynolds stated from Washington that he saw no objection to the arrangement.

Mr. Newcomb Carlton, vice-president of the Western Union Telegraph Company, announced at the dinner of the Morse Electric Club, on February 21, that arrangements had been made with the bankers who had underwritten the sale of the stock to reserve 2,500 shares for sale, at $60 per share, on easy terms, to the employes of the company.

On February 18 a circular letter, signed by Mr. A. R. Brewer, treasurer, was issued to the stockholders of the Western Union Telegraph Company, regarding the purchase of the telephone company's stock. The letter, in part, reads as follows:

"The American Telephone and Telegraph Company has sold its holdings, amounting to approximately $30,000,000 par value of stock of the Western Union Telegraph Company, under an arrangement by which the privilege is hereby given to the stockholders of The Western Union Telegraph Company to subscribe, at $63 per share, upon the terms and conditions hereinafter stated, on or before March 24, 1914, for an amount of its said stock equal to forty per cent of their respective holdings of the stock of this company, as registered on its books at twelve o'clock noon on February 28, 1914.

"Warrants signed by the treasurer or an assistant treasurer will be issued and mailed to each stockholder as soon as possible after February 28, 1914."

Then follows the details of the scheme.

The cash and cash assets of the company, as at December 31, 1913, were:

Accounts Receivable, less reserve for doubtful accounts	$6,670,000	
Notes and loans receivable	9,000,000	
Cash on hand, in bank, and in transit	2,278,950	
Total		$17,948,950
Less:		
Accounts payable ...		4,064,000
		$13,884,950

The total revenue and income for the calendar year 1913 increased four per cent over 1912.

With the circular letter was mailed an abstract of a statement made by President Theo. N. Vail, as follows:

"Immediately after the American Telephone and Telegraph Company acquired its interest, the Western Union directors had a thorough examination of the plant made, and a thorough investigation of its position from every standpoint. It was found that though the earnings had been impaired, its outstanding capital was well represented by property, but not all of it was in as good condition as it should be.

"The probable earnings of the future were carefully gone into and it was estimated that the three per cent dividend could be continued and a very considerably increased amount put into maintenance, improvement, renovation and reconstruction; also that the operating organization should be strengthened, wages improved, and operating conditions bettered.

"It was thought that these improvements and renovations could be completed in from five to seven years from that time.

"This policy was adopted: Substantially all surplus over and above the three per cent dividend was set aside for these purposes. The amount so set aside was distributed over different quarters in different amounts, so that no three months' period should show either a deficit or any considerable surplus over dividends. This has been fully set out in the annual reports to the shareholders.

"The results of the working for the three years ending October 31, 1913, as compared with the three years ending June 30, 1910, are as follows:

Gross cable and land lines revenue	$125,190,000	
An in increase of	38,805,000	or 45%
Wages paid, not including cable maintenance, construction or reconstruction wages	48,000,000	
An increase of	16,566,000	or over 50%
Construction, excluding real estate	3,791,000	
An increase of	360,000	or 10.5%
Amount set aside out of earnings for maintenance, improvement, renovation and reconstruction	*22,624,000	
An increase of	8,200,000	or nearly 57%

* Of this amount $2,660,000 is unexpended and carried in reserve for these purposes.

"Of the amount expended for maintenance, renovation, reconstruction, $2,847,000 could properly have been charged to construction, and will have to be so charged under the present accounting regulations of the Interstate Commerce Commission, which are now in effect, beginning with the current year. This will, if conditions remain unchanged, increase the divisible surplus by that amount during the continuance of the abnormal expenditures.

"It is estimated that these abnormal expenditures will be completed in two and a half to three years, when the property of the company will be in good going condition and can be so maintained by normal expenditures.

"The benefits of the work that has been done under this policy are beginning to be realized in the improvement of the spirit and feeling on the part of employes towards the company and in efficiency and economy of operation.

"If these benefits continue under existing conditions, based on experience of the last three months of 1913, it is expected that, at the very least, $1,000,000 a year will be saved in operation.

"The litigation between the Western Union and affiliated companies and the American Telephone and Telegraph Company, in respect to the interpretation of the contract of 1879, which has been in the courts for the last thirty years, and was, in the first instance, decided in favor of the American Telephone and Telegraph Company, has been finally decided, partially in favor of the Western Union, and that company received December 16, 1913, $3,300,000 as its share. This sum is nothing but deferred earnings and could be distributed to the shareholders either in one dividend or spread over the years during which abnormal expenditures will continue on renovation and improvement.

"The financial condition of Western Union was never better. It has liquid assets in cash, demand and time bills receivable, less current liabilities of some $15,000,000, sufficient to take care of all construction demands for some years to come, if the surplus revenue is not adequate for that purpose.

"Unless conditions change very much for the worse, the shareholders of Western Union are on the eve of getting some return for their patient waiting, and this return should be continuous and increasing.

"Whatever decrease there has been in the Western Union revenue from private line leases, has come from the discontinuance of leasing lines to those who put them to questionable uses and to the fact that in case of a general interruption the Western Union was compelled, when such lines were restored, to use them for its commercial business and thus deprive the lessees of their use for a time.

"The telegraph business had been carried on entirely on the basis of *immediate* transmission and delivery. This naturally called for operating staff and facilities equal to the peaks of normal demands, and it naturally followed that there were considerable intervals when this operating force and these facilities were idle. New services, not requiring immediate transmission and delivery, were gradually introduced to fill in these idle intervals, with beneficial results both to the public and to the company.

"The new services, in spite of adverse criticism and charges of unfair competition from some quarters, have been revenue-producing and profitable, and of great benefit to the public, and have not, in any way, affected adversely the regular business at regular rates. These were introduced in spite of the belief on the part of many that they would largely affect the long line telephone business.

"The results have demonstrated that there is a field for them; that with equally available facilities for both, the telephone and telegraph are not competitive, but each has its own distinctive field. If

telephone and telegraph facilities are equally available, the public will use that which is best adapted for the particular purpose for which it is used. In case of unequally available facilities, it will use one or the other as an alternative."

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. S. M. ENGLISH, president and general manager Postal Telegraph-Cable Company of Texas, Dallas, Tex., has been appointed general manager of the Gulf Division of this company, with headquarters at Dallas, vice Mr. E. M. Mulford, who will return to New York.

VISITORS.—Among recent executive office visitors were: Messrs. W. W. Ryder, general manager Western Division Chicago; H. J. Pettengill, president Southwestern Telegraph and Telephone Company, St. Louis, Mo.; S. M. English, president and general manager Postal Telegraph-Cable Company of Texas, Dallas, Tex.; E. C. Keenan, general superintendent of telegraph New York Central Lines, West, Chicago; H. C. Worthen, general manager Southern Division, Atlanta, Ga., and E. M. Mulford, general manager Gulf Division, Dallas, Tex.

MR. WILLIAM HOLMES, superintendent of tariff, New York, is enjoying a vacation in Florida. He will visit Nassau, Bahamas, before returning to his office, which will be about May 1.

MR. G. E. PALMER, chief operator of the San Francisco office, arrived in New York a few days ago, accompanied by his wife, to take up the duties of division traffic engineer, with headquarters in New York, to which position he was recently appointed.

MR. H. D. AUSTEN has been transferred from Philadelphia to New York as division traffic supervisor.

MR. C. E. DAVIDSON, manager of the Montgomery, Ala., office of this company for the past two years, has been appointed manager of the Macon, Ga., office.

MR. A. C. CRONKHITE, district commercial superintendent, Indianapolis, Ind., announces the appointment of Mr. R. H. Underwood as manager at French Lick Springs, Ind., to succeed Z. M. Apple, who leaves the service to engage in other business. Mr. Underwood will be succeeded at West Baden Springs by Mr. F. D. Walker.

MR. D. F. INGOLD, chief operator of this office, has been appointed chief operator at San Francisco, Cal., vice G. E. Palmer, appointed traffic engineer of the Eastern Division at New York. Before leaving for the north Mr. Ingold was tendered a banquet at the Casa Verdugo Segunda by his fellow employes, while the ladies of the office tendered a similar function to Mrs. Ingold at Campis Cafe. Mr. and Mrs. Ingold take with them the love and best wishes of every employe of the Los Angeles office. A picture and biographical sketch of Mr. Ingold appeared in TELEGRAPH AND TELEPHONE AGE, December 1, 1912.

ANNUAL MEETING.—The annual meeting of the Western Union Telegraph Company will be held on April 8.

HARRY S. CONVERSE, aged seventy years, formerly and for many years chief operator at San Francisco, died on February 13. Mr. Converse was retired by the company twelve months ago on account of ill health. He was a native of Ohio.

HONORS FOR MR. W. A. PORTEOUS.—Mr. W. A. Porteous, manager at New Orleans, La., who is also a lawyer of marked ability, has been admitted to practice before the United States Supreme Court at Washington, D. C. Chief Justice White, of the Supreme Court, recognized in Mr. Porteous the same messenger boy who used to carry telegrams to his house years ago, and invited Mr. Porteous to take luncheon with him. Mr. Porteous was afterwards taken for a governor of one of the States, and admitted on this supposition by a polite doorkeeper to the floor of the House, where none but members, senators, cabinet officers and governors have the right to be admitted.

J. D. Felsenheld, Manager, Houston, Tex.

James David Felsenheld, whose appointment as manager of the Western Union Telegraph office at Houston, Tex., was noted in our issue dated February 1, was born in Cleveland, Ohio, August 17, 1890. He entered the telegraph service as messenger at East Orange, N. J., in the summer of 1900, while attending school, and in 1904 he became a relief operator. From 1906 to 1909 he was in the railroad telegraph and clerical service, also manager of a private line in New York, and in 1910

J. D. FELSENHELD, MANAGER, HOUSTON, TEX.

he re-entered the service of the Western Union, at 195 Broadway, New York. He was secretary for district commercial superintendent J. F. Nathan for about a year, and afterwards held a position in the office of Mr. A. G. Saylor, general manager of the Eastern Division. In 1913 he was appointed assistant manager at New Orleans, La., his latest advancement being to the position of manager at Houston, Tex.

Mr. Felsenheld's progress has been rapid and steady, and he is a young man of much promise.

THE CABLE.

CABLE RATES.—The Commercial Cable Company has issued a leaflet containing additions and corrections to its book of cable rates for ordinary cablegrams and deferred plain language cablegrams.

SUBMARINE CABLE TELEGRAPHY.—At a recent meeting in London of the Dominion's Royal Commission, Mr. F. C. Crawford, chief of the submarine cable-laying department, and Mr. Rollo Appleyard, chief of the submarine core manufacturing department of the Silvertown works, gave evidence that during recent years the speed of transmission had increased by fifty per cent, or more, and accuracy had been improved. The cost of a modern Atlantic cable to give a speed of forty words a minute would be about $2,500,000. Mr. Appleyard said there was no prospect of a reduction in the cost of construction and working of cables. The advent of wireless telegraphy had in no way diminished the activities of the cable companies—quite the contrary. He had no fear whatever of the competition of wireless with submarine cables; it would be a feeder rather than a competitor.

Dinner of Western Union Cable Staff.

The fourth annual banquet of the staff of the Western Union cable office, 16 Broad street, New York, was held at Shanley's, West Forty-second street, Saturday evening, February 14. Sixty-five members were present.

After a splendid dinner had been served, a letter was read to the staff from Mr. J. C. Willever, United States manager, who was unable to attend, stating that Mr. G. H. Messner would represent that branch of the service. Mr. Willever very kindly donated the cigars, which were enjoyed by those present.

Traffic superintendent W. A. McAllister, of the central cable office, in a brief address thanked the staff for their co-operation in maintaining a high standard of efficiency in the office. He also read a cablegram from Mr. S. Fenn, traffic manager of the Western Union Cable System, London, England, who extended greetings from across the sea. Letters of regret were read from Mr. J. B. Taltavall, publisher of TELEGRAPH AND TELEPHONE AGE, and Mr. A. Simon, commercial manager, 16 Broad street.

Mr. A. B. Fiske was chairman and toastmaster, and was assisted by Messrs. D. J. Gilvey, Wm. Virge, jr., F. J. Cummings, V. De Dominicis, F. S. Millar, J. Kearney and C. B. Porter.

Seated at the speakers' table were: W. A. McAllister, traffic superintendent; J. Wiseman, cable supervisor; F. I. Fitch, D. J. Gilvey, G. H. Messner, N. Macdonald, clerk in charge No. 8 Broad street office; A. Rogers, traffic supervisor; A. B. Fiske, Wm. Virge, jr., N. Matherson, night clerk in charge.

Music was furnished by the Western Union Cable System orchestra, consisting exclusively of members of the staff, viz.: Messrs. Cummings and Clancy, violin; Manson, cornet, and Muniz, pianist. A lengthy programme of song and humor was arranged and greatly enjoyed by those present.

THE TELEPHONE.

MR. B. E. SUNNY, president of the Chicago Telephone Company, and an old-time telegrapher, has been elected a member of the Chicago City and Connecting Railways collateral trust.

MR. JOSEPH W. STICKNEY, commercial superintendent for Indiana, of the Central Union Telephone Company, Indianapolis, Ind., has been appointed general manager of the same company, with headquarters at the same point. He succeeds Mr. L. N. Whitney, recently appointed general commercial superintendent of the New England Telephone and Telegraph Company at Boston, as announced in our issue dated February 16. Mr. C. M. Nesbitt succeeds Mr. Stickney as commercial superintendent.

MR. H. B. EMERY, Boston, Mass., has been appointed corresponding secretary of the Telephone Pioneers of America for the territory of the New England Telephone and Telegraph Company. Mr. Emery is superintendent of rights of way of that company.

GEORGE W. JAMESON, aged forty years, office manager for a brokerage firm, and formerly employed in the traffic department of the American Telephone and Telegraph Company at New York, was killed, on February 16, by a subway train.

TELEPHONES IN SUBWAY AND ELEVATED STATIONS.—A bill has been introduced in the New York legislature to allow telephones to be installed in subway and elevated railway stations in New York City.

WHAT A LITTLE MOUSE CAN DO.—Miss Gertrude Lynch, telephone operator at Middletown, N. J., spied a mouse under her chair. She fainted, and when she revived, she ran into a clothes closet which had a spring lock on the door, and she was made a prisoner. She was released next morning, but the telephone calls during the night were unanswered.

THE CENTRAL UNION TELEPHONE COMPANY RECEIVERSHIP.—The placing of the property of the Central Union Telephone Company in the hands of receivers recently is, it is stated, designed to keep it intact, and in unimpaired usefulness during the course of the suit brought by the minority stockholders for an accounting to determine whether the financial relations existing between the company and the American Telephone and Telegraph Company have been equitable and fair to all concerned. Mr. Frank F. Fowle, the well-known telegraph and telephone engineer of New York, was named one of the receivers, as already noted in these columns.

NEW ORGANIZATION PLAN FOR SOUTHERN BELL GROUP.—A new plan of organization and operation for the Southern Group of the Bell Telephone System, with headquarters at Atlanta, Ga., went into effect early in February, and among the appointments announced are the following: F. E. Montague, assistant to the first vice-president; division general managers—M. O. Jackson, Georgia and Alabama division; M. B. Speir, Carolina division; David Laird, South Georgia and Florida; E. E. Bawsel,

Tennessee; C. A. Stair, Louisiana and Mississippi; and F. L. Woodruff, Kentucky. Mr. J. R. A. Hobson joins the staff of President W. T. Gentry. Under the new plan each department in each division reports direct to the division general manager, who is responsible to the first vice-president.

RADIO TELEGRAPHY.

MR. CHARLES BRIGHT, F. R. S. E., M. Inst. C. E., M. I. E. E., London, England, has forwarded to us a pamphlet containing the rules and list of members of The Wireless Society of London. Mr. Bright is one of the vice-presidents. This society was recently organized, and is the first of its kind in London. It has among its members many of the most prominent scientists and electrical engineers in England, including, besides Mr. Bright, Sir Oliver Lodge, Sir William Crookes, Dr. J. A. Fleming, Dr. Silvanus P. Thompson and others. Mr. Alan A. Campbell Swinton is the president.

LIGHTING INCANDESCENT LAMP BY WIRELESS.—One of the latest achievements of Signor Marconi is the lighting of an incandescent lamp at a distance of six miles by wireless power.

MR. IRVING VERMILYEA, wireless operator on the steamer "Northland," plying between New York and Portland, Me., is seeking a patent on a wireless telephone, which, he says, will carry the voice twenty-five miles.

WIRELESS TELEPHONY.—Signor Marconi states that he has been able to communicate quite easily and clearly by wireless telephony at a distance of 100 miles. He says the difficulty lies with the transmitter, which is very heavy, and requires two men to carry it.

WIRELESS TELEPHONES ON THE "AQUITANIA."—Is is said that the Cunard Line's new steamer "Aquitania," which is to make her maiden voyage to New York in June, will be fitted with wireless telephone apparatus.

PICTURES BY WIRELESS.—At a lecture in Berlin, Germany, on February 18, Professor Korn, the inventor of a system of transmitting pictures by telegraph, stated that wireless could be used for long-distance transmission of pictures, though the process had not yet been perfected.

EXPLODING SUBMARINE MINES BY WIRELESS.—Manrico Compare, an electrician of Leghorn, Italy, has invented a method of exploding submarine mines by wireless. Tests demonstrated that the operator of the apparatus could control the destination of the waves sufficiently well to explode mines separately.

WIRELESS IN FOGGY WEATHER.—At the inquiry in Philadelphia into the recent collision between the steamers "Nantucket" and "Monroe," off the Virginia coast, and the sinking of the latter with forty lives, the utility of wireless telegraphy in a fog was brought into the discussion. The Board of Steamboat Inspectors expressed the opinion that where steam vessels were within two miles of each other the time would be too short for captains to ascertain their positions and then exchange this knowledge through the wireless operators. And, again, ships running on dead reckoning in a fog, captains would be unable to give exact positions.

OBITUARY.

EDWARD C. CREW, aged forty-nine years, operator for the Western Union Telegraph Company, Washington, D. C., died February 16.

A. J. WILLARD, aged fifty-eight years, chief operator of the North American Telegraph Company at St. Paul, Minn., died in that city February 13.

THOMAS L. FARLEY, aged twenty-seven years, a well-known operator, died at the home of his father, Richmond, Va., on January 24. His father is repeater chief in the Richmond Western Union office.

G. M. DEETZ, aged seventy-eight years, who died at Cumberland, Md., on January 30, was manager in that place in 1852. His name was erroneously reported in our issue dated February 16 as G. M. Deeth.

G. W. NAILE, aged seventy-six years, an old-time operator, retired, formerly with the Western Union Telegraph Company in Omaha, Neb., and other western points, died in Omaha, February 17. He was an operator in the Army of the Potomac, and was in the War Department at Washington for a while during the Civil War.

F. W. JONES, connected with the Metropolitan Telephone and Telegraph Company in New York in the early eighties, later becoming manager of the Buenos Aires Telephone Company in Buenos Aires, Argentina, died in New Hartford, Conn., recently. He was an intimate friend of Mr. Theo. N. Vail, and after he left Buenos Aires he resided in London for several years. He left a fortune of several million dollars.

CHARLES E. BLISS, aged eighty-one years, for many years manager of the Western Union Telegraph office at Bangor, Me., and postmaster at that place under President Cleveland, died on February 13. Deceased was born in Bradford, Vt., July 23, 1833, and became an operator at the age of seventeen years. He was appointed manager of the Bangor Western Union office in 1865, and in 1894 was appointed postmaster by President Cleveland. At the expiration of his term as postmaster, he returned to the telegraph service, from which he retired twelve years ago. He was a member of the Vermont House of Representatives in 1905. He was widely and favorably known, particularly in the territory east of Boston, and at one time was offered a superintendency for the telegraph company, but refused to accept it.

T. & T. L. I. A. MEETING.—The annual meeting of the Telegraph and Telephone Life Insurance Association will be held at 195 Broadway, New York, on March 11. In the evening a dinner will be given to the delegates at The Fifth Avenue, Fifth Avenue Building, Fifth avenue and Twenty-third street. Mr. T. E. Fleming is in charge of the dinner arrangements.

Serial Building Loan and Savings Institution.

The annual meeting and council of the Board of Management of the Serial Building Loan and Savings Institution, consisting of the advisory committee, officers, directors, auditors, appraisers and counsel, was held at Farrish's Chop House, John street, New York, in the evening of February 11.

Mr. A. G. Saylor, president, made an address which reflected the excellent and helpful work being accomplished by the Institution. He said:

"It is a pleasure to again meet you at the close of another year in the history of this Institution, and it is a greater pleasure to report that the affairs of your Association were never in a more prosperous and sound condition than at present.

"We have had, during the past year, a vigorous and healthy growth, both as regards the number of shareholders and the increase in assets, as shown by the last semi-annual statement for the six months ended December 31, 1913.

"We have enrolled 738 new members, and, in that connection, we must not forget to mention that a large percentage of these new members are young men and women employed in the telegraph and telephone service, many of whom, for the first time, have placed to their credit a savings account.

"To my mind, one of the most important periods in the life of a young wage-earner is when he, or she, determines upon a practice to set aside a portion of his or her earnings each week or month, regardless of the fact whether the sum may be one per cent or ten per cent of their total income.

"It is practically the one turning point which ultimately leads to success, as it is a strong factor in promoting thrift, energy and trustworthiness, all of which is a valuable asset in the struggle for success in life. It is a factor which is invariably recognized by the employer and invaluable in upbuilding character and reputation. It goes further in doing the one thing that is equally essential; it promotes self-respect by virtue of the knowledge and conviction that, by following along this one safe path, it will eventually lead to an honorable and successful career.

"This Institution not only acts in the general capacity of a savings institution, offering every opportunity and encouragement to those desiring to save some portion of their earnings, carrying interest at the rate of five per cent per annum, but affords shareholders every opportunity, which they would not otherwise possess, in purchasing or building and owning their homes.

"Since the Institution was founded in 1885, the secretary advises me that the total amount of the deposits of your shareholders approximate $7,000,000; the number of borrowers for the purpose of purchasing or building their homes exceeds 1,300; the first mortgage loans exceed $4,000,000.

"The success of this Institution is due to the able manner in which it was founded and subsequently managed. Great credit is therefore due to Mr. James Merrihew, its first president, and to Mr. David Mitchell, its second president, and to the succeeding officers and members of the Board of Management, who have, during all these years, given careful attention and a great deal of valuable time in safeguarding, as trustees, the funds of the shareholders to the end that confidence would at all times be established. Without confidence, the success achieved would have been impossible. I wish that I could enumerate those who have contributed to the success of the Institution and thank them for what they have done.

"It is doubtful whether there is a financial institution of this character that has conserved the interests of its shareholders to a greater extent; safeguarded them from all losses and paid a larger interest return than your Institution, and your shareholders may well congratulate the Board of Management and advisory committee for the splendid work which they have performed.

"We meet to-night for the purpose of reviewing the past and outlining plans for the future, and, in so doing, I sincerely wish this Institution all the success it has heretofore enjoyed.

"I know you all join me in an expression of deep regret in the loss of one of our directors, Mr. E. E. Brannin, who unselfishly gave his time, not only to the welfare of this Institution, but was always helpful in aiding the fraternity wherever and whenever opportunity afforded.

"It is only proper to take this opportunity on behalf of the Institution, to thank our secretary, Mr. E. F. Howell, for the able and intelligent manner in which he has always conducted the affairs of his office."

Remarks were made by Mr. W. H. Baker on "Energy in Upbuilding the Society"; by Mr. David B. Mitchell, former president, on "The Serial as a Starting Point of Success," and by Mr. Edward F. Cummings, former vice-president, on "The Successful Appraising of Real Estate."

Messrs. Martin S. Cohen, John T. Mulhall, J. F. Nathan, M. J. O'Leary, Thos. M. Brennan, and others, also spoke briefly.

The burden of the addresses was to the effect that united effort should be made to increase the assets to $1,000,000 by January, 1915, the thirtieth anniversary of the Institution; on prudence and care in placing loans, and the value of the organized Association in forming good habits and inculcating correct principles of business in the young employes of the telegraph and telephone service.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

Every progressive telegrapher reads TELEGRAPH AND TELEPHONE AGE and is uplifted thereby.

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

NEW YORK, MARCH 1, 1914.

Systematic Saving and Judicious Spending.

We are all supposed to know the value of system, but how many of us seriously realize the importance of it in our own affairs. Business failures, whether as regards individuals or a body of individuals, are due very largely to lack of system and prudence in management.

We recently commented upon the improvidence of many operators in failing to provide financial protection for their families by means of life insurance. We there pointed out that carelessness and thoughtlessness were largely the cause of this neglect and that it was a moral duty of every man, especially those depending upon their salaries for a living, to protect their families against want and suffering in the event of their death.

Another subject along this line is provision against misfortune. Every operator should, to use a common expression, "lay something by for a rainy day." Many will say, "I cannot do this on my salary," but in most cases this is not true. If a man indulges in small vices and spends his money on things that bring him no benefits, but rather cause injury, then no salary he could reasonably earn will be sufficient for him to build up a surplus. A man earning a moderate salary should apply business principles to the spending of his money, just as a corporation does, and make provision for possible temporary reverses by storing up means to tide over such emergencies.

There is no better way for a man on a moderate salary to systematically accumulate savings than through membership in the cooperative building loan and savings institutions conducted in the interests of telegraph employes. Membership in such associations encourage thrift and the habit of saving in small or large amounts.

Some of the results of systematic saving are astonishing to those who have not given much thought to the subject. A monthly saving of $5.00 for twenty-four years, for instance, will accumulate the principal for a monthly income of $15 for the remainder of the life of the individual. In twelve years, at the most, a man can acquire a home all paid for at little or no sacrifice.

The possibility of small savings is, perhaps, best illustrated by a concrete example: one dollar invested each month for twelve years, making a total of $144 paid in, will, with interest and compound on interest added, amount to $200. From this simple illustration the results of systematic saving may be appreciated.

In this connection it is interesting to note what President Saylor, of the Serial Building Loan and Savings Institution, said on this general subject in his address at the recent annual meeting of the officers and those directly interested in the management of the Institution. This address is printed on another page of this issue. Mr. Saylor said that, to his mind, one of the most important periods in the life of young wage-earners is the determination to set aside a definite portion of their earnings each week or month. "It is practically the turning point," he said, "which, ultimately, leads to success, as it is a great factor in promoting thrift, energy and trustworthiness, all of which is a valuable asset in the struggle for success in life."

It is a universally recognized fact in the business world that a man who is saving and has a bank account is, all things considered, more trustworthy and careful than the man who makes no provision for the future. The size of the bank account is unimportant; it is the desire to have a bank account that counts. The late E. H. Harriman, the railroad magnate, once said: "No man can afford not to be thrifty. Only the poor are wasteful." Mr. Harriman, it should be stated, practiced economy and thrift systematically in all his affairs, notwithstanding his immense wealth.

The effect of the practice of systematic saving naturally tends to make a man more careful in his expenditures. He learns the lesson of self-denial and its beneficial results and can be trusted not to waste what he has accumulated in so painstaking a manner.

The Michigan Central Telegraph Office at Detroit.

The article printed elsewhere in this issue, illustrating and describing the telegraph office in the new terminal building of the Michigan Central Railroad at Detroit, Mich., is of particular interest in that it shows how important the telegraph and telephone are to the operation of the modern railway. The equipment is the most modern and the planning of such an office requires an engineering ability of the highest order.

"I will study and get ready, and may be my chance will come."—*Abraham Lincoln.*

Course of Instruction in the Elements of Technical Telegraphy.—LVIII.

(Continued from page 106, February 16.)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

Neutral Relays.—Frier's Relay.

Fig. 77 shows a side view of Frier's self-polarizing relay, which is still used, to a limited extent, in place of the ordinary neutral relay in Western Union quadruplex circuits.

The relay has three electromagnets, E, E¹ and M. M. is differentially wound, like E and E¹, and its coils are inserted in the main and artificial lines, in series with the respective coils of E and E¹. Owing

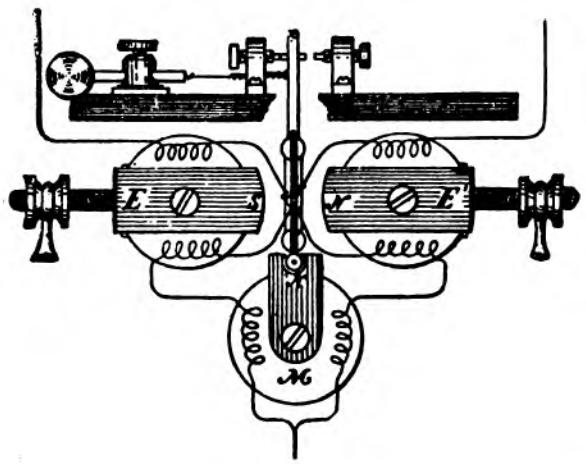


FIG. 77—FRIER'S SELF-POLARIZING RELAY

to this arrangement, the magnetic effects on the cores from the home battery are neutralized, and the relay responds only to the increase of the distant battery, regardless of the changes in the direction of the current. This will be apparent by reference to Fig. 78, where the arrows indicate the current direction. By the winding, the pole-piece of coil N is north, and the pole-pieces of S and S¹ are south. The soft iron armature S¹¹ is in connection with S¹, and, is, therefore, of similar polarity; consequently, it will respond to the attraction of coil N, and to the repulsion of coil S, provided the magnetizing current be sufficiently strong to overcome the retractile spring with which the ar-

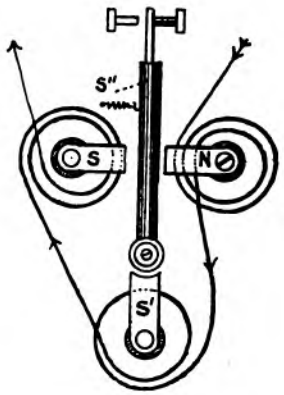


FIG. 78—DIRECTIONS OF CURRENT IN FRIER RELAY

mature is provided. A reversal of the current by the distant pole-changer changes the polarity of all three pole-pieces, but the polarity of the armature also changes, and the pole-piece of coil N, being now a south pole, the armature is attracted as before.

It will be generally found, in practice, that the best results obtainable with this relay in fine weather is when the attracting coil, N, is quite close to the armature S¹¹, the repelling coil, S, being at some distance from it, or occupying the relative positions indicated in Fig. 78.

It would appear that, when the repelling coil, S, is too close to the armature, the magnetism developed in coil S tends to induce in the armature an opposite polarity to that imparted to it by its own coil, S¹, thereby weakening the cumulative force that would otherwise be directed upon the armature.

In wet weather, when the current strength is low and the induced magnetism correspondingly feeble, the tendency to derangement of this kind is not nearly so pronounced, and the repelling coil can, with advantage, be moved closer to the armature, whose movements will then be influenced by the combined efforts of both coils operating in the same direction.

Fig. 79 shows the principle of a neutral relay

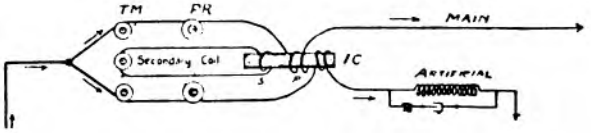


FIG. 79—PRINCIPLE OF POSTAL TELEGRAPH OLD NEUTRAL RELAY

formerly used by the Postal Telegraph-Cable Company to accomplish the same results. The relay has three coils, two of which are wound differentially, and connected in the usual manner to the main and artificial lines and the third is wound singly and connected with the secondary wire of an induction coil. The three coils are so

arranged about the armature that the cores of the different magnets, when magnetized, all tend to move the armature in one direction. The induction coil has two primary windings, one in connection with the main, the other with the artificial line, and, as these two windings are opposite in direction, the core is only affected when the current is stronger in one primary winding than in the other. The secondary coil is not affected by the current from the home battery, which divides equally between the two primary windings, but the distant battery creates an excess current in the primary, which rises and falls with every reversal of the distant pole-changer, and, consequently, induced currents are set up in the secondary at each moment of change, which tend to hold the neutral relay armature against its front stop, and thus bridge over the moments of "no magnetism."

(To be Continued.)

Increase in Cable Transmission Speeds.

In its engineering supplement, reviewing electrical progress in 1913, the London *Times* says:

"Throughout the year the opinion was strengthened that the telegraph world is about to experience a revolution in all that relates to speed of transmission through cables and land-lines. This opinion has extended among men actively engaged in practical work as telegraph engineers, and it is likely soon to find expression in results of great moment to the public in all countries. The limits of speed attainable in telegraphy are determined (1) by the electrical constants of the line or cable, and (2) by the efficiency and sensitiveness of the sending and receiving apparatus. A great amount of attention has been given during the last few years to the line and cable, and the investigations are proceeding; but in 1913, the point of chief attack was the design and working of the apparatus at the end stations, and in this direction progress was centered upon the development, notably by Orling, of a relay of marvellous sensitiveness, and the development, by Gott and others, of improved methods of transmission. As it happens that these improved methods of transmission involve the use of sensitive relays, the lines of investigation converge, with consequences that cannot fail to alter existing notions of speed.

"The sensitiveness of an ordinary relay is limited by the mechanical conditions of motion of a metallic tongue. Orling replaces the tongue by a fine jet of acidulated water, which, by its deviation to right or left, can either make or break contact with a conducting surface, upon which it impinges, or else can interpose or remove electrical resistance into or from a circuit. The nozzle from which the jet proceeds is rigidly fixed, clear of the moving coil of the relay. The jet, therefore, is not carried by the coil, but the coil merely inserts a finger into the jet, and it is found that the slightest movement of the finger in that place imparts a comparatively big deviation to the stream of conducting liquid. It follows that since the coil is called upon to impart only minute quick movements to a finger, it can be restrained under powerful controlling forces without appreciable loss of sensitiveness, and it thus acquires a high natural period of swing, like a compass needle brought very near to a controlling magnet.

"It was announced in February that Mr. John Gott, engineer for the Commercial Cable Company, London, England, had brought out a device which enables ordinary dot-and-dash signals to be sent over long submarine cables, using successive currents of alternate polarity, the discharge from the cable after each impulse being utilized, through the medium of a sensitive relay, to effect the reversal. The use of inverse-current Morse had been suggested so far back as 1880, but Gott applied the idea to a method applicable to sensitive relays like those of Orling or Heurtley, and extended it by an ingenious device which at once gave promise of improved signaling. A further development resulted from an invention by Mr. E. Raymond-Barker of two different forms of inverse-current electro-magnetic Morse transmitters, which have, within the last few months, been applied to a Gott system recently perfected. In this system Gott reverts to the use of ordinary cable signals formed with contacts of equal duration, using again two keys, but he adheres to inverse-current working, and, by a stroke of genius, distinguishes the dashes from the dots by increasing the current at each dash contact, of whatever polarity it happens to be. It is of interest to observe that Lord Kelvin long ago suggested the application to a cable of a number of battery strengths, so that signals might be read by the corresponding heights above zero position of the recorder indications. A system due to Mr. A. C. Baronio, involving the use of two strengths, was also developed during the past year. Further, it has to be remembered that honor must always be given to M. Pierre Picard for his system of applying to the cable momentary current impulses, each in succession reversed, and with the cable insulated after each, in which dots are distinguished from dashes by the length of the intervals between contacts, instead of by the duration of contacts. The significance of Mr. Raymond-Barker's recent improvements is that they take up the task of recording, or re-transmitting to another cable, the signals sent by the Gott system, and they do this by means of the Orling or any other suitable relay, provided with a double set of contacts—one set for normal (dot) currents and another set for stronger (dash) currents, irrespective of the polarities of the successive received currents, which always alternate.

"It is stated that at an Atlantic cable station the varying resistance type of Orling relay brought about an increase in siphon-record working speed of 125 per cent above the previous maximum speed, and that the signals were exceptionally easy to decipher. To obtain this result the relay coil was suspended almost rigidly by a pair of hard-drawn brass wires of No. 26 S. W. G., and to it at the bottom were attached two phosphor-bronze wires of that gauge, held in tension by a set screw. The casual observer might well regard this as a stupid proceeding for the attainment of extreme sensitiveness, but it secures the high natural period necessary to quick response."

Annual Report of the Mackay Companies.

The annual meeting of the Mackay Companies was held in Boston, Mass., February 16. President Clarence H. Mackay submitted the annual report for the trustees as follows:

"It is with satisfaction that, notwithstanding the reaction in trade during the year 1913, and in marked contrast to the unfavorable financial showing made by most railroad systems and other quasi-public corporations, your trustees are able to report that the extensions of your systems have gone on as usual, without the issue of obligations and without the use of any part of the reserves, which have been built up in the past. Not only this, but the reserves have been increased—not so largely as in previous years, but substantially, while at the same time the physical condition of the properties of your systems have been kept up to the highest point of efficiency.

"The unequalled character of the service, both on land and sea, is being maintained. The Postal Telegraph-Cable Company has extended its system into parts of Missouri and Oklahoma and North Dakota, not heretofore reached, and has strung many additional wires on its poles throughout the country. The Commercial Cable Company has renewed parts of the oldest of its three cables between Waterville, Ireland, and Weston-super-mare, England. The Gott invention, by which the company's submarine cables and land lines may be joined together into one continuous circuit whenever desired, and the whole operated by Morse instruments in the Morse code, is in daily use.

"Your combined land and ocean system is the largest in the world. The Western Union Telegraph Company has a larger land-line system, but it owns no cables across the Atlantic Ocean—it merely operates cables under leases. On the other hand, while one of the oldest English cable companies owns and operates a larger cable system to the East and Far East than your cable system, yet that company has few land lines. Such as it has are short connecting links.

"The physical properties of your subordinate companies are maintained in excellent condition. All reconstruction is charged to operating expense. Your trustees feel that your system is in so strong a position that the stability of your investment is assured.

"The $12,000,000 realized about four years ago from the sale of American Telephone and Telegraph Company stock is still preserved intact, in cash, and in the highest class of securities, including New York State and New York City bonds, and this great fund is ready for emergencies and extensions.

"The wireless telegraph continues to demonstrate its usefulness in its own field, which may be defined as communication between moving points or between a fixed and a moving point. There has been no development to modify the opinion we have already expressed that wireless telegraphy in no way threatens the supremacy of the submarine cable as a rapid, reliable and accurate means of communication. That we do not hold this view alone is proven by the frequent important additions made to the submarine cables of the world. For instance, in the year 1913 new submarine cables were laid by the British Government between England and Ireland, although the British Postmaster-General controls the wireless telegraph stations in Great Britain and Ireland. Cables were laid by the French Government between France and Algiers; by the British, Canadian and Australasian Governments jointly between Australasia and New Zealand; by the Greek Government between Chios and Mitylene, and the German Government has arranged to lay another cable between Germany and England this year. The Dutch Government is preparing to lay new cables in the East Indies and the Japanese Government between Japan and China. Private English cable companies laid cables from Arabia to Ceylon, and from Ceylon to the Malay Peninsula. In fact, nearly 6,000 miles of new cable was made and laid in 1913. The mileage of cables during the last five years has increased from 247,000 to 280,000. The governments have increased their cables by 23 per cent, and the private companies by 11 per cent. There is no instance of the abandonment of a submarine cable and the substitution of wireless telegraphy. All this indicates that not only cable companies but the governments themselves are satisfied that submarine cables are not to be displaced by wireless telegraphy.

"As stated in the last annual report, a suit by the Commercial Cable Company against the Newfoundland Government for repudiation of a contract by that government was decided in favor of the company by the Privy Council of the British House of Lords. Notwithstanding this fact, the Newfoundland Government has declined to carry out the provisions of the contract and The Commercial Cable Company is now engaged in a further suit against the Newfoundland Government, which, it is expected, will definitely be decided in favor of the company.

"The most striking event during the past year affecting your companies has been the action of the Attorney-General of the United States in compelling the American Telephone and Telegraph Company to sell its holdings of Western Union Telegraph Company stock and to disentangle the affairs and properties of the two companies and withdraw telephone directors and officials from the directorate and staff of the Western Union Telegraph Company; in other words, to make a complete separation of the two companies the same as existed before such stock purchase was made in 1909. This is due to the fact that the Bell Telephone Company, controlling one of the two great telegraph companies, discriminated in favor of the one which it controls, and in which it is financially interested, instead of preserving the impartiality which is required by all the decisions of the courts in the relations between the telephone companies on the one side and telegraph companies on the other. It has taken four years to demonstrate that the union of the Bell telephone companies

with the Western Union Telegraph Company was illegal and unfair, not only as against the Postal Telegraph-Cable Company, but as against public interest. The result is gratifying to your trustees, and it is hoped that the diversion of the Postal Company's business to the Western Union will now cease.

"The spectre of government ownership of telegraphs arises with periodical regularity. The United States Postmaster-General's office now resuscitates the question again, but in a new form, and advocates the acquisition of telephone lines in the United States by the United States Government, and using them for telegraph as well as telephone purposes in competition with the present two telegraph companies. Such a proposition will hardly commend itself to the intelligence and fairness of the American people. Furthermore, it has been pointed out that it would require at least $2,000,000,000 to pay for the physical properties and the earning capacity of the telephone and telegraph plants (which earning capacity must be paid for under the decisions of the Supreme Court of the United States), and that the Government would have to pay the railroads in order to acquire their rights in the telegraph lines now on the railroads, the same as England had to do. The plan has met with no support in the public press or in Congress or in public opinion. It is to be mentioned also that every municipality, every State, and even the Federal Government itself has a direct interest in maintaining the statu quo, because the telephone and telegraph companies pay from $15,000,000 to $20,000,000 a year in taxes, and the loss of this revenue by municipalities, States and the Federal Government, which would result from the Government taking over the telephone and telegraph lines, would make the burden of such purchase still heavier.

"Nor is this the worst consequence. Judging from English experience, the vast sum of purchase money would be entirely lost, because under Government management the operating expenses year by year would exceed the income.

"The following figures are taken from a report of the Postmaster-General of Great Britain, showing the result of Government ownership of telegraphs in that country:

	Receipts	Actual operating expenses	Operating loss	Total annual loss including interest paid and fresh money expended
1908	$15,516,805	$17,542,840	$2,026,035	$4,847,425
1909	15,492,245	18,394,005	2,901,760	5,248,245
1910	15,830,960	17,841,015	2,010,055	5,081,835
1911	15,829,960	18,659,710	2,829,750	*5,911,695
1912	15,747,420	18,985,090	3,237,670	*5,636,905

*Estimated.

"We feel there is little danger of the Government embarking in such an enterprise, and, in any event, your interests would be safeguarded.

"The controversy between the Postal Telegraph-Cable Company and the Western Union Telegraph Company before the Public Service Commission of New York State, relative to a discriminatory extra charge made by the Western Union Telegraph Company on messages transferred to it en route by the Postal Company, it was decided in favor of the Postal Company by the Public Service Commission, on January 29, 1913. The Western Union Telegraph Company thereupon took the matter into the courts, where it was argued in November, 1913, and a decision was handed down in January, 1914, affirming the decision of the Public Service Commission.

"The Postal Company for over twenty years has had portions of its telegraph lines on the right of way of the Southern Pacific Railroad on the Pacific Coast. Some time ago, the reconstruction of those lines was stopped by the Southern Pacific, and the Postal Company was compelled to resort to the courts. Then it transpired that the cause of the trouble was the Western Union Telegraph Company claiming an exclusive right on the Southern Pacific right of way. Although the Postal Company had arranged with the Southern Pacific itself as to the matter, the latter stated that it did not feel at liberty to conclude the agreement until the consent of the Western Union had been obtained. The Western Union refused. Thereupon the Postal Company brought the Western Union into the suit to explain on what ground it interfered, and the Western Union set up its exclusive right. The court, however, made short work of the claim, and on October 6, 1913, held that the grant of exclusive rights to the Western Union was void.

"The Commercial Cable Company continues to maintain its rate of ten cents a word for carrying press matter during the busy hours of the day. The Western Union has reduced its rate to five cents a word, regardless of the fact that five cents a word is an unremunerative rate. The Commercial Cable Company considers it only just to the business community that its cables during the busy hours should be devoted to the rapid transmission of regular commercial cablegrams. The Commercial Cable Company gives a deferred press service at five cents a word.

"On the other hand, in Mexico, where the Western Union has a monopoly, the telegraph rates are exorbitant. The Western Union rate between New York and Mexico City is $1.75 for a message of ten words. The distance is 2,867 miles. The Postal Company's rate between New York and San Francisco is $1.00. This distance is 3,400 miles. That telegraph communication between the United States and Mexico should be under the control of a single telegraph system in the present condition of affairs in Mexico is a serious matter, since the whole press of the country and the public have no alternative channel of transmission. It is a serious matter for any country that the means of communication be under one private control. If Mexico had the benefit of the Postal Company's competition, it would enjoy lower rates and faster service to this country. This condition between the United States and Mexico is the result of a

bargain between the Western Union Telegraph Company and the government of Diaz. Eminent Mexican lawyers have declared this Western Union-Mexican monopoly a violation of the Constitution of Mexico. The Postal Telegraph system reaches El Paso on the border just opposite Ciudad Juarez, in Mexico, where a connection could be made with the Mexican Railroad telegraph systems within an hour's notice. More than ten years ago the Postal Company, at great expense, built a telegraph line from Albuquerque, N. M., south through New Mexico and Texas to El Paso, where it had arranged to connect with railroad

PROFIT AND LOSS ACCOUNT.

FOR THE YEAR FEBRUARY 1, 1913, TO FEBRUARY 1, 1914.

RECEIPTS:		
Income from investments in other Companies		$4,202,413.30
DISBURSEMENTS:		
Dividends paid on The Mackay Companies Preferred shares	$2,000,000.00	
Common shares	2,069,020.00	
Operating expense, including Transfer Agents, Registrars, Auditors and Trustees' compensation, office rent, salaries, stationery, engraving of cerificates, etc.	30,587.70	
Balance carried forward	102,805.60	
		$4,202,413.30

BALANCE SHEET.

ASSETS.		
Investments in other Companies	$91,997,714.19	
Cash	471,995.31	
		$92,469,709.50
LIABILITIES.		
Preferred shares issued	$50,000,000.00	
Common shares issued	41,380,400.00	
Surplus	1,089,309.50	
		$92,469,709.50

telegraph lines, running from El Paso to Mexico City. The Postal Company began giving telegraph service between the United States and Mexico, but the Mexican railroad companies were soon ordered to cease exchanging telegraph business with the Postal, and have never since been permitted to resume.

"The Mackay Companies has no debts. Its outstanding preferred shares ($50,000,000) have not been increased during the past seven years. Its outstanding common shares ($41,380,400) have not been increased during the past nine years. No bonds, notes or stock have been issued and no debts incurred during the year.

"The shares of The Mackay Companies continue to be an attractive investment for the employes of The Commercial Cable and Postal Telegraph Systems, and their holdings are constantly increasing, especially as to the preferred shares. The co-operation resulting from such investment is gratifying to your trustees.

"At the annual shareholders' meeting, held February 15, 1913, Sir Edmund B. Osler, the head of the banking house of Osler & Hammond, of Toronto, Canada, and Mr. George Clapperton, vice-president of the Commercial Cable Company, were elected trustees."

Sir Thomas Skinner, of London, England, was elected a trustee.

The English Submarine Cable Industry.

The London *Times* of January 28 issued an engineering supplement, in which are recorded the advances made during the year 1913 in the various branches of the electrical arts. The following extract regarding the submarine cable industry will be of interest.

"The submarine cable industry of Great Britain has advanced against several opposing forces. It is noteworthy that while the price of raw india-rubber has fallen, the price of raw gutta-percha has been maintained, and, in some cases, has advanced, thus indicating an undiminished demand for submarine cables. Germany has continued to increase her network of cables, notwithstanding the extension of her wireless system, and the industry finds competitors also in France, Italy, and, to a small extent, in Japan. The complete list of new cables is not yet available, but it is safe to assume that the total length of them exceeds 9,000 nautical miles.

"The Postmaster-General announced in December that in the third quarter of 1913 the traffic through the Pacific cable was 468,000 words, as compared with 252,000 words in the corresponding period of 1910.

"Wireless telegraphy appears, in fact, to have abstracted little, if anything, from the older system of transmission, but to have acted as a feeder, very much as omnibuses and tramways feed the railways. The evidence of the year's working indicates that, with a proper adjustment of rates, the two systems will gradually harmonize, with advantages to both."

Handy Electrical Dictionary.

Every student of electricity should have at hand a copy of the "Handy Electrical Dictionary," to help him understand electrical terms met with in his books of study, the meaning of which he may be in doubt about. It covers a wide range of electrical subjects, and is published in pocket size. The definitions of the electrical terms are, in most cases, full enough to constitute a cyclopedia of electricity, and although dictionaries, as such, are not usually recommended for steady reading, there is much interest in reading this book through, in addition to its explanatory feature. The price is twenty-five cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Telegraph and Telephone Facilities in New Station of the Michigan Central Railroad at Detroit, Mich.

The telegraph and telephone facilities installed in the new station and office building recently completed by the Michigan Central Railroad at Detroit, Mich., are of the latest and best design known, and were chosen and arranged with the desire of having such facilities equal the many other good features in this new terminal, which may be considered one of the best railroad terminals of the country.

The private branch telephone exchange consists of eight positions of Western Electric latest type arc rectifier. The battery is located in a room near by, having a composite floor and vent flues to eliminate danger and carry away acid fumes from the batteries.

A separate room adjoining the private branch exchange has been very conveniently fitted up as a rest and retiring room for the operators.

An automatic telephone system has been installed for intercommunicating between the office building, station, yards, tunnel and freight house. It is equipped with 150 lines and 250 telephones. The three-wire system, arranged for six-party code ringing, is used, which furnishes service for many yard and short lines formerly equipped with hand-

FIG. 1—TELEGRAPH OFFICE, NEW MICHIGAN CENTRAL STATION, DETROIT, MICH.

of No. 10 toll and local switchboards. In these boards are terminated the railroad company's private long-distance circuits connecting with all the large cities on the New York Central Lines, together with yard and general office telephones, so that connections can be had with the public telephone service.

Special designed cord circuits and other facilities have been installed to insure the best possible transmission over the railroad private long-distance lines. Twenty-four and forty-eight-volt battery supplies the current for operating the boards. The storage battery is charged by means of a mercury generator ringing telephones. At each of the passenger track platforms automatic telephones of the mine type have been conveniently located for the use of station employes.

A telautograph system having twelve stations connected with the train director, station master, ticket offices, baggage rooms, waiting room, and similar places, has been installed to furnish prompt information regarding trains.

The telegraph office, a room, sixty feet long by twenty-six feet wide (Fig. 1), contains the equipment for the general railroad telegraph and telephone message and train order business, and wire

chief testing apparatus. The switchboards, distributing frames, repeaters, multiplex apparatus and automatic telephone switchboard are located at one end of the room arranged especially in regard to accessibility by the attendants.

The main switchboard (Fig. 2) is of the jack type, Western Union latest pattern, designed primarily to meet the most severe specifications of the underwriters. The jacks are mounted in porcelain panels and have a break-down test of 1,200 volts. No wood is used in the construction of the board. The framework is built up of angle irons, making the board absolutely fireproof. The patching and irregular layouts are handled by cords, although the regular assignments are wired to the jacks permanently. Three sections of this new type of switchboard were installed, two being used for the telephone circuits and one for the Morse circuits. On the board is provided the latest type of testing apparatus, consisting of Wheatstone bridge, volt and ammeters, and telephone and Morse test sets.

A combination main and intermediate distributing frame is located in the rear of the main switchboards. The frame has a present capacity of 5,000 terminals or wires, providing permanent connection with cables leading from the switchboards, operating and multiplex tables, coil racks, and other equipment, permitting universal distribution and changes without disturbing the permanent connections of the cable.

Two specially designed duplex and quadruplex tables (Fig. 3), located in front of the main switchboard, are equipped with fourteen bridge-type duplexes arranged for composite service, seven bridge-type quadruplexes and ten improved type of repeaters. The multiplex equipment is of the latest design, furnished by the Western Union Telegraph Company.

Five operating tables designed to meet the railroad's requirements provide twenty-six multiplex and straight Morse positions. On the multiplex positions local lamp signals are connected by means of a switch to the receiving sounder circuit, which signals are worked in common with one bell. The closing of the key at the distant end lights the lamp and rings the bell, indicating the position calling. This arrangement facilitates prompt movement of business during hours when a small force is maintained and eliminates continued calling by Morse.

The straight or single Morse wires are equipped with telegraph selectors and terminate in a concentration cabinet on one sextette table, with jacks multiplied so that any of these wires are accessible

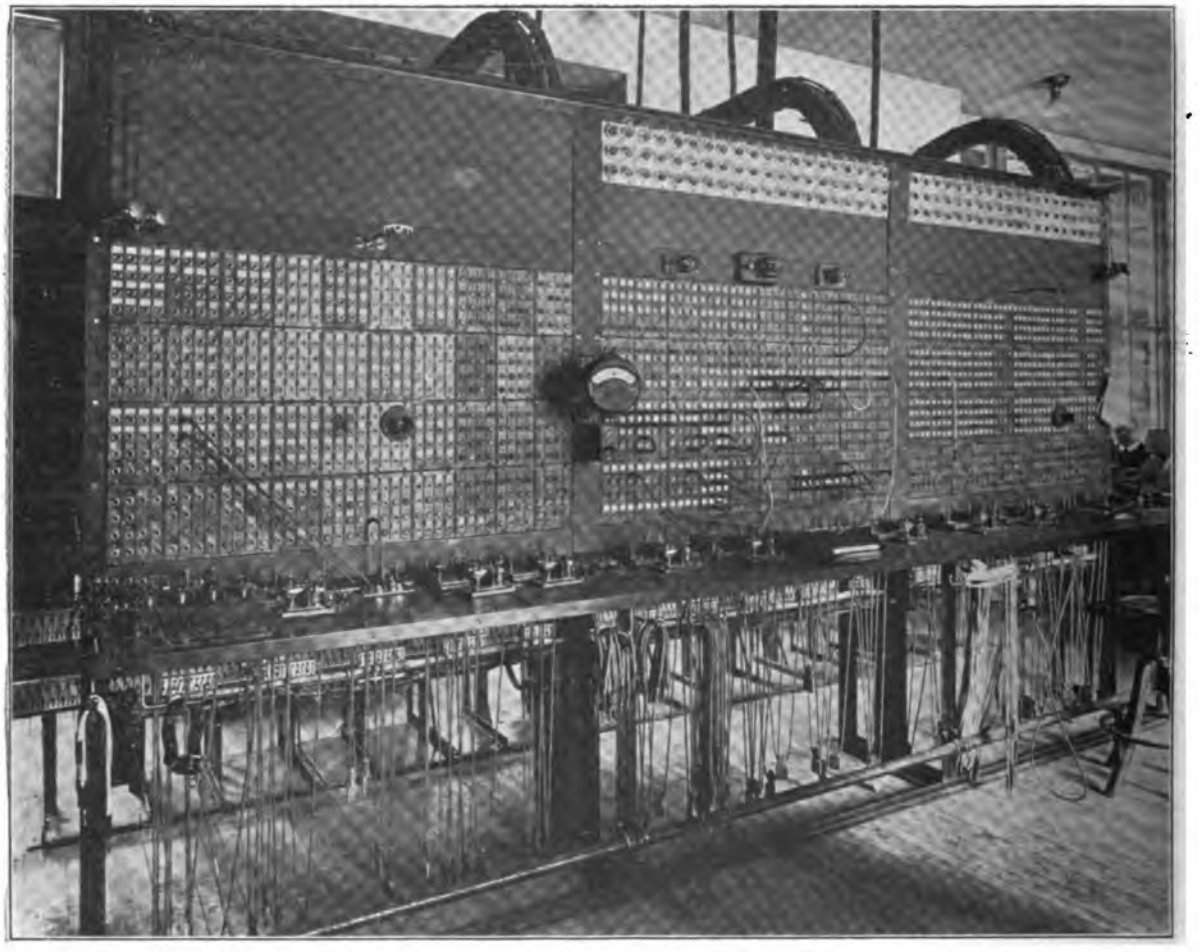


FIG. 2—JACK TYPE SWITCHBOARD, NEW MICHIGAN CENTRAL OFFICE, DETROIT, MICH.

to any position. The jacks in the cabinet are equipped with lamp signals. All of the selectors have the same combination or character, so that a way station desiring the main office at Detroit makes this combination or character with the telegraph key, which operates the selector and through its local points the lamp signal above the jack associated with the line calling is lighted, and through a pilot relay rings a bell indicating the line calling. By plugging in the jack to answer the lamp is extinguished and the ringing of the bell stopped. With this system much delay is eliminated and the necessity of long calling avoided.

The coils, condensers and other equipment in connection with the telephone composite and simplex service are mounted on coil racks designed for such service.

The main line battery potentials are furnished through cable from the main Western Union office. Two motor-generator sets furnish the local current of twenty-six volts.

At one end of the telegraph operating room space has been partitioned off, in which tables have been arranged to handle the railroad message service by telephone. These positions are equipped with specially designed circuits having lamp signals and other important features in connection with the selective signaling system.

An automatic tube system of the Lamson type furnishes means of carrying telegrams to twenty of the most important offices in the building, avoiding the necessity of messenger service.

In the waiting room public pay stations for telephone and telegraph have been provided.

The information bureau and ticket offices have been supplied with auxiliary exchanges connecting to the main private branch exchange by tie lines to provide the public means for quick information in regards to trains.

All of the equipment installed and cables run have been arranged to take care of future requirements.

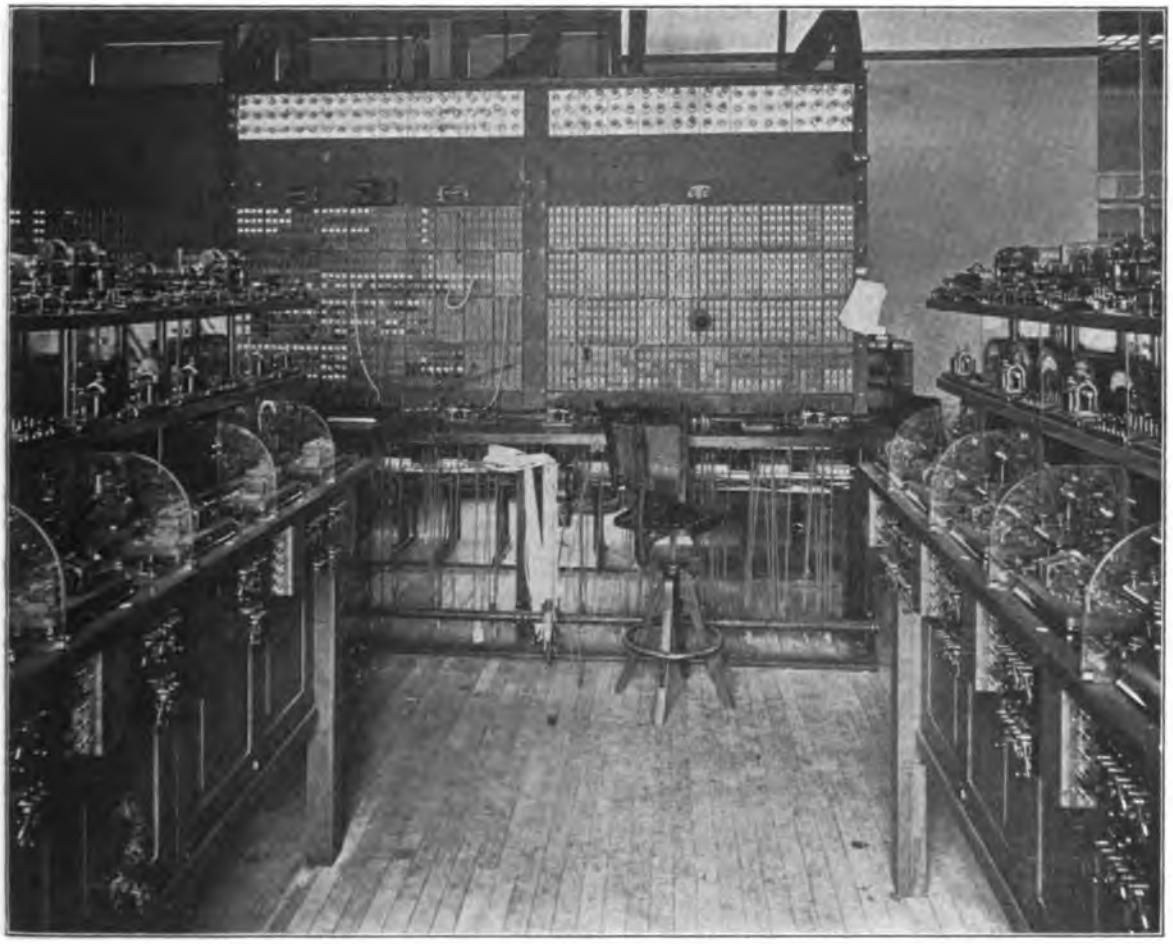


FIG. 3—MULTIPLEX TABLE AND EQUIPMENT, NEW MICHIGAN CENTRAL OFFICE, DETROIT, MICH.

The offices of the superintendent of telegraph, private branch exchange, and telegraph office, are located in adjoining rooms on the mezzanine floor of the office building.

The arrangements and installation of the telegraph and telephone facilities were under the direction of Mr. E. C. Keenan, general superintendent of telegraph, and in direct charge of Mr. J. J. Ross, superintendent of telegraph, the engineering features having been handled by Mr. R. F. Finley, engineer, general telegraph department, New York Central Lines West.

Looking Backward Sixty Years.

BY GERRIT SMITH.

In 1853, when I entered its service, the Commercial Telegraph Company operated three wires out of Boston and its office was in the Traveller Building, at No. 31 State street. The superintendent was Mr. A. A. Lovett, the manager Mr. James N. Ashley, and his assistant was Mr. Thomas M. Miler. Both Ashley and Miler operated the House system, which was the one our lines had been built to exploit. I was employed, originally, to operate the dummy which carried the messages taken in from the public up to the operating room on the fourth floor, and from that I came, eventually, to operate the wires. One of these ran to Providence, R. I., and thence, via Southbridge, to Springfield, Mass., where it was cut, the other part of it going on from Springfield to Albany, N. Y., via Pittsfield, Mass. The second wire ran via Worcester, Springfield, Hartford, Middletown, New Haven and Bridgeport, to New York. The third wire was a branch line to Nahant, erected for the handling of summer business. It was on this wire that I began my practice.

GERRIT SMITH.

When the American Telegraph Company, which was organized to introduce the Hughes printing telegraph, made its advent in New England, it absorbed our wires, together with the House system, and the Commercial Telegraph Company became an institution of the past. The American Telegraph Company, up to 1859, when it purchased the New York and New England Union lines, which owned and operated both the Morse and Bain systems, confined its operations to the printing telegraph. Under the most favorable condition of wires and weather it was regarded as a successful experiment for the Commercial Telegraph Company to work direct from Boston to New York, all business between those points being regularly relayed at Springfield. A storm prevailing east or south of there was the signal to prepare copies of messages to be sent by mail or express. It was the custom to accept business subject to indefinite delay, and when the sender was advised of this he often preferred to leave his message with us, with the remark: "Do the best you can. I want it to be printed at the other end."

The dummy of which I was in charge consisted of a frame enclosing two boxes, one of which went down as the other came up, and it was built outside the building. During the heavy north and east storms the carrier ran very hard, resulting very often in blistered hands. A relief from this rough kind of service came occasionally, and I was placed in charge of the office while the manager and all others competent for the work went out to repair the line between Boston and Providence. The heavy snow and sleet storms carried down the wires and the poles with them to such a degree that it would sometimes be a fortnight before communication with Providence was restored—a distance of forty miles. During these periods my opportunities came to look into the science of telegraphy and practice on the instrument connected with the Nahant wire.

My definite advance in the service came about in 1855, and in a very unexpected manner. It was caused by the selection of N. P. Banks as speaker of the House of Representatives. During the balloting at Washington the excitement in Boston became intense. Our manager, Mr. Ashley, was called to Springfield for consultation with the superintendent, and as I could receive very well, I was left in charge of the office the Saturday afternoon Mr. Ashley was absent. Bulletins from Washington came frequently, giving the result of the balloting. These were enclosed in envelopes addressed to Mr. Blanchard, the Associated Press manager, who made manifold copies and sent them to the various newspapers entitled to receive them. More than 100 ballots had been cast when, about six o'clock, Bank's election was announced. That particular bulletin never reached Mr. Blanchard. The messenger who had it was stopped by some one connected with the *Traveller*, and before the other papers heard the news the *Traveller's* flag and extras were out and State street was quickly ablaze with fireworks. An explanation was demanded from Springfield. The wire was in fine shape and worked beautifully. I was in good spirits, feeling that I was clear of blame in the matter, and I handled my case so efficiently that Mr. Ashley would scarcely believe that Gerrit Smith was at the key in Boston.

Shortly after this, a request being made by the jewelers of North Attleboro for a telegraph office, I was sent there with the necessary apparatus to operate the wire, and took charge of the office. Incidentally, I officiated, also, as lineman, my section extending half way to Boston and about twelve miles toward Providence. I used, in North Attleboro, what was called the "baby" instrument. This consisted only of a small ivory wheel, on which the letters of the alphabet were painted. With pencil and slate in hand the operator read and copied the messages as the wheel revolved, and afterwards transferred them to the regular message blanks. The office receipts on prepaid business

never fully paid the operator's salary of $29.16 per month. The deficit was made good by the manufacturing jewelers.

A vacancy occurring in Providence I was transferred to that city, and spent some of the happiest years of my life serving under Mr. Henry C. Bradford, the manager of the American Company's office, and, subsequently, of the consolidated office of the printing and Morse lines, through the amalgamation of which the Morse telegraph ultimately dominated the printing system. The name of the American Telegraph Company, however, superseded that of all of the original companies, of which there had been several, and which the American Company absorbed, one after another, until it commanded the Atlantic seaboard from New Foundland to New Orleans. In Providence I learned to work the Morse system, and when I left there, in 1860, to go to New York, I was quite expert in operating it, the printing telegraph having been abandoned, gradually, as far as Providence was concerned, and Morse substituted for it on all but one wire. This ran from Providence to Springfield, via Southbridge, and, in the course of one or two years, the printing telegraph became unknown in Providence forever. My successor, at one or two removes, was the late Franklin Leonard Pope. He was the last of the printing operators employed in Providence, with the exception of manager Bradford, who, however, very rarely operated the instrument after the consolidation of the American and Morse lines in 1859.

During my stay in Providence I had an experience in detective work that made a deep and lifelong impression upon me. A hardened criminal, known in police history as "Hicks, the murderer," after having slaughtered the captain and crew of the schooner "E. A. Johnson," made his escape, with his wife and child, from New York by the Fall River steamer. The murders had been of the most horrible character. Hicks had killed his victims with an axe and their bodies were found, terribly mutilated, in the cabin of the vessel, which he had set adrift and which, when boarded, was just outside the Narrows. The tell-tale axe was found, and there was every indication that Hicks was the culprit. Four detectives left New York for the east, two of whom went to Boston. The others, accompanied by my brother, Elias, of the New York *Tribune* staff, came to Providence. I speak of this incident because I really became instrumental in locating the murderer and effecting his capture. In passing, on the east side of town, the dock of the local steamer running between Providence and Fall River, I suggested that we stop and speak with the deckhands, with a view to learning if anyone who might be the man we were looking for had come up from Fall River. The first man spoken with volunteered a clear description of Hicks, as well as his wife and baby, and also told us about the cab which took them away from the steamer. The next morning we went to the railroad station, and with the description of the conveyance in our possession, we readily discovered who the driver was, and ascertained where he lived. We found him in bed, his wife saying he had been up late the night before. But he soon came down to see us, and on being told the object of our visit, he readily informed us that he had taken Hicks and his family, the night before, to a house situated on the hill at India Point. Arrangement was made to have our informant call for us and take us to the murderer's retreat, where we arrived at about 7 p. m. We found the family at supper, but they told us the visitors were in the house, with the exception of the man, who had gone out. He was expected back shortly, however, to take tea with his wife and little one. To avoid suspicion as to the nature of our errand, it was decided to defer making an arrest until midnight, and, accordingly, we returned about twelve o'clock with reinforcements and surrounded the house to prevent a possible attempt to escape. In response to our knocks, the lady of the house appeared at an upper window, and was told that we were in search of a man who was stopping in the house, and who was charged with passing counterfeit money. When told we had a warrant for his arrest, the landlady came down stairs, and admitted my brother and me and the New York detectives, and we proceeded to the room occupied by Hicks and his family. He was told that he was wanted for circulating bad money, and he offered no resistance. We were well armed, but there was no occasion to resort to the use of weapons. Hicks arose and dressed, leaving his wife and child sitting up in bed. Pretending to search for counterfeit money, we found, in his trunk, some parts of blood-stained bedding. Telling his wife that he was under arrest for passing counterfeit money and that he would be back in the morning, Hicks went with us to the police station. He tried all sorts of expedients and worked many schemes to be allowed to step out of the carriage, but did not escape from custody. After he was placed in his cell, he was told the real cause of his arrest, and it soon became known that the murderer was in custody, with the result that when he was taken to New York for trial, the officers having him in charge had great difficulty to keep the angry crowds at the various railroad stations from lynching him. Hicks was promptly tried, convicted and hanged on a specially erected gallows on Bedloe's Island, within sight of the vessel on which he had committed the murders for which his life was the penalty.

In 1863 Mr. Henry H. Ward, one of the earliest of the prominent operators, came on from Boston, and, after serving as assistant for a time, was appointed manager of the main office of the American Telegraph Company, which, in 1861, had been established at No. 145 Broadway, the old office in Wall street being continued, however, as a branch office. Mr. Ward had been a first-class operator for thirteen years, having entered the service as a messenger at Springfield, Mass., in 1848, for the New York and Boston Magnetic Telegraph Association. He quickly learned to operate, and went from Springfield to Worcester, thence to Norwich, where he was appointed manager. From Norwich he went to New York, and from there to Boston.

In 1850 he was appointed manager at Portland, Me., where he surprised superintendent L. L. Sadler, by taking his messages by sound. For a time Ward and William W. Porter were the only operators in New England who did not use registers. In 1851 Porter went to New York, and Ward was brought to Boston to succeed him. Ward's reputation as an operator, in 1863, was thoroughly established. For twelve years he had stood at the head of the profession in Boston, and it was so difficult to find anyone who would consent to succeed him that superintendent Charles F. Wood came to me, in New York, and painted such a rosy picture of the position Ward was vacating that I accepted it. I became night manager of the Boston office, in name at least, but the work that I took up immediately, as Ward's successor, was the receiving of the press report. The Civil War was well under way, and I shall always remember the exciting years that I worked the famous No. 4 East, of which Mr. Walter P. Phillips, so well known and highly esteemed by the entire telegraph fraternity, has written most interestingly in his various contributions to TELEGRAPH AND TELEPHONE AGE. I well remember the many times I have taken up my pen at 7 p. m. and hardly dropped it until 4 a. m., receiving from forty-five to fifty foolscap sheets of Associated Press matter, besides the voluminous special despatches to the Boston papers. Very often I went home after sunrise. It was hard work, but I kept it up until toward the close of the war, in 1865. My health wavering under the prolonged strain, I asked to be relieved, but when it came to securing my successor, it was discovered that no one in Boston had any illusions about the work Ward and I had been doing, and the position, though freely offered, had no takers. The place was filled by my agreeing to work one night each week. A robust young man from Bangor, Me.—Mr. Win Todd—was selected for the position, and he was competent and vigorous. Although he had all the necessary qualifications and a night off duty every week, he threw up his hands at the end of a fortnight, and declined to hold the position any longer. About this time I had an opportunity to return to Providence as manager of the United States Telegraph Company, and I lost no time in taking my departure from Boston. A year later, in 1866, the United States and the American companies were consolidated with the Western Union. Both of the others were larger than the United States Telegraph Company, but the latter made a vital contribution to the combination in the person of its president—William Orton—who, in due course, succeeded Jeptha H. Wade as president of the Western Union.

The story of the New York draft riots has been woven into the history of the Civil War, and the story told of how the offices in New York City were closed, and communication with outside points maintained by connections with the main lines at places in the near suburbs. The draft excitement finally reached Boston, and a riot was frustrated only by the prompt action of the city authorities. The first scene in Boston was occasioned by the gathering of a crowd in front of the telegraph office on State street. Before any definite move was made some one cried out: "Come to Faneuil Hall Square and get firearms." In less than twenty minutes the entire mob assembled in front of Faneuil Hall Market, where they broke into the gun shops. In the meantime, the authorities had their force out and the Mob Law was read. This failing to disperse the crowd, a charge of grapeshot was fired, which had a magical effect. The crowd fled through all of the five avenues afforded for escape in that locality. This closed the draft rioting fever in Boston. Our plans were completed at the office for making connections at Roxbury and other points outside of the city in case the rioters overcame the police force placed at our disposal in State street.

After my return to New York from Providence, in 1866, I went through the experience, with many of the old timers, in the moves that occurred at the well-remembered locality, No. 145 Broadway. The old operators still living, who were in the service there, will never forget the move from the fourth to the third floor. At a given signal every key was opened, and so remained until President Orton finished a pleasant little talk, when all arose from their seats, and, leaving their keys still open, passed to the third floor, where, by previous arrangement, they took their places at their respective tables and resumed service at the point where they had stopped on the floor above. Not a hitch occurred in making the change, which was so successfully accomplished by the well-known electrician of those days, Mr. Dixon F. Marks.

I do not recall the exact date of my appointment as a chief operator in the Western Union office at No. 145 Broadway, but for several years prior to 1874, when I was made an assistant to Mr. George B. Prescott, electrician of the company, I had been employed at the switchboard, and on the date of my retirement I was senior chief operator, a fact that was impressed upon me by the speeches of Mr. James D. Reid, Mr. Joseph L. Edwards, and others, in connection with the presentation, on October 10, 1874, of a beautiful gold watch as a token of the esteem of my associates of the operating room. It was all very unexpected, and I found myself in the same situation I had occupied, nine years before, when I was leaving Boston for Providence, and my friends presented me with some valuable electrical books and a beautiful and costly friendship ring to show me how they felt toward me. However, I acquitted myself, on both occasions, without discredit, and told the donors how grateful I was for their good opinion, and how much I appreciated the tangible evidence thereof. I do not remember much that happened in Boston, but in New York the situation was greatly relieved by some one calling for "three cheers for Gerrit Smith." This enabled me to subside. It is easy, indeed, to speak lightly of events of this kind, when they are long past, but whosoever has gone through experiences of this nature, however much merriment there may have been on the surface, has

learned that "the well-spring of laughter lies close to the fountain of tears."

During the years I had been a chief operator I studied the electrical books whenever I had an opportunity, and I had made several inventions, including an automatic repeater that was a marked success. My first rough model that was put in circuit in the New York office and used during the winter of 1872-73, was made up with wooden penstocks and a couple of single transmitters, and was very much admired by the operators, who gave it the name of "Gerrit Smith's penholder repeater," a name that it retained for several years after it had been made up in permanent form and successfully introduced on several long and difficult circuits. I did not patent this repeater for some reason not clear to me at this late day and the same is true of many other inventions that I made subsequent to 1874. My sketch and scrapbooks are filled with drawings of what my associates and I regarded as improvements, some of which were used, others abandoned for something I thought to be simpler and better, while others were duly patented. Notable among the latter was my invention for duplexing the Phelps' Combination Printing Instrument, on which the patent issued July 6, 1875. This invention gave Mr. Phelps' ingenious welding together of the best features of the House and Hughes printing telegraph systems a new lease of life. When we worked it for the first time from New York to Boston, I received the following telegram:

"NEW YORK, June 7th, 1875.

"GERRIT SMITH, Boston:

"I congratulate you on the result. This begins a new era for the printers.

"GEORGE B. PRESCOTT."

I need not go into the details as to how I accomplished my results, as they are all a matter of history. The value and efficiency of the Phelps system was very much increased, and some great records were made, but good printing operators were scarce, while Morse men were plentiful, and the "new era" that Mr. Prescott had predicted did not arrive, although the system was used between New York and Boston and New York, Philadelphia and Washington for many years, always giving perfect satisfaction, and undeniably a most beautiful, accurate and wonderful invention, reflecting great credit on House, Hughes and Phelps.

(To be Continued.)

SUCH IS FAME.—Mr. Hanin, a French architect, states in a newspaper communication that "the telephone was invented by two Americans, Graham and Bell, in 1876, and the phonograph by an American, named Edison, in 1877."

MR. T. J. DWYER, general supervisor of the Iowa Telephone Company, Des Moines, Iowa, writes: "I should say I do want to be continued on your subscription list. I look for TELEGRAPH AND TELEPHONE AGE as going to lunch. It is appetizing and instructive. Therefore I am enclosing check for $2.00 to cover subscription for another year."

Tug Fouls Government Cable.

A very peculiar and unusual accident occurred recently when the Hamburg-American Line tug No. 3 fouled the United States Government submarine telephone cable, extending from the new Barge Office at the Battery to Ellis Island, in New York Harbor, says the *New York Telephone Review.*

The cable is made up of thirty-eight stranded conductors. Each conductor is especially insulated and is waterproof. The armor consists of thirty-three steel wires, three-eighths inch in diameter, wound spirally around the cable, the completed cable being four inches in diameter.

Taking into consideration the size and weight of the cable, it is evident that an enormous power must have been exerted in order to twist it up in the condition found. There were fifteen complete turns of the cable about itself, and in one place the two thicknesses of cable were twisted so tightly together that their combined diameter was less than that of the original cable.

The tug referred to is the most powerful tug in the harbor, and was built especially to warp the steamship "Imperator" into and out of her pier. She was so badly damaged as the result of this encounter that she was unable to proceed under her own power and had to be towed away.

Universal Telegraph Alphabet.

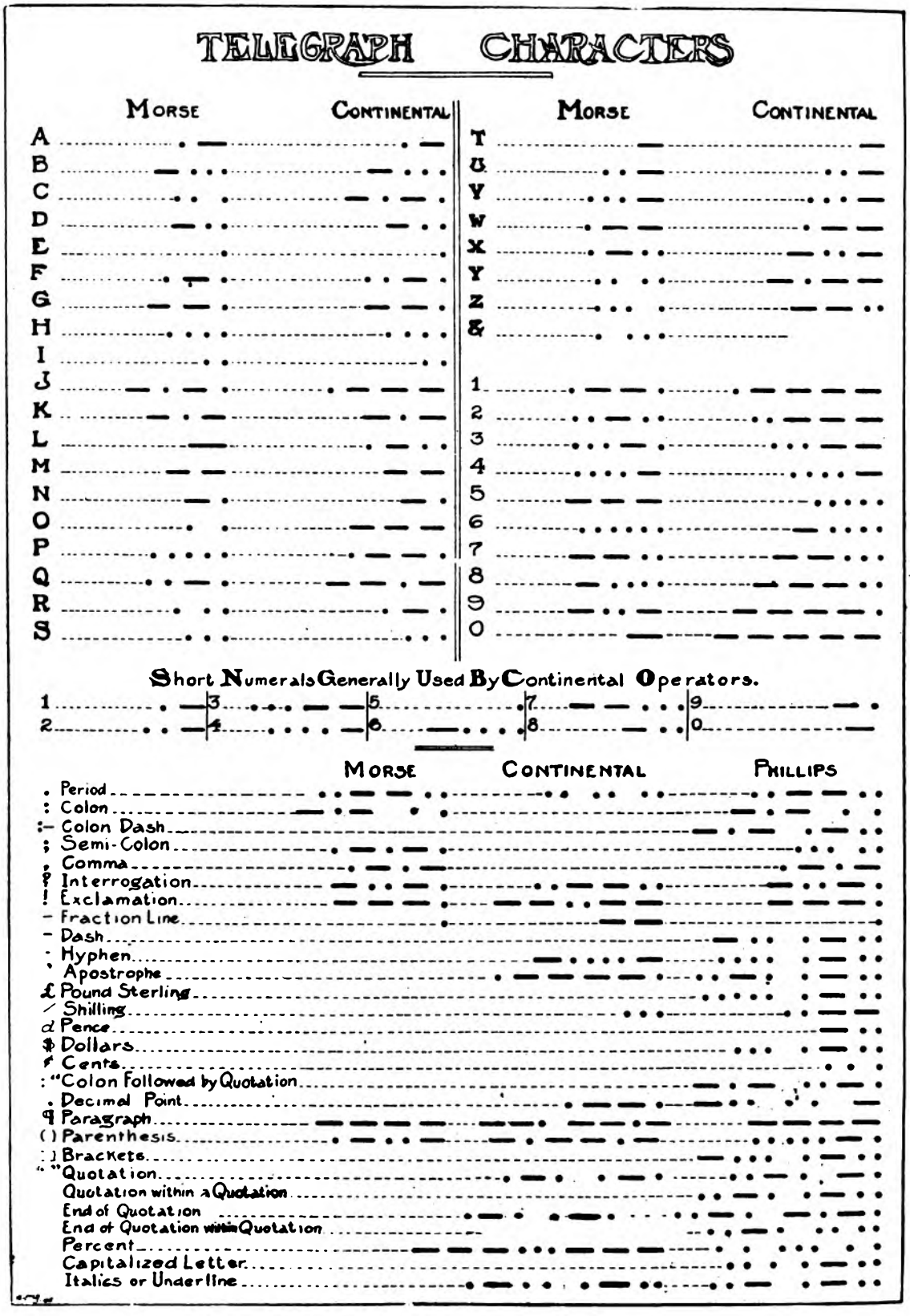
BY W. TAYLOR, HELENA, MONT.

In the last few issues of TELEGRAPH AND TELEPHONE AGE, I notice that you are advocating a universal telegraph alphabet. I agree with you that there should be only one alphabet, and I believe the Continental should be the one. I have used both Continental and Morse, and can speak from experience. The spaced letters of the Morse cause numerous nonsensical errors. A first-class operator picks up and corrects numerous combinations, but the inexperienced operator does not, and complaints and service messages are numerous as a result. As to speed, I believe there is very little difference; I could handle just as much business with the Continental as with the Morse, and feel safer, and not as much fear in watching for errors.

The change could be made in a very short time, and operators could practice as business would permit, and soon become familiar with the Continental characters.

Telegraph Alphabets.

Our editorial article, in the January 16 issue, on the subject of a universal telegraph alphabet, has aroused such wide interest that there is a call from many quarters for the publication of the Continental alphabet. In compliance with these requests, we publish on the page following this the Continental alphabet, together with the Morse alphabet, for the benefit of those interested. From this the two alphabets can be easily compared, and the points of difference readily noted.



MORSE, CONTINENTAL AND PHILLIPS' TELEGRAPH CODES COMPARED.

Edison-BSCO Type 452 Cell, 450 Ampere Hours' Capacity.

EDISON BSCO PRIMARY BATTERY

The Standard Closed Circuit Cell

The use of Edison Primary Battery on your telephone talking circuits will improve the transmission, strengthen the system, and reduce operating expenses for the following reasons:

A transmitter, to give the best results, should be supplied with a uniform current. Edison Cells are designed for hard service and the drop in voltage from beginning to end of life is very slight. This feature is important where clear transmission is a necessity.

Their use strengthens the system for the reason that long use of any particular set will not impair the transmission. Its superiority, in this respect, over the open circuit types, is marked, the latter quickly polarizing if discharged continuously for any considerable period with consequent drop in voltage, while the Edison Cells are not subject to polarization.

The active material costs much less per ampere hour for Edison Cells than for Cells of the open circuit type. Inspection and maintenance charges are negligible, the cells requiring no attention from the time set up until exhausted; this, considering their long life (200 to 450 ampere hours, according to size adopted), is an item worthy of notice; all the material you pay for is turned into current, nothing wasted account cells drying out, local action, or any of the troubles which affect a battery not built on correct principles.

Write for catalog, voltage curves or other information.

The Cheapest Form of Battery Energy.

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EDISON-BSCO
Complete Renewal showing the all-in one assembled element.

THE RAILROAD.

MR. O. C. GREENE, formerly superintendent of telegraph of the Northern Pacific Railroad Company, St. Paul, Minn., now retired, is living at Orange, Cal.

MR. PERCY HEWITT, superintendent of telegraph of lines in Texas, Southern Pacific Railroad, suffered a broken leg, as a result of a fall from his motor velocipede while on an inspection tour on February 8.

WILLIAM H. BOARDMAN, aged sixty-eight years, editor of the *Railway Age Gazette*, New York, died in Ridgefield, Conn., February 16. He was born in Dixon, Ill., and was graduated from the University of Michigan.

MR. ERNEST LAMAR KING has been appointed superintendent of telegraph of the Southern Pacific Railway Company, with headquarters at San Francisco, Cal., to succeed F. S. Rawlins, deceased. Mr. King is about thirty-five years of age. He began his business career as a messenger at Sacramento and has risen steadily in the ranks. He was trainmaster of the Shasta Division of the company, prior to his present appointment.

TELEGRAPH SUPERINTENDENTS AT MORSE CLUB DINNER.—The following railway telegraph superintendents were in attendance at the annual dinner of the Morse Electric Club in New York, February 21: C. Selden, Baltimore and Ohio, Baltimore, Md.; A. B. Taylor, New York Central Lines, New York; W. P. Cline, Atlantic Coast Line, Wilmington, N. C.; W. H. Potter, Southern, Washington, D. C.; J. F. Caskey, Lehigh Valley, South Bethlehem, Pa.; E. P. Griffith, Erie, New York.

THE NEW ORLEANS CONVENTION.—Mr. W. A. Porteous, manager of the Western Union Telegraph Company, New Orleans, La., and local member of the entertainment committee of the Association of Railway Telegraph Superintendents, promises an excellent programme of entertainment during the convention of the Association in that city, May 19, 20, 21 and 22. Those who are acquainted with Mr. Porteous will know that he will keep his promise and will leave nothing undone that will, in any way, contribute to the enjoyment of the members while in the Crescent City. Mr. Porteous is an extremely active and progressive gentleman, and is putting his heart and soul into his duties as an entertainer in this instance, as he does in everything he undertakes.

Meeting of Western Division of the Association of Railway Telegraph Superintendents.

The regular meeting of the Western Division of the Association of Railway Telegraph Superintendents will be held at the La Salle Hotel, Chicago, March 18, the following subjects being scheduled for discussion:

1. Use of the Telephone for Dispatching Trains and Handling Messages.

General Discussion. While this subject has been freely discussed at previous meetings, it is desired to have members report progress, explain new developments, and give data showing money savings and gains effected by use of the telephone, based on actual experiences during the past few years.

2. Use of Motors Cars by Stationed or Section Linemen, Inspectors and Gangs.

3. Automatic Telephone for Railroad Intercommunicative Service Between Yards, Shops, Offices, etc. Report of experience by members who now use the automatic.

4. Wire Crossings Over Railroad Tracks and Property. What progress has been made in the adoption of the association specifications for both high and low tension wires. General discussion.

As only one divisional meeting is held each year, the members of this association will undoubtedly be glad to attend and discuss formally the papers, as well as talk over informally general affairs relating to the details of the telegraph and telephone, which will not be covered by the annual meeting of the association, and a large attendance is expected.

Mr. E. C. Keenan, Chicago, general superintendent telegraph, New York Central Lines, West, is chairman of the Western Division, and is making arrangements for a very interesting meeting.

Full Use of Wires.

At the annual convention of the Association of Railway Telegraph Superintendents, held in St. Louis, Mo., May 20, 1913, Mr. H. D. Teed, superintendent of telegraph St. Louis and San Francisco Railroad, Springfield, Mo., read an interesting paper, entitled, "The Full Use of Wires." Mr. Teed described the methods adopted to obtain the greatest use of the wires along the system he represented.

In order to ascertain what has been done in this direction on other railroads, we recently addressed a letter to the superintendents of telegraph of some of the leading lines throughout the country, asking to what extent they were employing the various improved methods for increasing the utility of wires. The means of increasing the use of wires include simplex, duplex, quadruplex, composite, phantom, printing telegraph systems, etc., and, it appears, from the replies received, that these methods are in general use.

Mr. J. P. Church, of the Wabash Railroad, Decatur, Ill., writes:

"We have not had to make use of multiple apparatus on many of our circuits on account of not having operators enough in our relay offices to man the regular wires. At present we are working one quadruplex between St. Louis, Mo., and Peru, Ind., with a Montpelier-Detroit wire repeatered through a half set to the polar side, Peru and St. Louis using the common side for their business. We also have a quadruplex from Decatur to St. Louis arranged with half sets, so that we can put Springfield, Chicago or Toledo through to St. Louis when necessary.

"We formerly had a quadruplex from St. Louis to Moberly repeatered to a duplex from Moberly to Brunswick, but this was taken out several years ago when the dispatching force was consolidated at Moberly, as the single wires were sufficient for

the business. We also maintained a quadruplex between Chicago and St. Louis when the president's office was located in Chicago, but that circuit was recently discontinued, as it is not now needed.

"We have not had to simplex any of our telephone dispatching circuits as yet, but on account of congestion of business between Peru and Montpelier, I am figuring on simplexing one circuit between those points, a distance of 105 miles, and repeatering it to the second side of the Peru-St. Louis quadruplex, in order to relieve the Detroit wire on the first side of the quadruplex of the Montpelier-St. Louis business."

Mr. J. C. Johnson, of the Pennsylvania Railroad Company, Philadelphia, sends us a booklet containing a description of the different systems in use on his lines. The book covers telephone circuits, connecting grounded lines to metallic circuits, tying telephone lines to telegraph wires, the simplex, the phantom, the phantom simplex, the grounded line composite, metallic circuit composite, cables, electrolysis. Mr. Johnson states that all of the circuits described are in service at different points on the Pennsylvania system. He also states that experiments have been made with the printing telegraph system, although none of this apparatus is in active service. The booklet referred to contains much other valuable information, in addition to the descriptions of the systems mentioned, and is well illustrated with diagrams.

Mr. G. A. Cellar, of the Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa., writes:

"On the Pennsylvania Lines West we are working composite telephony and telegraphy on phantomed pairs of telephone circuits, working the telegraph circuits duplex; we are operating the quadruplex on simplex telephone circuits, and, also, single Morse circuits on simplex lines; we are experimentally operating one printing circuit, 190 miles long, with very good success. All these combinations are effected to the extent of our plant available for such formations.

"We have some combinations which may be a little unusual, because we just happen to have the right conditions for producing them, and, briefly, I may say that in these days of heavily increased expenses, it is necessary to make use of all such processes as will save the railroad company anything in the way of construction, maintenance or operating cost."

Mr. Charles Selden, of the Baltimore and Ohio, Baltimore, Md., writes: We are dispatching trains by telephone from Washington Junction to Cumberland, Md., 109.5 miles; Grafton, W. Va., to Wheeling, W. Va., 99.8 miles; Wheeling, W. Va., to Newark, Ohio, 101.7 miles; Wheeling, W. Va., to Pittsburgh, Pa., 67.7 miles; Connellsville, Pa., to Johnstown, Pa., 88.5 miles; Connellsville, Pa., to Fairmont, W. Va., 70.6 miles; Fairmont, W. Va., to Hartzel, W. Va., 56.3 miles; Grafton, W. Va., to Parkersburg, W. Va., 103.1 miles; Seymour, Ind., to Louisville, Ky., 72.7 miles. Total, 769.9 miles.

"All of these circuits are being used simplexed, either for communication from terminal to terminal, or forming part of a through single Morse circuit. We have none upon which we have placed multiplex of any character."

Mr. W. H. Potter, of the Southern Railway, Washington, D. C., states that his company operates a considerable number of quadruplex, duplex and one simplex circuit, and did, up to a year or so ago, operate a number of composite circuits, which service, on account of unsatisfactory results, together with added facilities, was abandoned.

"The results obtained from our multiplex circuits," he states, "are fair, considering the resistance of the wires. Other difficulties are experienced by induction and earth currents from adjacent and paralleling high-tension wires.

"It is certainly our desire to get a maximum efficiency from the plant, and any discussion that would promote this end would, no doubt, be very interesting and profitable to all concerned."

Mr. A. B. Taylor, of the New York Central Lines, New York, writes: "We are using on various telephone dispatching circuits over divisions a simplex telegraph circuit duplexed, in some cases working three of these simplexed circuits in tandem between New York and Buffalo, to give an additional through circuit from New York to points west.

"On our two long-distance pairs from New York to Buffalo, over the West Shore Road, both of which are No. 8 coppers, we have two side telephone circuits, a phantom circuit and two duplexed telegraph circuits carrying service from New York to Buffalo and points west. The Morse circuits are obtained by compositing each side of the phantom circuit. Later it is probable that we will composite each of the four wires making up the two pairs, giving us three telephone circuits and four duplexed telegraph circuits on the two long-distance pairs."

Mr. W. J. Camp, assistant manager of the Canadian Pacific Railway Company's Telegraph, Montreal, Que., writes: "We have simplexed practically all our telephone dispatching circuits, and over some of these simplexes we work duplex, but the majority of them are worked single. I think some of our friends on the roads in the States, however, are doing considerably more in this respect."

(To be Continued.)

MR. E. A. SMITH, formerly, and for many years, superintendent of telegraph of the Fitchburg Division of the Boston and Maine Railroad Company, now retired, in remitting to cover his subscription for another year, makes these observations: "I note one of your subscribers says: 'As long as I am in the business I cannot get along without the AGE.' I cannot get along without it, now that I'm out of the business. I couldn't keep track of a host of good fellows I used to trot with, and I'd miss reading Mr. M. J. O'Leary's eloquent speeches at the reunions. I'd lose track of L. B. Foley and Charles Selden, Thomas E. Fleming, my good friends E. B. Pillsbury and C. E. Bagley—but I'll ring off. If I name all the good friends in whom my interest is as great as when I was with them, I'd tire you. Mr. George L. Lang comes to see me once in a while, so I keep tag on him, myself."

Dinner of the Morse Electric Club.

One of the most delightful dinners ever held by the Morse Electric Club took place at the Knickerbocker Hotel, corner Forty-second street and Broadway, New York, the night of February 21, and was largely attended. Many officials of the Western Union Telegraph Company, the American Telephone and Telegraph Company and the New York Telephone Company, and several railway telegraph superintendents were present, and, altogether, it was an event long to be remembered. The dinner was held in the beautiful banquet hall of the hotel, and at its conclusion an intermission of half an hour was spent in social intercourse.

Seated at the guests' table, with President Belvidere Brooks, were, at his right, Messrs. Newcomb Carlton, vice-president Western Union Telegraph Company and guest of the club; H. F. Thurber, vice-president New York Telephone Company; S. M. English, president and general manager Postal Telegraph-Cable Company of Texas, Dallas, Tex., and A. R. Brewer, treasurer Western Union Telegraph Company. On his left were Messrs. H. A. Bishop, director and member of the executive committee Western Union Telegraph Company; A. S. Hibbard, telegraph relations American Telephone and Telegraph Company; G. W. E. Atkins, vice-president Western Union Telegraph Company; E. P. Griffith, superintendent of telegraph Erie Railroad, and E. J. Nally, vice-president and general manager Marconi Wireless Telegraph Company of America.

On rapping to order, President Brooks, who acted as toastmaster, introduced the guest of honor, Mr. Newcomb Carlton.

Mr. Carlton made a very interesting address. He said that there was a tinge of sadness at this gathering on account of the separation of the telegraph and the telephone interests. He had never known of an instance where such self-abnegation had been shown, as the telephone company had exhibited toward the telegraph company, and to him it seemed a pity for the telegraph to be deprived of the co-operation of the telephone company. All public service corporations, he said, were being driven from pillar to post these days, but he believed a saner point of view was rapidly coming over the country.

Referring to the sale of the holdings of Western Union stock by the American Telephone and Telegraph Company, Mr. Carlton stated that opportunity would be offered employes to subscribe to the stock, and he made the important announcement that the company had arranged with the bankers to set aside 2,500 shares of the stock at 60 and up to 10,000 shares at 63 for sale to employes on easy terms, to be announced later. Every employe will have an equal show in purchasing this stock, said Mr. Carlton. There will be no insiders—every employe will be an insider. He advised intending purchasers not to take any more stock than they could conveniently and safely carry. This announcement made a deep impression and was received with hearty applause.

Mr. Carlton also referred in complimentary terms to Mr. E. J. Nally, one of the guests. "We have esteemed him as a competitor," he said. "Now we welcome him as a friend." He suggested that Mr. Nally be called upon to tell something about the wireless. He also referred to Mr. J. C. Willever, in like manner, and spoke of Mr. Willever's high ability as a cable manager.

Mr. Nally said: "I consider it a great privilege to have been invited here to-night, and to have had the opportunity of meeting so many of my old friends. I see in this gathering many with whom I worked in my early days, and many against whom I fought for business in my later days; but it was a spirited fight, and, being Irish, I enjoyed it.

"Competition does everyone good, the public and the organization. In the latter it creates a spirit that forms the chief asset of every vigorous company.

"I am glad," he said, "to see the attention which is being paid to the spirit of competition within your organization, and I am sure that whatever is done to foster it will bring results that will count a thousand fold. Money devoted to the development of multiplex circuits, copper wires, and all the higher and more advanced forms of apparatus, new lines, etc., has its value, but all of this can be increased many times over when the facilities are handled with the proper spirit."

Mr. A. S. Hibbard spoke on the relations of the telephone and the telegraph and thought they had been productive of much good to both services. He expressed his personal pleasure in his associations with telegraph men. At the close of his address he sang one of his characteristic songs.

Mr. H. F. Thurber, in a few remarks, referred, in a complimentary manner to the telegraph fraternity.

Mr. E. P. Griffith made the final address, speaking on the subject of the relations of the telegraph superintendents to the commercial service. The superintendents, he said, responded cheerfully to every call to promote the interests of the commercial people.

An excellent vocal and instrumental programme was rendered all through the dinner by a soloist and orchestra.

Following is a list of those present:

Ames, C. F.; Atkins, G. W. E.; Atwater, H. G.; Austin, W. J.; Albert, V. J.; Allen, M. C.

Brixey, R. D.; Barth, F. W.; Brewer, A. R.; Brown, P. E.; Boelsen, J. J.; Black, R. A.; Brooks, B.; Brooks, M. J.; Byrne, F. D.; Blanchard, G. W.; Brady, W. J.; Brady, J. L.; Burrill, E. T.; Bates, H. G.; Brennan, T. M.; Baker, W. H.; Bosch, Geo.; Bertholf, J. B.; Bowen, T. D.; Barnard, C. I.; Bowman, S. C.; Benjamin, C. R.; Beck, L. H.; Beard, Jas. R.; Barrett, M. E.; Bishop, Henry A.; Bellows, B. C.; Bergen, W. H.; Bauer, C. A.; Berry, J. A.; Barker, W. S.; Beall, L. D.

Connolly, J. W.; Carlton, N.; Cline, W. P.; Casey, P. J.; Collins, J. W.; Cook, M. J.; Chetwood, R. E.; Custer, S.; Creamer, J. M.; Caskey, J. F.; Cowell, E. F.; Clark, T. F.; Collins, W. H.; Car-

michael, A. R.; Crowder, Samuel; Carroll, T. W.; Chase, W. G.; Clunan, J. J.

Dealy, H. W.; Durivan, M. J.; Driver, W. R.; Dierks, J. A.; Durland, H.; Drake, A. W.; Doyle, J. P.; Dowd, F. C.; Duffy, E. F.; d'Humy, F. E.; Drehner, R.; Devereaux, F. L.; Day, E. W.

Everett, Edw.; Edwards, J. P.; English, S. M.

Fraser, W. J.; Fitzgibbon, S. E.; Fuchs, D.; Fordham, C. F.; Fraser, F. C.; Fitzgibbon, F. E.; Fairweather, Wm.; Fashbaugh, W. N.; Ferguson, R. B.; Fairlamb, J. F.

Gott, Chas. C. D.; Griffith, E. P.; Giles, F. D.; Gherardi, B.; Gifford, W. S.; Gries, Harry; Gaffey, J. W.; Gray, E. A.; Gaffeney, C. H.

Harrington, P. F.; Heffner, H. M.; Hill, J. A.; Hayden, M. J.; Harvey, C. A.; Hayes, H. C.; Hamblin, M. W.; Higgins, W. G.; Halligan, H. A.; Houghtaling, W. A.; Hibbard, A. S.; Haig, S. B.; Hansberger, G. W.

Irving, Gardner.

Jamison, J. A.; Jacoby, W. J.; Jenney, L. R.; Jones, John Hall; Johnson, C. C.; Jenkins, J. E.; Jones, T. J.

Kelley, C. B.; Kaufman, A. C.; Kline, Alex.; Kitton, F.; Kilfoyle, C. A.

Lewis, F. S.; Lupka, Harry; Lamb, F. G.; Leith, L. L.; Ladd, H. W.; Lonergan, S. E.; Linder, W. H.

Moore, E. C.; Murphy, R. J.; Merly, W. C.; Murphy, R. F.; Messner, G. H.; Mombert, F. A.; Martin, R. F.; McCammon, T. A.; McGuire, J. F.; Morison, J.; Moody, H. A.; Murphy, C. H.; Marshall, Wm.; Moran, J. T.; Morehouse, H. W.; Mills, C.; Murray, W. A.; Mathews, W. H.; McAllister, W. A.; McLain, F. J.; McRobie, J.; McMahon, J. W.; McKisick, L.; McNeil, A. A.; Maxwell, J.

Nelson, J. C.; Nathan, J. F.; Nachman, A.; Nally, E. J.

Orr, W. F.; O'Brien, J. P.; O'Brien, M. J.; O'Leary, M. J.

Pearson, A. N.; Porch, W. S.; Pierce, M. E.; Price, J. D.; Perkins, P. J.; Potter, W. H.; Piccolo, J.

Quinn, W. J.

Reynolds, A. E.; Rafford, C. E.; Riley, J. J.; Rorty, M. C.; Roberts, H. E.; Rayens, M. W.; Reynolds, B. H.; Ryder, W. W.; Rhodes, F. L.; Robb, James; Reed, J. W.

Smith, T. J.; Sawyer, W. A.; Simmonds, J.; Schreiner, Geo.; Stainton, G. F.; Simons, Jay; Shay, L. J.; Saylor, A. G.; Spry, W. H.; Sullivan, P. J.; Sherwood, E. F.; Swayze, J. L.; Singleton, T. G.; Sackett, S. V.; Skelton, D.; Smith, N. E.; Selden, C.; Schram, W. D.; Shriner, E. H.

Taltavall, T. R.; Taff, H. F.; Tierney, P. J.; Tilghman, C. R.; Thurber, H. F.; Terry, A. C.; Taylor, A. B.

Vanderbilt, L.; Vatter, W. L.; Veale, F. R.; Van Meter, J. L. R.; VanZandt, W. H.

Woodle, A.; Worthen, H. C.; Wesson, A. G.; Waterson, A. W.; Willever, J. C.; Webb, F. R.; Whitney, L. N.; Wardell, G. C.; Wallis, A. O.

Yorke. G. M.

Wireless Book for Boys.

The interest taken by boys in wireless telegraphy is so keen that a book on this subject has been brought out for their special benefit. The author is Mr. A. Hyatt Verrill, who is a well-known writer of juvenile books, and he has produced an excellent work on wireless and one that will be appreciated by practical wireless operators, as well as by boys, on acount of the specific information it contains.

The book is divided into three main parts, Part I being devoted to "The Why and How of Wireless," Part II to "How to Build and Use Wireless Apparatus," and Part III to "Wireless Telephony."

The book is written in simple language, and is very instructive, the numerous illustrations being a great aid in the understanding of the text matter. It tells why wireless works; describes the instruments and how to make them, and gives the laws regulating wireless operation and the international rules. It also goes thoroughly into the fundamental principles of wireless telephony, expressed in elementary language, so that the novice may clearly understand this apparently difficult subject.

A chapter about tools contains much valuable information, and will be as much appreciated by "grown-ups" as by boys.

The volume has 184 pages, and is liberally illustrated with clearly drawn diagrams, and with general views of stations, operating rooms, etc. It will form an excellent gift for boys who possess investigating minds, and who find a fascination in the "mysteries" of wireless.

The price of the book is $1.25 per copy. Orders will be received and filled by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

Vibroplex Patents.

Mr. J. E. Albright, New York, sole selling agent for the Vibroplex and Mecograph transmitting keys, has obtained an injunction against J. M. Dixon (Mt. Auburn Specialty Company), Cincinnati, Ohio, restraining Dixon from making and selling all kinds of telegraph keys or transmitters that in any manner infringe United States Patents No. 182,183 and No. 842,154. This injunction is in addition to those recently obtained by Mr. Albright in Chicago, restraining similar infringement by Max Levey (Atoz Electric Novelty Company), and in St. Louis, restraining Oliver M. Thomas (O. M. Thomas Electric Company). All who are now using sending machines purchased either from the parties named, or their agents, are daily liable to prosecution for contempt if they continue such use.

Mr. Albright states, however, that he has no desire to cause hardship to those who have unwittingly purchased infringing machines, and that if any of those who have made this mistake will take up the matter with him promptly, he will make arrangements that will relieve them from the danger of legal proceedings on terms that will be mutually satisfactory.

MUNICIPAL ELECTRICIANS.

MR. WILLIAM GELLATLY, who has been connected with the Gamewell Fire-Alarm Telegraph Company for the past eight years or more, and for the past four years as vice-president and general manager, has just been elected president of the company to succeed the late William H. Woolverton.

MR. LEONARD DAY, chief of the Bureau of Fire-Alarm Telegraph, New York, has resigned, and Mr. Putnam A. Bates, a well-known electrical engineer, has been appointed to the position.

MR. FRANK C. STOVER, formerly connected with the Gamewell Fire-Alarm Telegraph Company, has become identified with the Star Electric Company of Binghamton, N. Y., with headquarters at Chicago, Ill.

SALARY INCREASE.—The salary of the superintendent of fire alarm telegraph at St. Paul, Minn., has been advanced from $1,800 to $2,400 per annum. Mr. Stanley W. Manning is the superintendent.

CONVENTION OF MUNICIPAL ELECTRICIANS.—The nineteenth annual convention of the International Association of Municipal Electricians will be held in August or September next, the date and place to be named by the executive committee. As the time approaches for the meeting, interest is being renewed in the papers to be presented. Judging from the quality of the papers read at the recent conventions, there is no doubt that the next meeting will, in this respect, maintain the standing the Association has attained among technical societies. The officers are at work arranging the plans and programme, and they will soon have a definite announcement to make regarding the meeting. The officers of the Association are: John W. Kelly, jr., Camden, N. J., president; Dr. Charles P. Steinmetz, Schenectady, N. Y., R. J. Gaskill, Fort Wayne, Ind., E. D. Fitzgerald, Tampa, Fla., and Howard Joslyn, Seattle, Wash., first, second, third and fourth vice-presidents, respectively; Clarence R. George, Houston, Tex., secretary, and C. E. Diehl, Harrisburg, Pa., treasurer.

BUCKET SHOPS AND STOCK QUOTATIONS.—The New York Stock Exchange has submitted a new form of contract to the telegraph company officials by the terms of which it is hoped to prevent bucket-shops and poolrooms from receiving the quotations of the stock market.

Dance of Boston Telegraphers.

The first dancing party of the Western Union Chapter of the Telephone and Telegraph Society of New England was held at Paul Revere Hall, Boston, Mass., Tuesday, February 17, and was a decided success, both socially and financially.

The attendance numbered about 500, including operators and employes from the Boston main office and branches, and also the Metropolitan Boston district.

From 8 to 9 p. m. Hooley's orchestra rendered a very enjoyable concert, and promptly at 9 o'clock the first waltz was started, and from that hour until 1 a. m., dancing was continuous, with a short intermission for refreshments at 11 p. m.

The affair was voted by all of those attending as the largest gathering of telegraphers ever held in New England.

The floor was in charge of Mr. S. E. Fitzgibbon, who was assisted by Mr. G. T. Dee and Mr. W. G. Wetmore, with the following aides: Mr. John A. Molloy, chief; H. J. Coughlin, P. J. Molloy, E. J. O'Connor, Chas. Sala, J. J. Coughlin, J. J. Mullen, Walter M. Isles, T. A. Thorpe, A. C. Dunne, A. Stevenson, L. I. Frye, G. W. McMenimen, A. P. Tait, L. J. McLeod, J. E. Grinsell.

The success of the affair was due to the hard work of the following committee: F. W. Barth, chairman; S. E. Fitzgibbon, G. H. Bell, J. B. Rex, W. G. Wetmore, R. W. Hall, J. R. Hennessey, J. S. O'Brien, S. M. Tracey, G. F. Rose, C. J. Morris, W. A. Donovan, F. F. Ross, F. D. Carline, G. E. Manthorne, J. McCarthy, J. G. Powell, J. Camp, W. J. Irwin, and others.

The officers of the Chapter are: F. W. Barth, president; H. J. Flynn, vice-president; J. A. Molloy, secretary; T. Wright, treasurer.

MR. J. B. HAMMATT, of Peoria, Ill., writes: "I enjoy reading TELEGRAPH AND TELEPHONE AGE very much, notwithstanding I have been practically out of the telegraph business for over twenty years. It keeps me posted on what is going on among the dots and dashes in the fraternity with which I was identified from 1869 to 1893."

T. & T. L. I. A. ASSESSMENT.—Assessment 564 has been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of Thomas D. Lovell, at Boston, Mass.; John R. Hogan, at Toledo, Ohio; Solomon Ehrman, at San Francisco, Cal.; Mary F. Clift, at Minneapolis, Minn.; S. A. Coleman, at Brooklyn; N. Y.; Tudor Bidwell, at Salamanca, N. Y.; David A. Van Ham, at Dedham, Mass.

THE WESTON ELECTRICAL INSTRUMENT COMPANY, Waverly Park, Newark, N. J., is distributing a card showing a hand holding in the palm a Weston battery-testing voltmeter. The fact that it can be held in the palm of the hand gives an idea of its small size. It is a very neat and accurate instrument, and, as the company states, "fits the pocket and the pocketbook." Bulletin No. 8 describes the Weston portable and switchboard, miniature precision instruments.

LETTERS FROM OUR AGENTS.

CHICAGO.

The annual meeting of the Chicago Telegraphers' Aid Society was held on Sunday, February 8, and officers were elected as follows: J. F. Costello, president; Joseph Powers, vice-president; A. J. Fuller, secretary, and W. J. Crosby, treasurer.

PHILADELPHIA POSTAL.

Among the recent visitors at this office were Messrs. J. P. O'Donohue, division electrical engineer, and A. J. Eaves, of the electrical engineer's department, New York.

ST. LOUIS WESTERN UNION.

Agnes B. Drohan, wife of Mr. T. J. Drohan, district cable agent, this office, died at her residence in this city on February 7. For many years prior to her marriage Miss Hickey, which was her maiden name, had served the Western Union as operator and later as assistant time-keeper. She made many friends, and was much admired for her sympathetic and considerate nature.

James P. McClure, aged seventy-one years, an old-time telegrapher, died in this city February 17. He worked in this office for many years, and was retired on pension about two years ago. He was a military telegrapher during the Civil War.

Mr. Geo. A. Littell, night wire chief, has been appointed assistant wire chief vice Mr. Moore, promoted. Mr. O. R. Carson, assistant quadruplex chief, succeeds Mr. Little as night wire chief.

Mr. H. F. Musgrove, formerly printer department mechanic, is advanced to the quadruplex department as assistant quadruplex chief in place of Mr. Elmer E. Frey, who has been assigned to night duty at the switchboard.

Mr. W. J. Dill has been appointed to day duty, filling the position vacated by Mr. Carson, and Mr. D. R. Flotron takes Mr. Dill's former position as night quadruplex chief.

Telegraph and Telephone Age

No. 6. NEW YORK, MARCH 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

"Do It Electrically."

If only one person out of every three or four could be made to realize the practicability of doing much of his daily work electrically, with a consequent greater degree of satisfaction than by any other means, the demand for household and other electrical appliances would suddenly be so great that many orders could not be filled for months to come.

The only reason why household appliances are not more generally used is that electricity cannot be furnished in small quantities in suburban towns and isolated localities as cheaply as it could and would be if users thereof were sufficiently numerous. The price of electric energy is almost invariably lowered as soon as the demand for current increases sufficiently to assure the financial safety of the central plant. It is the initial cost of the plant and the cost of maintenance that prevent low prices at first; therefore, it is to the advantage of the public to not only reduce the cost of electricity and living, generally, by a more extensive use of it, but to determine whether they shall live economically and happily, or go on in the old unsatisfactory rut.

Fortunately, the public is waking up. Too many good things are now in the market to have escaped observation, and the present indications are that it will not be long before electricity will be on tap at reasonable prices along all the principal by-ways and in desirable localities. In the meantime, to hasten this event, it would be well for doubters to request advertisers of household electrical appliances to send pamphlets describing the operation and cost of the apparatus.

Very few persons realize the number of different electrical appliances that have been invented to do much of the disagreeable work daily performed by the housewife. Possibly, electric toasters, electric irons, coffee percolators, and one or two other devices are about all most people have ever heard of, yet in a recent contest one competitor was able to name 193 different electrical appliances in the market. The common mistake usually made by those giving electrical devices a trial lies in their still retaining the old appliances the electrical devices are intended to supersede. For example, where electric irons and percolators are being tried, the gas stove and chandeliers are usually kept in commission also. The result is that an additional bill is presented at the end of the month, with possibly no appreciable decrease in the amount of the gas bill. The proper way to have proceeded would have been to cut out the gas entirely and installed electric lamps for illumination, as well as such other appliances as may be desired, and thereby obtain electric energy at a reduced rate.

Electricity offers some advantages in the way of cooking utensils not obtainable by any other means; the electric grill for broiling meat, for example. In all other grills the fat drops into the fire and is wasted. In the electric grill it drops into a pan and is saved. It is stated that one well-known restaurant keeper, by substituting an electric for a coal grill, collects and sells enough fat each month to more than pay for all the electrical energy used in cooking. Not only that but twenty-five to forty per cent more cooking can be done with the electric grill than with the coal grill, and with equally satisfactory results.

It would be impracticable to describe in one article all the uses electricity could be put to in the way of economical household devices, yet even with such appliances as have already been invented and put in practical operation, there is every reason to believe that the homes of many in the next generation will be equipped somewhat as follows:

All parts of the house will be wired and equipped with convenient sockets for tapping the main supply of current wherever desired. Electric rugs or carpets, together with cooking, washing and ironing apparatus, will do away with the necessity of a furnace and coal bin in the cellar. There will be no coal bills; no ashes to carry out, or fires to build on a cold winter morning. Instead, the good wife, when she hears the first alarm from the electric clock, will simply touch a button in the "central" board at the head of the electrically heated or fan-

cooled bed, according to the season, and cut in the heat radiators, after which she may take another nap. The second alarm, an hour later, will signify that it is time to prepare breakfast. As the ham, eggs and coffee will have been placed in their respective cooking devices before retiring, all she will have to do will be to cut in "eggs" three minutes, "ham" ten minutes, "coffee" three, etc., while she dresses and routs out lucky John. On reaching the kitchen they will find breakfast already prepared and steaming hot, and the house nice and warm.

In case "hubby" or the children should develop a cramp or boil during the night an electric poultice in the form of a collar, or pad, as best fits the occasion, may be quickly applied. The torture and discomfort due to being smeared and blistered by mustard plasters will be a thing of the past.

In case Mrs. Newly-wed should fail in her first attempt at biscuit making "hubby" need not feel alarmed. Professor Bertholet, of Paris, has already devised a method by which he can artificially reproduce the processes of digestion on food. All "hubby" will have to do is to place the mistreated biscuits in a quartz receptacle and turn on the ultra-violet rays for a few minutes, after which they will be perfectly safe and sane. Thus, the first quarrel being avoided, they live happily ever afterwards.

About 8:30 or 9 o'clock John rises from the table, and after ordering his electric limousine, which has been charged on the premises, calls up his office by wireless telephone to ascertain whether the clerks are at work after a possible night devoted to the ever popular but fatiguing "tango." It will be impossible to fool the "boss" by dissembling, for the reason that by that time the selenium cell will have been so developed that "seeing by wire" will be not only possible, but practicable; hence, whoever answers the telephone and stands before it, will find his or her portrait reflected on a screen in front of the transmitter. Priests and ministers will thus find their sphere of usefulness very much curtailed, as sobriety, punctuality, and other uplifting traits of character will be developed by the more potent "boss," who will "do it electrically."

While the foregoing may seem somewhat fanciful to many readers, as a matter of fact a house so equipped would not be impossible even to-day, if one had the means to afford it. Yet, as previously stated, after the public has once learned of the practicability of "doing it by electricity" and begins to use more of it, the cost therefor will be within reach of all who are now able to pay the present prices for coal and gas, and probably less.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, March 10:

American Telephone and Telegraph Co.	121¼
Mackay Companies	84¾
Mackay Companies, preferred	70
Marconi Wireless Tel. Co. of Am.	5⅛
Western Union Telegraph Co.	63⅞

Telegraph and Telephone Patents.

ISSUED FEBRUARY 17.

1,087,127 and 1,087,128. Telephonic Receiver. To A Marr, Manchester, Eng.

1,087,549. Receiver for Wireless-Transmission Signals. To V. Poulsen, Copenhagen, Denmark.

1,087,704. Head Support for Telephone Receivers. To C. Adams-Randall, Boston, Mass.

ISSUED FEBRUARY 24.

1,088,270. Telephone System. To W. A. Fricke, Chicago, Ill.

1,088,283. Telephone. To P. L. Jensen and E. S. Pridham, Napa, Cal.

1,088,541. Automatic Exchange System for the Transmission of Intelligence. To F. S. Coulter, Livonia, Ind.

PERSONAL.

COLONEL A. B. CHANDLER is the subject of an interesting article in *The Brooklyn Eagle* of February 22. The story deals with Colonel Chandler's war experiences as a cipher operator and his relations with President Lincoln.

MR. G. M. MYERS, of Kansas City, Mo., an old-time telegrapher, now retired, and president of the Old Time Telegraphers and Historical Association this year, spent the month of February in the West Indies and Central America. He was in Caracas, Venezuela, February 15. He was accompanied by his wife and daughter.

MR. G. H. MORGAN, manager of the Melbourne, Australia, telephone exchange, and Mr. S. L. Monaghan, assistant manager of the Sydney, Australia, exchange, are on a trip of inspection to Great Britain and the Continent to study the latest developments in telegraphy and telephony. They will visit the United States for the same purpose.

MR. AGUSTIN SAL, inspector general of national telegraphs Argentine Republic, Buenos Aires, has arrived in New York from Europe, where he spent some time in Paris, Berlin and London, inspecting telegraph and telephone systems in those cities. He will remain in New York about ten days, after which he will go to Chicago and other Western cities, and then return to Buenos Aires, via Cuba, Panama and Lima, Peru.

MR. E. D. SLINGERLAND, formerly of the Western Union Telegraph Company at Seattle, Wash., but since last September in the Government service at Valladolid, Occ. Negros, P. I., in renewing his subscription for another year states that he is well pleased with the Philippine Islands. The climate is all that could be desired. His office is a repeater station and there are five operators besides Mrs. Slingerland, who is also in the service. Mrs. Slingerland is the only American woman in the town.

Skill to do comes of doing; knowledge comes by eyes always open and working hands; and there is no knowledge that is not power.—*Emerson.*

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. F. LEONARD, superintendent first district, has been appointed superintendent of the seventh district, in addition to his former position, vice Mr. E. B. Pillsbury, resigned. Mr. Leonard has moved his office to the ninth floor to the room formerly occupied by Mr. Pillsbury.

MR. E. B. PILLSBURY has resigned from the Postal Telegraph-Cable Company's service, and entered that of the Marconi Wireless Company in the capacity of assistant traffic manager, with headquarters in the Woolworth Building, New York.

MESSRS. D. MCNICOL AND A. J. EAVES, of the electrical engineer's office, were in Albany, N. Y., several days, in connection with the work of re-establishing service after the effects of the disastrous storm of March 1 and March 2. They had a portable quadruplex with them. Mr. D. H. Gage, jr., also of the engineer's office, was employed in performing similar duties at various points in New Jersey.

MANAGERS APPOINTED.—Managers have been recently appointed as follows: L. J. White, Dodge City, Kan., vice G. Harris, resigned; D. G. Kahrs, Atchison, Kan.; R. T. Benware, Auburn, Ind.

THE MACKAY TELEGRAPH AND CABLE COMPANY has moved into new quarters at Galveston, Tex.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

DIVIDEND.—A quarterly dividend of one per cent was declared at a meeting of the Board of Directors, March 11. Mr. Edwin G. Merrill was elected a director in place of Mr. Wm. H. Moore, and Mr. J. P. Morgan resigned as a director.

WESTERN UNION STOCK FOR EMPLOYES.—Official announcement has been made of the plan to enable employes of this company to purchase 2500 shares of the company's stock at 60, and 10,000 shares at 63. Employes may buy the stock in installments, making a preliminary payment of 25 per cent on the purchase price, and making monthly payments thereafter for a period of two years. The employes will have the privilege of buying stock to the amount of one-half their yearly salaries. To prevent speculation in the shares allotted to employes, the plan provides that none of the 12,000 shares allotted to them will be delivered before March 1, 1915. A preliminary announcement of the plan was made by vice-president Newcomb Carlton at the annual dinner of the Morse Electric Club on February 21, and referred to in the report of the dinner published in our issue dated March 1.

GENERAL ECKERT'S WILL BROKEN.—The will of the late General Thomas T. Eckert, former president of the Western Union Telegraph Company, was, on March 6, broken by the Appellate Division of the Supreme Court. By virtue of the decision the estate of General Eckert will be divided equally between his two sons, Thomas T. Eckert, jr., and Clendennin Eckert.

MR. WALTER L. JONES, auditor of the Postal Telegraph-Cable Company of Texas, has been appointed general manager, with headquarters at Dallas, Tex., to succeed Mr. S. M. English, resigned.

NEW MESSAGE BLANKS.—The Postal Telegraph-Cable Company of Texas has adopted a universal receiving blank of new design. Besides the title of the company there is little printed matter on the face of the blank, the usual conditions, etc., appearing on the back.

S. M. English, General Manager Gulf Division, Western Union Telegraph Company, Dallas, Tex.

Mr. Shirley M. English, president and general manager of the Postal Telegraph-Cable Company of Texas, Dallas, Tex., whose appointment as general manager of the Gulf Division of the Western Union Telegraph Company, with headquarters at Dallas, was announced in our issue dated March 1, is still a young man, as the world counts the years nowadays. He is a native of Alabama, having been born in Mobile.

Like most all successful telegraph officials and many other eminent business men, he began his career as a messenger, and advanced successively through various positions until now, when he has reached one of the most important titles in the company's service.

After his career as messenger he became, in the order named, manager of the Mobile Telephone

S. M. ENGLISH, DALLAS, TEX.

Exchange, secretary of the Mobile and Gulf Telegraph Company, superintendent of the Mobile city electric light plant, quadruplex chief of the Western Union Telegraph Company at New Orleans, La., chief operator of the Postal Telegraph-Cable Company at the same place, general manager and afterwards president and general manager of the Postal Telegraph-Cable Company of Texas, at Dallas, which position he occupied at the time of his appointment, on March 1, to his present post.

The able manner in which Mr. English has conducted the affairs of the Texas Postal Company naturally drew attention to the great order of abil-

ity possessed by him, and it was simply a question of time when a higher office would seek the man.

He is one of the ablest men in the telegraph business, and is a past-master in every department of it. He possesses the happy and valuable faculty of handling men successfully, and those who have worked for him have learned to love him and their work because of his stimulating and unselfish leadership.

Mr. English is receiving the congratulations of his many friends on his advancement to so important a position, knowing that he will, by his long training, fill it with honor and dignity and with satisfaction to his company.

THE CABLE.

JOHN GOTT, aged seventy-five years, engineer of the Commercial Cable Company, died at Brighton, England, on March 8. Mr. Gott was one of the pioneer submarine telegraph engineers and had been connected with the Commercial Cable Company since its organization.

CABLE OFFICE BURNED.—The cable office at Esmeraldas, Ecuador, was burned during the recent fighting at that place.

NEW ANGLO-DUTCH TELEPHONE CABLE.—A new cable is to be laid jointly by the British and Dutch Governments during this year, and will be the longest cable of its kind in the world, covering a stretch of seventy-nine nautical miles between Aldeburgh and Walcheren. It will be of the four-core coil-loaded type.

CUBA CABLES INTERRUPTED BY STORM.—The storm of March 1 and March 2 interrupted all cable communication between New York and Cuba, also with the Western Union land connection with the Key West cable. The New York and Havana cable became interrupted on March 1, and the interruption to the New York and Hayti cable was restored on March 8. The first through connection with Cuba, via Key West, was established at 9 p. m., Monday, March 2. During the interruption to the service the only route to Cuba was via Bermuda.

CANADIAN NOTES.

IN FAVOR OF CANADIAN PACIFIC TELEGRAPH.—On account of an error in a telegram, in which the quotation for apples was changed from $1.80 to $1.08, suit was brought against the Canadian Pacific Railway Telegraph Company in Hamilton, Ont., for damages. The judge found in favor of the company on the ground that the telegraph company cannot be held liable for errors, unless gross negligence is proved.

TELEPHONES IN CANADA.—According to the report of the comptroller of statistics in the railway department of Canada there are 1,075 private, co-operative or municipal telephone organizations in the Dominion. During the year 1913 seventeen new municipal services, 129 co-operative services, 175 joint stock services, and thirty-two partnership services were established. The total cost of the systems now in operation is placed at $69,214,971. The gross earnings were $14,877,278 for the year, or $32.13 per telephone, and the cost of operation was $11,175,689, or $24.10 per telephone. The ratio of telephones to inhabitants is 1 to 15.2.

GRAND TRUNK PACIFIC TELEGRAPH EXTENSIONS AND APPOINTMENTS.—The Grand Trunk Pacific Telegraph Company has opened an office at Calgary, Alta., thereby affording that city a competitive service. Telegraph lines of the company are being extended rapidly concurrently with track laying and a commercial telegraph service was recently inaugurated to Prince George, B. C., serving South Fort George and Fort George. It is expected that a through service, Winnipeg to Prince Rupert, will be established shortly. R. M. MacMillan, city manager at Regina, has been transferred to Calgary as city manager at that point; A. J. Hoag, night manager, Winnipeg, Man., has been appointed city manager at Regina, vice R. M. McMillan, transferred; S. H. Walters has been appointed night manager at Winnipeg, vice A. J. Hoag, transferred; D. C. Smith has been appointed night manager at Edmonton, vice C. W. Collicutt, resigned.

THE TELEPHONE.

Washington-Boston Underground Telephone Line Completed.

The construction of the underground telephone system between Washington, D. C., and Boston, Mass., was practically completed in the first week of March. The cable is laid in underground trenches the entire distance—452 miles. A new type of cable was devised for the work, but it is not used for the entire distance, however. The old type of cable is used on forty-seven per cent, and the new cable covers the remainder of the distance.

The cable carries seventy-four pairs of wires, which permit of ninety-nine talking circuits, including twenty-five phantom circuits.

Report of Chicago Telephone Company.

The annual report of president B. E. Sunny, of the Chicago Telephone Company, for the year 1913, shows that the total number of telephones connected to the company's exchanges at the close of the year was 430,812. Six years ago the number of telephones connected was less than half of the present number. The increase in the number of telephones in Chicago continues to be largely for the low-priced service. In 1913 the number of telephone stations increased 48,275. About $6,000,000 of new capital will be required in 1914 to care for new subscribers. The rapid growth not only means the addition of new plant, but also involves the replacement of existing plant, in some instances long before it has had a normal life. Mr. Sunny makes some interesting observations on this point, substantially as follows: "While the replacement has been, in the past, largely with reference to outside plant, the removal of poles and wires and the substitution of aerial or underground cables, and the substitution of larger cables for smaller ones, we are in a condition now where several exchanges in the city, including the land, buildings, switchboards and other equipment, must be abandoned. The salvage value of these exchanges will be small, but new and larger exchanges must be provided.

Not only are exchanges outgrown, but the wire center shifts. Exchanges located ten years ago, or even more recently, at what were then the wire centers of the districts to be served, are now found to be from half a mile to a mile, or more, from the present or prospective centers, owing to new telephones installed. Because of the heavy expense for conduits and cables, the necessity of having exchanges centrally situated will be readily appreciated. The exchanges of recent years have been constructed with reference to a continuing large growth. Larger parcels of ground have been bought, and buildings and switchboards provided in such manner that additions can be made readily and effectively." The 430,000 telephones of the company are used, on an average, seven times a day for outgoing calls. The gross earnings for 1913 were $16,274,602, compared with $14,538,399 in 1912. Other figures from the earnings statement for 1913 are as follows: Operation expenses, $6.620,413; current maintenance, $2,581,391; depreciation, $2,608,530; taxes, $858,300. Deducting the sum of these items leaves $3,605,968 as the net earnings for the year. From this was paid bond interest and 8 per cent dividends on $27,000,000 of capital stock.

TELEGRAPHY IN GERMANY.—The first telegraph underground cables were laid in Germany in 1876. Through the work of the telegraph experiment station of the Post Office Department, various improvements have been made, so that reliability of operation by the Hughes system has been made possible on lines up to 240 miles, and by the Morse system up to 300 miles. The present arrangement permits utilizing each cable conductor to an extent ten times that which was possible in 1888.

OBITUARY.

ALFRED E. HUGHES, aged fifty-eight years, a telegrapher formerly employed in New York, died in Chicago on February 26.

THOMAS FARLEY, aged fifty-six years, repeater chief for the Western Union Telegraph Company at Richmond, Va., died March 9. He was stricken with apoplexy while at church Sunday evening, March 8.

FRANK MCCARTY, aged sixty-seven years, an operator for the Postal Telegraph-Cable Company at Memphis, Tenn., died on February 4. He served as an operator in the Confederate service during the Civil War, and was, for many years, connected with the Western Union Telegraph Company in Memphis.

PROF. EDWIN J. HOUSTON, aged sixty-seven years, a well-known scientist, electrician, educator and author, died in Philadelphia March 1. Deceased was well known to telegraph and telephone people through his publications on those subjects, and was the co-inventor, with Prof. Elihu Thomson, of the Thomson-Houston system of electric arc lighting. For many years he filled the chair of natural philosophy and physical geography in the Central High School of Philadelphia, and was Emeritus Professor of Physics at the Franklin Institute.

Annual Meeting of Telegraph and Telephone Life Insurance Association.

The forty-seventh annual meeting of the Telegraph and Telephone Life Insurance Association was held at 195 Broadway, New York, in the afternoon of March 11, president Belvidere Brooks in the chair.

After the reading of the report of the committee on credentials, which showed 2,157 present or represented by proxy, the address of president Brooks was read.

President Brooks referred to the change of the name of the Association to Telegraph and Telephone Life Insurance Association in due legal form.

Regarding the growth in membership during the year he said:

"It was to be expected that the operation of the welfare work of the Western Union Telegraph Company and of the Bell Telephone System, would have had a marked effect on the number of new entrants, but not to the extent as shown, as it was believed that the sound family protection offered by the Association was better appreciated by the telegraph and telephone fraternity.

"It may be of interest," continued Mr. Brooks, "to note that during the past twelve years, the sum of $834,200 was paid the beneficiaries of deceased members, and that the reserve fund was increased more than 78 per cent, or from $193,213.82, to its present figure, $343,986.73; the ratio of reserve funds held to contingent mortuary liabilities rising from 3.92, at the close of 1892, to 7.03, in 1913.

"Of the 100 deaths reported in the full grade, seventy were of members admitted prior to the graded rates adopted on January 1, 1887, and forty-one were members who, if their assessments had been paid for according to age at entry, at these rates, would have each contributed a much larger amount to the mortuary fund, and thus considerably augmented your present assets.

"As this rate inequality in your membership is thus rapidly passing away, it will be seen that, in the near future, the entire membership will be paying assessments in equal graded rates, to the marked betterment of your revenue. Should a substantial increase of membership be made in the same period, a decrease in the number of assessments required to be annually levied may be confidently expected.

"The future of the Association is, therefore, full of bright hope and promise, and I cannot do better than to again urge every individual member to interest every eligible person in the merits and advantages of membership to the end that the good work that has been and is now being done by the Association may be continued to a late generation.

"In retiring from the presidency of the Association," said Mr. Brooks in conclusion, "I tender my thanks to the officers, members of the executive, auditing committee and agents for their efficient services during the past twelve years, and bespeak from them the same cordial support to my successor as has been accorded to me."

The reports of the secretary, the treasurer and the

auditing committee were then read. They showed that the Association had, on December 31 last, 4,481 members in full grade, carrying $1,000 insurance, and 823 members in half grade, $500 insurance, and that assets were held amounting to $359,186.24 par value over all liabilities.

The election of officers resulted as follows: William H. Baker, president; Charles P. Bruch, first vice-president; S. S. Garwood, second vice-president; A. R. Brewer, treasurer; M. J. O'Leary, secretary; S. H. Marriott and T. E. Fleming, members of the executive committee to serve three years.

Advisory Board: B. E. Sunny, Chicago, Ill.; H. J. Pettengill, St. Louis, Mo.; W. T. Gentry, Atlanta, Ga.; A. L. Salt, New York; H. C. Worthen, Atlanta, Ga.; G. H. Usher, Atlanta, Ga.; C. H. Gaunt, San Francisco, Cal.; J. G. Blake, San Francisco, Cal.; H. D. Reynolds, Buffalo, N. Y.

Auditing committee: C. E. Bagley, Philadelphia, Pa.; W. J. Dealy and R. J. Murphy, New York.

Those present were:

Baltimore, Md.—J. W. McLean.

Boston, Mass.—P. J. Farrell.

Buffalo, N. Y.—H. D. Reynolds.

Jacksonville, Fla.—M. S. Lanier.

New York.—W. H. Baker, B. Brooks, A. R. Brewer, A. G. Saylor, E. J. Nally, E. M. Mulford, W. N. Fashbaugh, M. M. Davis, L. Lemon, C. F. Leonard, Garden Irving, L. Dresdner, J. A. Dierks, A. C. Kaufman, P. J. Tierney, M. W. Rayens, C. R. Tilghman, W. L. Ives, G. W. Fleming, J. Costelloe, T. E. Fleming, B. Bernstein, W. C. Merly, W. H. Mathews, J. P. O'Donohue, W. B. Dunn, T. R. Taltavall, W. J. Quinn, J. P. Carroll, T. G. Singleton, W. J. Austin, J. R. Beard, W. A. Sawyer, J. F. Nathan, A. O. Wallis, C. P. Bruch, S. S. Garwood, M. J. O'Leary, T. M. Brennan, F. O. Ryan, F. E. Coyle, J. W. English, H. W. Dealy, G. Roehm, J. F. McQuire, F. X. O'Connor, J. C. Nelson.

Providence, R. I.—G. H. Mills.

Richmond, Va.—A. Watkins.

In the evening the delegates were entertained at a dinner at the Fifth Avenue Restaurant, Fifth avenue and Twenty-third street, New York, at which there was a large attendance, including prominent officials of the Western Union and Postal Telegraph-Cable Companies and the Marconi Wireless Telegraph Company. In this respect it was notable, being the first time in several years that the officials of both telegraph companies broke bread together at a telegraph dinner.

Owing to the recent storms which affected the telegraph service, several of the delegates were unable to be present, owing to wire conditions. Letters of regret were read from several gentlemen, including Colonel A. B. Chandler, W. C. Humstone, Edward Reynolds, vice-president and general manager of the Postal Telegraph-Cable Company; Charles Smith, Louisville, Ky.; Harry McKeldin, Washington, D. C., and F. J. Loesch, Chicago.

After the dinner, president W. H. Baker introduced Mr. Newcomb Carlton, vice-president of the Western Union Telegraph Company, who made a few pleasing and interesting remarks. He expressed his pleasure in being present. This Association, he said, as well as all other associations that had for their object the betterment of humanity, had his hearty support, and he expressed his ideals of the men who not alone did for themselves, but, while doing so, were always mindful of the best interests, material and moral, of those with whom they worked. He had no sympathy with the cold-blooded, worldly man of business.

Addresses were made by Mr. C. P. Bruch, first vice-president, who spoke on the duties and responsibilities of the membership; Mr. S. S. Garwood, second vice-president, on the beneficiary side of the work, and Mr. M. J. O'Leary, secretary, on behalf of the executive committee. Mr. O'Leary presented historical facts of interest.

All of the New York telegraph societies were represented, as follows: Mr. Gardner Irving, president of the Gold and Stock Life Insurance Association; Mr. A. G. Saylor, president of the Serial Building Loan and Savings Institution; Mr. C. F. Leonard, president of the Magnetic Club; Mr. A. M. Lewis, president of the New York Telegraphers' Aid Society, and the secretaries of each of the Associations.

The addresses were followed by an excellent vaudeville programme.

The dinner and entertainment were admirably arranged and carried out, and much credit is due to Mr. T. E. Fleming for the able manner in which he performed the arduous task.

Those in attendance were:

Baltimore, Md.—J. W. McLean.

Boston, Mass.—P. J. Farrell.

Buenos Aires, Argentina.—A. Sal.

Buffalo, N. Y.—H. D. Reynolds.

Jacksonville, Fla.—M. S. Lanier.

Jersey City, N. J.—A. C. Ackerman.

New York.—C. C. Adams, W. J. Austin, W. H. Baker, C. A. Bauer, L. D. Beall, J. R. Beard, J. W. Behre, B. Bernstein, J. A. Berry, Geo. Bosch, T. M. Brennan, A. R. Brewer, B. Brooks, M. J. Brooks, C. P. Bruch, W. H. Bush, N. Carlton, J. P. Carroll, P. J. Casey, J. W. Connolly, J. Costelloe, F. E. Coyle, M. M. Davis, H. W. Dealy, F. N. Dowler, J. A. Dierks, L. Dresdner, W. B. Dunn, W. N. Fashbaugh, G. W. Fleming, T. E. Fleming, S. B. Haig, M. Heim, J. E. Houlehan, Gardner Irving, C. Jacobson, A. C. Kaufman, C. A. Kilfoyle, Frank Kitton, H. S. Latimar, L. Lemon, C. F. Leonard, A. M. Lewis, T. L. Mahan, M. J. Mallahan, H. T. Marks, R. J. Marrin, S. H. Marriott, W. H. Mathews, Wm. Maver, jr., W. C. Merly, E. M. Mulford, E. J. Nally, J. F. Nathan, J. P. O'Donohue, M. J. O'Leary, J. M. Phelan, W. J. Quinn, M. W. Rayens, C. F. Rorke, A. G. Saylor, E. B. Saylor, W. A. Sawyer, T. G. Singleton, B. P. Stevens, T. R. Taltavall, P. J. Tierney, C. R. Tilghman, E. P. Tully, A. P. Velie, A. O. Wallis.

Philadelphia, Pa.—S. S. Garwood, G. W. Miller.

Providence, R. I.—G. H. Mills.

Plainfield, N. J.—W. H. Bush.

Richmond, Va.—A. Watkins.

Stamford, Conn.—C. A. Tinker.

Full Use of Wires.

In our issue dated March 1 we printed replies from several railway telegraph superintendents in answer to a letter sent to them by us, asking to what extent they were employing the various improved methods of increasing the utility of wires.

This information is valuable to all railway telegraph superintendents, in that each is learning what superintendents on other roads are doing. It is information that, in the ordinary course, does not come to the surface, but which is of the highest importance to railway operation. Its importance was emphasized by the results of the heavy wind and snow storm of March 1 and 2, which paralyzed the operation of all the railroads running into New York, because of the prostration of their wires.

Mr. G. A. Cellar, of the Pennsylvania Lines West of Pittsburgh, in his communication published in our March 1 issue, stated that "in these days of heavily increased expenses, it is necessary to make use of all such processes as will save the railroad company anything in the way of construction, maintenance or operating cost." This is really the keynote of the situation. It means fewer wires on poles and stronger construction.

Following are other replies, which will be read with much interest, showing, as they do, that the various methods of getting all of the use possible from wires are being adapted to special needs:

Mr. W. P. Cline, of the Atlantic Coast Line, Wilmington, N. C., writes: "The demands of our service have not yet required us to build up any unusual circuits. We work our iron telegraph circuits either duplex or quadruplex. For several years we have operated, more or less successfully, railway composite telephone circuits on iron telegraph wires, either grounded or metallic circuit, between stations 110 and 124 miles apart, respectively, the telegraph wires working as single Morse circuits, with no intermediate stations.

On copper wires, which we have strung for telephone train dispatching service, we get satisfactory simplex telegraph circuits worked as single Morse circuits.

Where we have four parallel copper wires making up one telephone circuit for train dispatching and another for message work, we operate very successfully a phantom telephone circuit and also simplex the phantom and operate it as a single Morse circuit.

Mr. W. S. Melton, Queen & Crescent Route, Danville, Ky.: "At the present time we are not using any of our wires in simplex or duplex, but expect to in the near future."

Mr. N. E. Smith, New York, New Haven and Hartford, New Haven, Conn.: "There has not, as yet, been a demand on this road for duplex, quadruplex, or any other systems of telegraphy, excepting that of the ordinary kind.

"We have a few railway composite telephone circuits and several telephone phantom circuits. As soon as there is a demand we intend to simplex some of our telephone lines."

Mr. E. C. Keenan, general superintendent of telegraph, New York Central Lines, Chicago, writes: "On the New York Central Lines West of Buffalo, we are getting the full and proper use of all wires, using the duplex, quadruplex and automatic printing telegraph. Our wires are composited and simplexed. For instance, when the new dispatchers and message telephone circuits are put up, each pair is simplexed for Morse, and these simplexes are then duplexed and quadruplexed. Also between the dispatchers' telephone and the message telephone circuit, each of which have about thirty drops, we get, in addition to the superimposed Morse, a phantom telephone circuit."

Mr. J. F. Caskey, of the Lehigh Valley, South Bethlehem, Pa., writes: "On the Lehigh Valley Railroad, where we own and maintain our entire telegraph system, we have the following service, in addition to our straight wires: "One standard quadruplex, New York to Bethlehem, 89 miles; one standard quadruplex, Bethlehem to Sayre, 182 miles; one standard quadruplex, Bethlehem to Buffalo, 357 miles.

"The wires used on these quadruplex circuits are No. 12 B. W. G. hard-drawn copper, and are not used for other purposes. At night they are used as straight Morse wires, as the quadruplex is not needed after the busy hours of the day.

"The only simplex circuit that we have is on a telephone line between Bethlehem and Easton, a distance of twelve miles, where the volume of business is very heavy.

"We do not have any duplex apparatus in service, as our quadruplex circuits cover the congested portions of the road and are ample for our purposes.

"Between Bethlehem and Jersey City we have a pair of No. 12 B. W. G. hard-drawn copper, transposed every mile, which is properly equipped with composite apparatus, so that we get one straight telephone trunk line between our private branch exchanges at these points, and, in addition, two straight Morse telegraph wires, which are in constant use.

"We have the same arrangement between Bethlehem and Packerton, one side of the telephone pair extending to Wilkes-Barre, a distance of eighty-eight miles.

"So far we have not installed any printing telegraph systems. We may, however, do something along this line later. As far as our road is concerned we have ample telegraph facilities, a large portion of the wires, however, being composed of iron, preclude the possibility of very successful simultaneous work.

"We have three small phantom telephone circuits in service at different points, where, by the use of two pair of telephone wires, we obtain three talking circuits."

Mr. W. F. Williams, Seaboard Air Line, Portsmouth, Va., writes: "This system provides telegraphic facilities for each division, as follows: A telephone dispatching circuit, simplexed for terminal to terminal operation, two local telegraph circuits and a through circuit to the general offices. The general telegraph office at Portsmouth operates duplex circuits to Jacksonville, Fla., Atlanta

and Savannah, Ga., in addition to several local circuits. Besides these we have the necessary coils and equipment on hand to simplex our telephone circuits from Portsmouth through to Jacksonville, Fla., to be operated as a duplex telegraph circuit. We are also negotiating for printers to be operated duplexed on our long circuits. The Seaboard is fortunate in having ample telegraphic facilities to handle its business currently at this time. If demand upon our present facilities be exceeded, we will quadruplex our duplexes to meet it. I might add that we now have in operation 1,700 miles of telephone dispatching circuits and 300 miles of telephone blocking circuits, which greatly relieves former wire congestion. Our budget provides for 400 miles additional telephone dispatching circuits this spring, and we hope to equip the whole system within the next two years."

Mr. E. A. Chenery, Missouri Pacific, St. Louis, Mo.: "We work both iron and copper telegraph wires quadruplex between important offices, and all but one of our train dispatching telephone circuits are simplexed. The one that is not simplexed is in a district where additional telegraph facilities are not required at present. When occasion arises, we use duplexes and quadruplex on simplexed dispatching circuits.

"We have composited telephone circuits between St. Louis and Little Rock and between St. Louis and Kansas City, distances of 345 and 283 miles, respectively. These circuits are composed of a pair of No. 9 B. & S. copper wires, transposed. Two duplex circuits are obtained from each pair. Intermediate telephone drops are also connected to them at intermediate division headquarters. They are connected into the private branch exchanges at St. Louis, Kansas City and Little Rock.

"We also utilize two iron wires for a station-to-station telephone blocking circuit. These circuits are simplexed for single Morse working, with telegraph instruments cut in at all way stations. They are not transposed.

"A considerable number of grounded composite telephone circuits are in use on short circuits, but their use is not encouraged where inductive disturbances on important dispatching or long-distance circuits might be caused by the 'howler' signaling apparatus.

"No printing telegraph system is in use on this railroad."

Mr. B. F. Frobes, Oregon Short Line, Salt Lake City, Utah: We have at our general telegraph office at Salt Lake two quadruplexes with our principal division office at Pocatello, Idaho. These circuits are equipped at each end with half-set repeaters for connection to Morse wires by means of which we are enabled to reach all main line circuits and all of our important branch circuits direct. In addition, we have two duplexes direct with Omaha, Neb., one with Portland, Ore., and one with Los Angeles, Cal., which are in service for through business. The two local quadruplexes enable us to make many combinations which we find are convenient in case of circuit trouble."

Mr. William Bennett, Chicago and North Western, Chicago: "So far this company has but one circuit used for train dispatching on each of the divisions where it has long-distance telephone service. It is operating a simplex telegraph between Chicago and Baraboo, Wis., which is placed upon two train dispatchers' telephone circuits upon adjoining divisions; one division is from Chicago to Janesville, Wis., and the other from Janesville to Baraboo, Wis. The simplex circuit is connected at Baraboo with an ordinary through telegraph circuit from Baraboo, Wis., to Winona, Minn., which is frequently worked to Huron, S. D., with repeater at Winona. The length of the simplex circuit is 167 miles.

"We are also operating an ordinary telegraph circuit, Chicago to West Chicago; thence simplex via Nelson to South Pekin, Ill. This is placed (between West Chicago and Nelson) on a dispatching telephone circuit extending from Chicago to Clinton, Iowa, and another from Nelson to South Pekin. The length of the simplex circuit is 168 miles."

Mr. W. H. Hall, Missouri, Kansas & Texas Lines, Denison, Tex.: "The Missouri, Kansas and Texas road has about 1,700 miles of train dispatching telephone circuits. We have all of these circuits simplexed and on some of them we are using a polar duplex. We also have some of our No. 8-gauge iron wires transposed, and are getting composite telephone circuits for a distance of 106 miles on such wires. We have not yet phantomed any of our circuits, but will, in about thirty days, phantom four copper wires between Denison, Tex., and Parsons, Kan., a distance of about 275 miles. All of our simplex and composite circuits are very satisfactory and are considered quite an addition to our equipment."

Mr. L. A. Lee, Pittsburgh & Lake Erie, Pittsburgh, Pa.: "Over a year and a half ago the Pittsburgh and Lake Erie substituted the telephone for the telegraph in the dispatching of trains, retaining the Morse for local and through message service.

"No telephone message circuits have been installed, as the through telegraphing is taken care of over simplexed telephone circuits, and the local telegraphing is being rapidly superseded by the more satisfactory development of private branch exchange service, making direct communication available.

"Telephone train dispatching has proven to be an unqualified success, and the circuits are simplexed where the service is needed. Several long distance and private branch exchange trunk lines are phantomed and simplexed for single and duplex telegraph service when needed. Shorter trunk and tie lines are simplexed for the transmitting of hourly time signals by telegraph."

Mr. W. C. Walstrum, Norfolk & Western, Roanoke, Va.: "We simplex our through telephone circuit from Roanoke, Va., to Portsmouth, Ohio, and we have two composite telephone circuits on iron wires. We have not gone further into the matter for the reason that our facilities are ample for the present.

(To be Continued.)

Telegraph and Telephone Age

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

NEW YORK, MARCH 16, 1914.

Utility of Wires.

It would be highly interesting to know how much the world is gaining by the prevalent and growing practice of making the most of available facilities. In our issue dated March 1 we published statements from several railway telegraph superintendents regarding the extent of use to which they put their wires, and, in this issue, other contributions on the same subject are given.

The possibility of obtaining from two telephone circuits three telephone conversations and eight telegraph messages, simultaneously, without interference with each other, is a fascinating thought indeed, and it is not only beautiful in theory but is practicable as well. Without going into details as to how this is accomplished, it is sufficient to say that the commercial telegraph companies, telephone companies and railway companies enlarge their facilities by superimposing, "phantoming" and multiplexing their existing circuits in ways modified to suit their special needs.

The importance of getting all the use possible out of wires cannot be overestimated. Existing pole lines are now overloaded, and it seems as if the limit had been reached. Hence, to paraphrase a familiar expression, the necessity of making three or more wires grow where only two existed before. The extra facilities thus obtained, however, are not all physical realities but so-called "phantoms." This is a case where a "phantom" is put to good and practical use, notwithstanding the popular idea of apparitions.

The telegraph companies find it imperative to get more work out of their wires because of plant limitations, and, as a consequence, they are testing and introducing high-speed machine systems with that object in view. The recent blizzard in the vicinity of New York destroyed much telegraph property, the damage being attributable largely to the overloaded condition of the poles. Fewer wires and the use of high-speed systems of transmission would seem to be a partial solution of the problem that confronts the companies.

Not only are the American companies interested in these matters, but in England and other countries the same conditions prevail. The English post-office engineers are giving much attention to increasing the carrying capacity of existing telegraph and telephone lines by every possible means. The Baudot sextuplex duplexed, giving twelve circuits from one wire, has been introduced between London and Birmingham, and advantage is also taken of the trunk, or long distance, telephone wires by superimposing, in order to increase their utilization factor. It is stated that recent experiments have been made with a superimposed Wheatstone circuit, working at a speed of 150 words per minute, without any observable interference with the telephone service.

Universal Telegraph Alphabet.

Analyzing the objections that have been put forward against the change of a few of the characters of the American Morse telegraph alphabet, in order to harmonize it with its modification as used on the continent, we find that there are only two, and these are based on sentiment and speed. Taking a rational view of the proposition, neither one of these objections is entitled to serious consideration. While we believe that sentiment is all right in its proper place, it has little standing in modern business, and it is being, of necessity, brushed aside in the progress of the world.

In our cities and towns there are many buildings with historic associations, that we are loathe, for that reason, to see disappear before the onrush of business necessity. If they were allowed to stand on account of the sentiment attached to them, business progress would, to that extent, stagnate.

As regards the matter of speed, we have another subject to deal with, which should be looked at squarely in front; and the question should be asked: "Do the telegraph companies seriously regard speed as the all-important consideration?" Just at this time "safety first" is an idea uppermost in the minds of business leaders and the first consideration in the practice of railway and other public service utilities. There is an old saying to the effect that the greater the haste the less the speed. This, of course, is subject to some modification, according to circumstances, but in telegraphy everyone knows, or should know, that deliberate and continuous action accomplishes a great deal more than do high-speed spasms. There are, it is true, many operators gifted with the ability to do efficient work at high speed, but the standard is not set by them; the average sets the standard.

When a company hires an operator and places him in the first rank, it is because he works efficiently; he is not required to send fifty or sixty

words a minute, nor is he asked to do so in order to receive his standing. The company gives first consideration to freedom from errors—accuracy, in other words. High speed work, of course, is given due consideration, but it is not the question of first importance.

Errors in telegrams due to the spaced letters of American Morse alphabet are numberless, and it is universally acknowledged that these letters do cause errors. Now, if we remove the cause, the effects will disappear. It is not claimed, however, that all errors are due to this cause; but a great many of them are.

Despite all the precautions against making errors mistakes will occur, but that is no reason why every effort should not be made to prevent them.

The speed objection has, in reality, no standing; "accuracy first" is the desideratum. The question of speed should not be given too much weight in the discussion of the point at issue. The object sought is to unify the telegraph alphabets of the world. This result will alone reduce the errors in international correspondence very materially, and the telegraphic family of the world would be one in telegraphic language.

Commission on Industrial Relations.

Public hearings in important industrial centers, from New York to San Francisco, will be held during the spring and early summer by the United States Commission on Industrial Relations.

Some of the subjects to be inquired into in each city are irregularity of employment; possibilities of ending irregularity and increasing production through scientific management; the activities of trades unions and employers' associations; and the extent and operation of governmental machinery for regulating the conditions of industry, including the relations between employers and employes.

Successful methods of maintaining harmonious relations beneficial to both employers and employes will be inquired into particularly, with a view to their adoption in other centers where no such methods have been tried.

Postal Telegraph-Cable Company's Adjustable Condenser.

BY J. F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

I read with interest Mr. Paul Thompson's criticism in your February 16 issue of my article on condensers, published in TELEGRAPH AND TELEPHONE AGE, February 1, and can assure Mr. Thompson that there was no intent to mislead anyone.

My article describes mechanical improvements in the structure of an adjustable condenser and indicates the value of these improvements. It was stated that in designing the new instrument rolled type units were utilized to gain the advantages of economy, reduced size and sectional unit construction; that the units were of low cost and in the event of a breakdown could be replaced locally in a few moments' time; that the new condenser does away with the need of returning condensers for repair and reduces the first cost of transportation; that many shipments of defective condensers back and forth are avoided and that the cost of repairing leaky or burned-out condensers of the plate type is so high that such repairs are seldom worth while.

There is nothing, so far as I can see, in these statements that is misleading in any way. No comparison is made of the relative electrical merits of plate condensers or rolled condensers. The fact that provision is made to employ the unit system in condenser construction so that replacements may be made readily when necessary neither proves nor implies that the units employed will fail frequently. As a matter of fact, experience with several thousand units of the type described shows that the failures are no more frequent than in a corresponding number of plate type condensers used for the same purposes.

To my mind sectional unit construction should be employed in the manufacture of all equipment wherever it is practicable to use it to advantage; that is to say, other things being equal, and the cost the same. A design comprising sectional units which may be replaced at will is a better design than a complete structure that cannot be readily separated into units.

The argument that sectional unit construction is unnecessary, or undesirable, because the equipment will never fail does not appeal to me as a sound one, particularly when the cost of sectional unit construction is no greater than that of non-sectional construction. "Never" is a long time, and when building for permanency I know from experience that sectional construction pays.

I do not know what make of condensers Mr. Thompson refers to as having been in use by telegraph companies over thirty years without a single failure, and this statement, by itself, means little, because it does not give the conditions of operation where such condensers were used nor the quantities involved. I have little doubt that a similar statement could be truthfully made of some of the first rolled condensers produced, and this is not a conclusive argument either for or against the use of either type of condenser. We have in service many hundred condensers of the plate type. Some of these have been in use thirty years, or more, and some of them undoubtedly were none too good when they were put in use. Inspection of returned equipment and of records shows that condensers of every make purchased come back at times, burned out. High-tension power and lighting in some sections of the country appear to be no respecters of either good or bad condensers, whether of Marshall, Foote Pierson, Siemens Halske, Kellogg, Western Electric, or other make.

If there are plate condensers made costing practically the same as rolled condensers and of practically the same size and with better guarantees as to life and efficiency than the rolled type, as is stated by Mr. Thompson, the manufacturers of such condensers have not, so far, brought them to our attention. We are not wedded to any make or type of equipment, but like our friends from Missouri, we like "to be shown."

Course of Instruction in the Elements of Technical Telegraphy—LIX.

(Continued from page 133, March 1.)

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per copy.]

QUESTION PAPER.

(1) In a polar duplex, explain why the reversal of battery at the home station does not affect the home relay.

(2) Explain how, in a polar duplex, the home relay responds to the distant pole-changer reversals.

(3-*a*) Let Figs. 68 and 69 represent the relays on a duplex circuit working between two stations, A and B. With both pole-changers closed, A has a positive current to line and B a negative current. How would the relays be affected if an intermediate test office cut in on a single set and worked his key?

(*b*) With the keys at A and B closed, would the signals from the intermediate office be intelligible at either or both stations?

(*c*) Would they be intelligible with the keys at A and B open?

(*d*) A is sending, B has his key closed; if the intermediate office cut in, could he read A?

(*e*) If B had his key open, could the intermediate office read A?

(4) Show by a diagram how you would join up a pole-changer for duplex working.

(5-*a*) How would you obtain a resistance balance on a polar duplex?

(*b*) A static balance?

(6) Explain briefly the principle on which the quadruplex is worked?

(7) What part of the quadruplex battery does the pole-changer control?

(8) Is the long end open, or closed, with the transmitter open?

(9) The distant transmitter is closed; why does not the home neutral relay respond to the distant pole-changer reversals?

(10-*a*) Why does the working of the home key not affect the home polar relay?

(*b*) The home neutral relay?

(11) The home polar relay being open, the distant station closes his No. 2 key. How is the home polar relay armature affected?

(12) Why is a repeating sounder used in connection with the neutral relay?

(13) What is the function of a Smith condenser arrangement?

(14) Why is it necessary to have the resistances R and R¹ (Fig. 75) in circuit?

(15) Why does the condenser not receive a charge from the outgoing currents?

(16) Explain how the Postal neutral relay bridges over the moments of no magnetism?

(17) The home neutral relay does not respond to the distant transmitter. What would you do?

(18) How would you test the outgoing currents from the home pole-changer?

Relay and Circuit Relationship.

In circuits equipped with 150-ohm relays, the minimum power applied should be one gravity cell to every forty ohms resistance in the circuit, but should the circuit be overloaded with relays, a corresponding increase in e. m. f. should be allowed to offset the self-induction of the circuit, which, of course, increases with each additional coil. Where low resistance relays are used, or relays which have had their resistance decreased by multiple connections, an e. m. f. sufficient to generate a current of at least forty milli-amperes in the circuit, should be used.

As regards the advantages to be derived from connecting the coils of line relays in parallel, and thereby reducing the resistance of the circuit at the expense of the relay ampere-turns, we quote from a well-known authority as follows:

"Ampere-turns are what we must rely upon to secure magnetizing power. We must, in any case, to have good results, have a liberal allowance of ampere-turns.

"We cannot have a sufficiency of ampere-turns if we undertake to reduce the resistance of relays, by simply giving them a straight or series low-resistance winding, because the magnetizing power of the average telegraphic circuit current is never too great, and we lose in magnetic strength more than we gain in the main current by the resistance reduction.

"Resistance of itself has no special significance. If we could have a relay of sufficient number of ampere-turns, it would be all the better if it were totally without resistance, but a specified resistance is a measure of a given winding, because the resistance of a wire is proportionate to its length.

"It is bad practice to connect up a great number of relays in a single circuit.

(To be Continued.)

[NOTE.—Fig. 74 used in the installment of this article, published in our January 1 issue, and Fig. 77, in the March 1 issue, were originally reproduced from Maver's "American Telegraphy."]

Looking Backward Sixty Years.

BY GERRIT SMITH.

(Concluded from page 143, March 1.)

Duplexing the Phelps' combination printing telegraph embodied the quadruplex principle, and led to my making an improvement in the quadruplex, as used on the Morse lines, for which I was granted a patent on February 3, 1877. This improvement consisted, chiefly, of the introduction of a double-acting relay, placed at the receiving station, and composed of an electromagnet which acts upon a single armature capable of being placed, by the action of the electromagnet, in four different positions, corresponding to the four possible positions of the two keys at the sending station. By means of suitably arranged contact levers, two independent local circuits are brought into action by the same armature in its different positions, which circuits, in turn, actuate two independent sounders. With the adoption of my invention, the troubles that had baffled us on long circuits began to depart, and results of a most satisfactory character were achieved all over the Western Union system. One example will suffice: On February 7, 1877, a test was made between New York and Chicago, via Pittsburgh, a distance of 913 miles, and the simultaneous reception of two communications, going in the same direction, was accomplished at the rate of thirty words per minute on each of the respective sounders. Naturally, a great deal was printed both here and in Europe about the improved quadruplex, and from viewing the original invention askance, our British cousins, in particular, began to "sit up and take notice," as the Scotch say. Messrs. Preece and Fischer, of the English post-office, made a special visit to the United States in the summer of 1877, and were so favorably impressed by the quadruplex in its latest developments that they asked to have it tested on the wires of their government. Their request was complied with, and, accompanied by my old and dear friend, Mr. George A. Hamilton, I sailed by the Cunard steamer "Algeria," on Wednesday, September 5, to set up and exhibit the quadruplex apparatus in practical operation on the British lines. A number of our telegraphic friends were at the steamer to see us off, wish us a pleasant voyage and success on our mission.

On our arrival in England, Mr. Hamilton took charge of the Liverpool terminal and I remained in London. Considerable doubt was expressed about the success of the system upon the government lines. Mr. Preece thought failure would come at once with the first appearance of a London fog. After a few days' service and several talks with Mr. Hamilton at Liverpool, we laid our plans to grapple with the much talked about bugbear. Indeed, as the days passed, we became quite impatient for the arrival of the first storm since our arrival in England. It finally came, in full force, and extended over the length of the entire line from London to Liverpool. The normal resistance balance on the wire furnished to us was a trifle more than 3,000 ohms. On this stormy morning we began with a variable resistance balance of 1,800 ohms. At 10 a. m. the following communication was sent down to Mr. Preece: "All Liverpool duplex circuits have failed. Quadruplex working to full capacity on four sides." In a few minutes Mr. Preece came up, with a sufficient number of persons, to form a complete circle around the table at which four operators were working with Liverpool. Sir William Thomson (afterward Lord Kelvin) was one of those who witnessed our triumph. This test settled the question of the success of the quadruplex on the wires of the British Government. Our mission crowned with success, our trip was surely one of great pleasure to Mr. Hamilton and me.

After a short experience the operators handled the instruments with perfect ease, and we were enabled to make a week's visit to Paris before starting for home, an experience that we enjoyed to the fullest extent. Our home coming, in December, was an event never to be forgotten. The meeting down the bay with the Western Union cable steamer, and the cordial reception tendered to us will remain one of the most happy incidents of our lives, and will serve, as long as we may live, to make the year 1877 one of the most memorable in all our experience.

The development of the quadruplex system brought Mr. Edison and me into the pleasantest possible relations. I recall many interesting features of my association with him in the little room adjoining No. 145 Broadway. The first actual practical service of the quadruplex came about on a New York and Boston wire. Edison was at the New York end and I at the Boston end, and it was then claimed, I believe, that the Boston end was handled the more successfully. Among the New York operators who assisted Edison were Mr. Fred Catlin, Mr. Walter P. Phillips, Mr. P. V. DeGraw and Mr. E. C. Boileau. They were quite unanimous in their opinion that the quadruplex was about the rockiest proposition that they had ever encountered.

As illustrating Edison's quick grasp upon anything relating to practical telegraph matters at that time, I may mention this incident: On one of his morning visits to the Western Union offices at No. 195 Broadway, I said to him: "I have found a way to change the direction of the stream of water without causing a stoppage of the water-wheel, which continues to revolve in the same direction." No explanation of the method was given or asked for. The next day Edison came in and handed me a sketch, showing exactly how the thing was accomplished. I had, shortly before, put the plan into operation on two circuits from New York, viz.: Long Branch and Newark. A patent was promptly issued to me for this combination.

In 1879 I took the position of engineer-in-chief of the American Rapid Telegraph Company, and held it until shortly before its absorption by the Western Union in 1882. My immediate successor in office was Mr. Walter P. Phillips, who, a little later, resigned to become general manager of the United Press, to be succeeded, in turn, with the Rapid, by Mr. William E. Athearn. The American Rapid Company

had three wires to Boston, one of which was leased to the principal owners of the company, Messrs. Kidder, Peabody and Company. It frequently happened that but one of these wires was serviceable, and the lessees had the call on that. An exchange of 2,500 messages was easily accomplished, during the day, without interrupting the business of Messrs. Kidder, Peabody and Company, and without their knowledge. Much has been written in recent years about stealing bases by the great ball players, but their achievements have been slight compared with our frequent and repeated theft of 250 miles of telegraph wire! We attained a speed of 800 words per minute on regular business, with perfect recording, and, under favorable circumstances, we went much higher than that.

On my return to the service of the Western Union Telegraph Company, General Thomas T. Eckert very graciously appointed me, in a circular letter dated October 17, 1882, to the position of "electrician of circuits, with special reference to the practical working of the automatic and multiplex systems," and from then up to 1907, when my health became such that a surgical operation was necessary to save my life, I served in many capacities. My retirement, which was made as easy and pleasant as possible by the Western Union, rounded out fifty-four years that I had devoted to the telegraph service, but even before I was placed in charge of that historical dummy at No. 31 State street, Boston, I had embarked on journalistic seas, in more senses than one, and while not directly connected with the wires, my work, at the ripe age of eleven years, was of such closely related nature, that, in a way, I was one of the forty-niners of the telegraph. In that year, and possibly for a year or two earlier, the Associated Press supported a small schooner, known as the Associated Press News Yacht "Wanderer." This modest craft was stationed at Sandy Hook, and my brother Elias, who, in later years, came to Providence to assist in the search for Hicks, the murderer, was her captain. I was his assistant. Our branch of the press service consisted of meeting the incoming steamers, and to receive from the purser of each copies, in manifold, of the foreign markets. The schooner lay inside or outside the Hook, and as soon as the steamer for which we were watching was signaled from the Highlands, we started out to meet her, frequently going as far as the lightship, about five miles out. After giving a salute and receiving one in return from the steamer, the purser would throw overboard a tin box, loaded with lead at one end, so as to keep it well out of water. With a net we took it in easily, and removed the manifold copies of the foreign markets. One of these we attached to the leg of a carrier pigeon, and pointing him toward the Hook, let him off. Usually, he would emerge through the trap door immediately and fly away on his errand and the operator at the Hook would take the light paper off the pigeon's leg, and, frequently, before the steamer reached the Hook, the New York papers had received the news and got out extras, thus enabling speculators, in some cases, to make fortunes in short order. For several years after this plan was abandoned for the improved one of intercepting the steamer off Cape Race the foreign markets were obtained and telegraphed from points in Nova Scotia. This was made possible by the gradual extension of the telegraph lines beyond Boston. The successful operation of the Atlantic cable, in 1866, did away with this kind of service altogether by taking its place permanently through the substitution of a daily service, covering not only the foreign markets, but the news of the world, somewhat briefly, as applied to the latter for some time, but very fully in later years under the influence of greatly reduced cable tolls.

The "Wanderer" came from Nova Scotia, was ninety tons register, and drew six feet of water. The night that I left her and was on my way home down the Sound, she went ashore in the Horse Shoe cove, just inside the Hook, and was wrecked completely. She had put in there for shelter from a northeast storm, but the wind shifting to the northwest at midnight blew her ashore, high and dry, with both anchors down.

Sailing in the "Wanderer" was comparatively pleasant, but sometimes we had a fog and no wind, and then we had to row. I remember one of these occasions when we had the whole distance to do, fifteen miles, and we pressed into service the robust Welshman we had for cook. The telegraph wire was down, and a Bremen steamer came in and gave us what was thought to be later news of great importance. Owing to the fog, she would not venture further in than the Hook, and I volunteered to get the package to the city in the dory if the Welshman would go with me. It proved to be a very difficult undertaking, especially after we struck the Narrows, where the tide was against us and running very strong. We hugged the shore closely after passing Fort Hamilton, but did not reach Whitehall until about noon the next day, and, after all, got the papers into the wrong box, so their arrival was too late for an extra that afternoon. The anticipated reward was withheld, and, on the contrary, we won the ill-will of the Associated Press manager, Mr. D. H. Craig, with whom my lot was cast, a few years later, in Boston, and again in the service of the American Rapid Telegraph Company, 1879-82. He and his associates controlled the Commercial Telegraph Company, with which I began service in 1853. It had been started several years before as the New York and Boston House Printing Telegraph Company in opposition to the unpopular and arbitrary F. O. J. Smith, who was the pioneer telegraph man of New England, and who controlled the New York and Boston Magnetic Telegraph Association, which operated the Morse system, and had begun business in the summer of 1846. Although the wires of our opponent were execrable and seldom worked in rainy weather, ours were not much better, and our competitor had the advantage over us that the Morse system was simple and not difficult to keep going unless the wires were down. On the contrary, the House instrument was by no means well understood by those who attempted to work it. Theo-

retically it was beautiful, but in practice it somehow seemed to get balky. Many times, when our ingenuity had been exhausted, and business was piled up on the hooks, I have seen Mr. Ashley's face, which had been wearing a worried look all day, suddenly and perceptibly brighten, and from wishing the House printing system was at the bottom of the sea, he would give it a new endorsement and the instrument having "come O. K." he would dispose of the business at a rapid rate, and became a changed man—a very happy one instead of the disgruntled, discouraged and greatly perplexed one he had been while the instrument was unresponsive to all the cleaning of the friction parts and the regulation "course of sprouts" that it was put through when it was not in on its good behavior. It was under these circumstances, with bad wires and uncertain instruments, that the projectors of the House lines lost heart and induced Mr. Craig and his friends to take the property off their hands. Later, these wires were leased by the American Telegraph Company, and it was on the printing system of Hughes and House that the American Company was built up to a point which enabled it to force F. O. J. Smith to surrender. His lines were purchased, and he never was able to make his reappearance in the telegraph field. With the sale of his property to the American Company, his former competitors came into possession of both the Morse and the Bain systems, and they were able to keep him out of the telegraph business forever after. He tried many times to break into the business again, but he had no following and no patents, and, finally, was convinced that the day of his telegraphic destiny was over.

My life, from boyhood to the time when, as Emerson says, it is "time to be old, to take in sail," has been a very satisfactory one, but, perhaps, the pleasantest part of it was the last twenty-five years that I was with the Western Union Telegraph Company, 1882-1907. My duties were of a very interesting and varied character, and my associates were always kind and helpful. In much of my work I had the assistance of Mr. Robert H. Morris, and together we attacked and solved many problems. Sometimes, when there was too much to do in a given time, and something was entrusted to others and did not work out quite right, it was gratifying to have the managers compliment me, as, for example, when Mr. A. S. Downer remarked: "We shall never get to the end of all these troubles until we can duplex Gerrit Smith."

Although I did not go away from New York a very great deal I visited, at one time and another, almost every part of the country, including the Pacific Coast, where my experiences were delightful, but it would be a long story, indeed, if I were to attempt to tell of my journeys and speak of the many charming people with whom my travels brought me in contact. Their name is legion. Some of them are living and some have passed into the great silence. Everybody treated me with unfailing kindness, and to all who are alive I send my greetings, and for those whom God called away I am a sincere and unchanging mourner.

Improved Gas Battery.

Matteuci, in 1838, discovered the existence of a potential difference between two platinum plates immersed in different gases, and a year later Grove invented the gas battery which bears his name, says the *Elektrotechnische Zeitschrift*, of Berlin. This battery comprises two platinum plates, surfaced with spongy platinum, covered by gas containers, and dipping into dilute sulphuric acid. If one electrode be surrounded by oxygen, the other by hydrogen, and the external circuit be closed, current flows through the latter from oxygen to hydrogen. The e. m. f. of the Grove battery varies with the gases employed, the electrochemical series ranging from chlorine to hydrogen. During working certain characteristic changes appear on the surface of the electrodes, and concerning the nature and significance of these changes—and, indeed, concerning the whole nature of the action proceeding in this cell, which employs a triple contact of solid, liquid and gas—many of the most famous scientists of last century contributed more or less inconclusive data.

Grove himself entertained no high hopes as to the practical utility of his gas cell, and, until recently, the work of no other investigator indicated that the cell could be made of practical value. It is now reported, however, that Dr. Karl Siegl has succeeded in developing a modified cell of from 100 to 1,000 times the capacity of the Grove cell, which is by far the most economical primary battery yet discovered.

Commencing by investigation of the seat of e. m. f. in the Grove cell, Siegl concludes that all parts of the electrodes are operative during short discharges. During longer discharges, the gases occluded in the electrodes are consumed. The portions of the electrodes surrounded by gas are fed by the latter, but the portions submerged in electrolyte not only cease to be operative, but also become polarized in opposition to the active electrode area, hence the latter should be as large as possible. This desideratum may be realized, while securing a cheap construction, by employing platinized carbon granules (of say, 3 mm. diameter), contained together with a carbon contactor plate by a porous cell, which also forms the gas chamber, and is saturated with electrolyte. The gas pressure prevents the electrolyte from flooding the porous cell.

The current taken from Siegl cells should not exceed 3.75 amperes per square foot of active electrode surface on momentary discharge, 0.28 ampere per square foot on longer discharges, or 0.19 ampere per square foot on continuous discharge, otherwise polarization will occur.

Protection of Poles Against Rotting.—A new French method of protecting telegraph poles from rotting at the ground line is by surrounding them with earthen pipes and filling in the space between the pole and the pipe with melted resin and sand. When this composition solidifies it becomes waterproof.

Land Telegraph Systems, 1912.

Preliminary figures of the forthcoming quinquennial report on land telegraph systems of the United States have been given out by Director W. J. Harris, of the Bureau of the Census, Department of Commerce, Washington, D. C.

The statistics relate to the years ending December 31, for 1912 and 1907, and cover commercial operating companies only.

All systems, except one, reporting, are operated by companies incorporated in the United States. The exception is a Canadian company, but its report is limited to operations in this country alone.

Systems operated by the Federal Government for military or commercial purposes, either in Alaska or the insular possessions, and telegraphs owned and operated exclusively by railways, are not included. Neither do the figures include the incidental telegraph business done by telephone companies over their own wires.

During the semi-decade 1907-1912, covered by the figures shown, the number of companies increased by two. The systems operated under the same ownership are counted as one company. The miles of single wire increased by 236,235, or 15 per cent. The increase in number of offices was 1,725, or 5.9 per cent. This number includes offices operated in connection with railway companies.

While the gross income increased $12,381,301, or 28.2 per cent, the expenses of all kinds increased by a greater amount—$14,625,438, or 38.2 per cent. The net income was therefore reduced $2,244,137, or 39.5 per cent. If charges for depreciation and sinking fund be excluded for 1912, a considerable increase is shown.

The increase in construction and equipment account appears as $11,303,011, or 8.5 per cent, but the amount reported for stocks and bonds and other permanent investments decreased $6,392,290, or 27.2 per cent. There was an increase of $19,612,023, or 179.8 per cent, in cash and current assets, including supplies and sundries, much of this being in cash and current assets only.

The capital stock outstanding increased $1,984,860, or 1.9 per cent, and the funded debt decreased $2,463,000, or 6.6 per cent. There was a notable increase of $3,377,471, or 180 per cent, in reserves.

It was not practicable for the companies to segregate the salaried employes and wage-earners, and the totals are given for them combined and for the combined salaries and wage payments. The increase in number was 8,812, or 32.8 per cent, and in salaries and wages $6,904,814, or 40.9 per cent.

Wireless Telegraph Systems, 1912.

Preliminary figures of the forthcoming quinquennial report on the wireless telegraph systems of the United States have been given out by Director W. J. Harris, of the Bureau of the Census, Department of Commerce.

The statistics relate to the years ending December 31, for 1912 and 1907. The totals include only the plants operated for commercial purposes. Federal Government plants and all plants, whatever their ownership, in the insular possessions are excluded. The report of one wireless company in the hands of receivers is not included. Its principal business was that of renting apparatus and perfecting inventions. One company did some exclusively land telegraph business over a leased wire.

The figures presented show that while there was a net deficit in operation in 1907, a net income was the result of the business in 1912. The gross income increased $562,367, or 527 per cent, over 1907. A great part of this income was the rental of wireless apparatus for ship equipment. The expenses, including charges for depreciation in 1912, increased $504,091, or 314.4 per cent. The great decrease in assets—$22,581,700, or 68.5 per cent—is due to the disappearance of one large company in a merger of interests. The decrease was largely in the value placed on patent rights, good will, and contracts in 1907, and on treasury stock.

The amount expended for construction and equipment increased $888,156, or 280 per cent, over 1907, and the number of employes 782, or 444 per cent; the increase in salaries and wages being $311,835, or 381 per cent.

Electrical Instruments and Testing.

We are frequently asked about the methods employed for testing telegraph lines for crosses, insulation, grounds, etc., and we invariably recommend Schneider and Hargrave's book, entitled, "Electrical Instruments and Testing." As its name implies, this book describes the instruments used in making tests and the tests themselves, and is up to date. It is well illustrated, and has very little mathematics—just enough to exemplify the work.

This is a book every progressive operator should possess, and, no doubt, it has been a stepping stone to advancement in many instances.

It is written in a very clear style by practical men for practical men. Mr. Jesse Hargrave, who wrote the chapters on testing, is a well-known telegraph engineer, and what he says on this subject is worth much to those whose duty it is to test wires, and to those who hope to occupy such positions in the future.

The price of this book is $1.15 per copy, which is a remarkably low price for so much information. Copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

VALENTINE BY TELEGRAPH.—We have received from Mr. W. A. Logan, chief operator Western Union Telegraph Company, Houston, Tex., a copy of a unique valentine designed and transmitted on the printer between Houston and Dallas, by Mr. G. E. Longshie, printer mechanic. The conventional emblem of love—the heart—is outlined on the sheet by the letter O printed at proper intervals, and across the widest part are the words "Valentine Greetings." Down through the center are the office calls of Houston and Dallas—"HO" and "DA." The design is an interesting example of what can be done on the printer in the way of fancy work.

Some Reminiscences of an Old Timer.

Mr. Royal S. Keith, a well-known New York old-time telegrapher, identified with banking and brokerage houses for many years past, has had an interesting telegraph career. He was born at New Canaan, Conn., December 30, 1845, and learned telegraphy in 1863, with Mr. Lucius M. Munroe, who was then and is still manager of the New Canaan office. He entered the service at 145 Broadway in 1866, being employed by H. H. Ward, who was then manager, and who is now in the banking business in East Orange, N. J. The equipment of the New York office at that time consisted of three House printing telegraph systems and one old register in operation along with about forty Morse circuits.

Mr. Keith later went as manager to Portsmouth, N. H., and Superintendent J. S. Bedlow soon afterwards placed him in charge of the Profile House, White Mountains, N. H. After the season was over, Mr. Keith returned to New York and became manager of the Franklin Telegraph Company, at 131 Maiden Lane. This was in 1867. In 1871 he was transferred to Hartford, Conn., for the same company. A year or so later the company was absorbed by other interests, and Mr. Edward H. Johnson, for many years identified with the general electrical industry, paid a visit to the Hartford office, where he installed the automatic system. The system was perfect, but the appliances Mr. Keith had to work with were faulty. For instance, the perforator keys were made of rough cast iron, which resulted in wearing off the tips of the operator's fingers. Mr. Conrad A. Meyers, who is still active in the Western Union service at New York, operated the system at the New York office, and the service rendered by him was of a superior character. It was not difficult to copy his work.

After the Hartford telegraph business had been perforated, ready for transmission, usually it required considerable time to obtain the circuit. The matter was transmitted quickly, but it was most always unsatisfactory. New York would usually say "N. G." A repetition of the matter would bear the same result. The trouble was usually discovered in the battery, the carbon or zinc being broken off, which, of course, made it useless. This battery was contained in a small soap box, and consisted of about forty half-pint bottles, cut off at the top, holding the electropoin fluid, and placed in paraffin wax. The lid of the box held the carbon and zinc. To make the battery complete it was necessary to close the lid tight. This operation resulted in breaking some part of the battery, thus putting it out of commission. The mishap was only brought to the attention of the operator when a distant point reported "N. G."

General Thomas T. Eckert wrote a letter to all managers, asking for opinions regarding the automatic system. What was said in response to this letter in a majority of cases was unfit for publication.

In 1876 Mr. D. H. Bates sent Mr. Keith to Syracuse, N. Y., as manager of the Atlantic and Pacific Telegraph Company, where he reconstructed the office, placing Mr. George H. Usher, now general superintendent of the Postal Telegraph-Cable Company at Atlanta, Ga., in the position of chief operator. Among the operators in the Syracuse office at that time were Mr. W. L. Waugh, now and for over thirty-five years with the Associated Press, New York; Frank and Charles Lake, and a number of other good telegraphers. While Mr. Keith was manager at Syracuse, Mr. Edward H. Johnson visited that city, not to install another automatic system, but to deliver a lecture on the "Usefulness of the Phonograph." This was in 1876. Mr. Johnson had entered the service of Mr. Thomas A. Edison, the inventor of this device. Mr. Keith recalls that Mr. Johnson made a very favorable impression on the audience. He had secured a wire to Auburn, N. Y., where he had some musicians playing and singing, the music and songs being reproduced by means of the phonograph through a massive funnel. On the platform with Mr. Johnson was the president of the Syracuse University. Mr. Johnson handed him a receiver and requested him to tell the audience what he heard, which he did. He slowly arose from his seat and said, 'Why, I hear a voice saying, 'Twinkle, Twinkle, Little Star.' As the telephone was not then in use, one can form some idea how that incident aroused the enthusiasm of those present. Mr. Johnson received $50 for his lecture.

A little later Mr. Theo. N. Vail visited Syracuse, with the object of interesting some one in the telephone. As Mr. Keith could see nothing in it, the idea was not favorably received. Mr. W. C. Humstone, then general superintendent of the Atlantic and Pacific Company, transferred Mr. Keith to Portland, Me., to open an Atlantic and Pacific office there, to combat the influence of the American Union Telegraph Company, whose lines were being rapidly constructed. Later, Mr. Keith returned to New York as superintendent of the American Rapid Telegraph Company, Mr. Gerritt Smith being the electrician. After the absorption of the American Rapid by the Western Union Telegraph Company, Mr. Keith did considerable construction work for the Bankers' and Merchants' Telegraph Company, and was that company's manager at Albany, N. Y. Mr. Walter P. Phillips called at the office one day and told Mr. Keith that he was lost to view in remaining at Albany. Mr. Keith thereupon returned to 195 Broadway, New York, where Manager W. J. Dealy appointed him assistant chief operator of the Long Island division. This position he retained until 1890, when he resigned to construct some lines for the Postal Construction Company between Middletown and Narrowsburg. Mr. Jesse Walton was the contractor. After this work was completed, Mr. Keith took a gang to Ohio, where he did considerable construction work for the same interests.

In 1894 Mr. Keith entered the service of Henry Clews and Company, bankers, New York, and two years ago was placed in charge of their telegraph department, where he has been located ever since.

It is the duty of every telegrapher to subscribe for TELEGRAPH AND TELEPHONE AGE for his own good.

Echoes from Old New Orleans.

BY JEFF W. HAYES.

Standing on the portals of the old "NO" office, my head was uncovered in respect and reverence to the long list of friends who had dwelt here, labored in this vineyard, and who now have gone to meet their Creator.

As I stood at the door of this old office a crowd of memories came to me, and many old faces and forms seem to clamor for recognition. I could see their laughing, happy countenances, and, like "Old Black Joe," in the song, "hear their gentle voices calling," etc.

A halo of romance always seemed to pervade this office, due, possibly, to the friendship of the artists who have come and gone for these many years. So, one need not wonder that a feeling of awe overcame me as I realized that I was standing in the old, historic room once graced by so many telegraphic stars of the first magnitude.

Here it was that the gentle Sidney B. Fairchilds manipulated the key during the trying scenes of the war, and it was here, also, that Colonel L. H. Korty and Charles W. Moore spent several years of their earlier manhood, which training greatly shaped their after lives. Later, in my own time, the office, no doubt, rang with merry peals of laughter from newer faces.

It would be difficult to enumerate the boys who have tarried in this office in the '70's and '80's, and I will mention but a few.

A man is a hero who enlists for war when certain death seems inevitable, then why are not the names of Fred. B. Moxon, W. D. Barnes, Henry Hunt, Willis Wolf, Hugh Irvine, Richard D. Babbitt, Jack McDermott, Paul Leloup, Ed. Davis, Charles Chase, Charles H. H. Cottrell, Charles Fisher and W. D. West, worthy to be enshrined as heroes?

Wishing to do the greatest good to the greatest number, these boys heroically stood by their keys, sending and receiving the sorrowful news of the havoc of that fell destroyer, yellow fever, during the terrible epidemic of 1878.

The first seven named gentlemen succumbed to the dreaded disease. Paul Leloup, who was a victim to the scourge, but who recovered, is hale and hearty, occupying the position as assistant to Manager W. A. Porteous, of the New Orleans office.

No special monument marks the graves of these heroes, and their names are almost entirely effaced from the memory of the present generation.

I am going to hunt up the grave of Fred. Moxon before I leave this city, and strew thereon some flowers, dropping a tear to the memory of the whitest boy and best friend that I ever knew.

Albert S. Ayres, the irrepressible "Patsey," helped to make this office famous; George Armstrong, too, another Cincinnati boy, did excellent work here, and was widely known.

Michael Tully, now of St. Louis, was a former well-known operator in this office, as was also E. V. Weedon, now of the New York office, and Les W. Bradley, now deceased.

Charles H. H. Cottrell, one of the most distinguished-looking gentlemen in the telegraph business, still works a wire in this office with the old-time celebrity. His handsome face and courtly manners are still a part of his personality, and his heart is always responsive to the call of a suffering brother.

In speaking of those who served during the yellow-fever epidemic, no name should stand higher than that of the late David Flanery, who was superintendent of this district in 1878. Mr. Flanery had been in the South from his boyhood, and had passed through the epidemics of 1853, 1867 and 1878, always faithfully doing his duty as an employe and official, and ever administering with heart and hand to his suffering brothers. When the operator at Grenada, Miss., was stricken and died, and no other man could be found to take his place, Mr. Flanery went there and worked night and day until completely exhausted.

The New Orleans office has been occupying its present quarters since 1853, and has long since outlived its usefulness. A splendid new up-to-date office will be occupied about May 1.

The present officials of the Western Union at New Orleans are: T. P. Cummings, superintendent; W. A. Porteous, manager; Paul LeLoup, assistant manager; J. K. Harper, chief operator; Andy Foltz, district wire chief; Joseph Meynier, traffic chief; J. J. Gallagher, night chief.

The New Orleans officials of the Postal Telegraph-Cable Company are: N. E. Church, manager; L. L. Duyck, chief operator; L. H. Dinkeldein, night chief operator; W. E. Schultheis, all-night chief; J. N. Perry, wire chief; E. E. Jackson, day traffic chief; C. E. Hogshead, night traffic chief.

Universal Telegraph Alphabet.

BY J. S. KNAPP, MEMPHIS, TENN.

Relative to the subject of a universal telegraph code, now being discussed in TELEGRAPH AND TELEPHONE AGE, permit me to say a few words.

I agree that a universal code is highly essential to progress. A telegrapher in South Africa or China should be able to converse and transmit messages with and to New York City and *vice versa*, via land lines, wireless or cable.

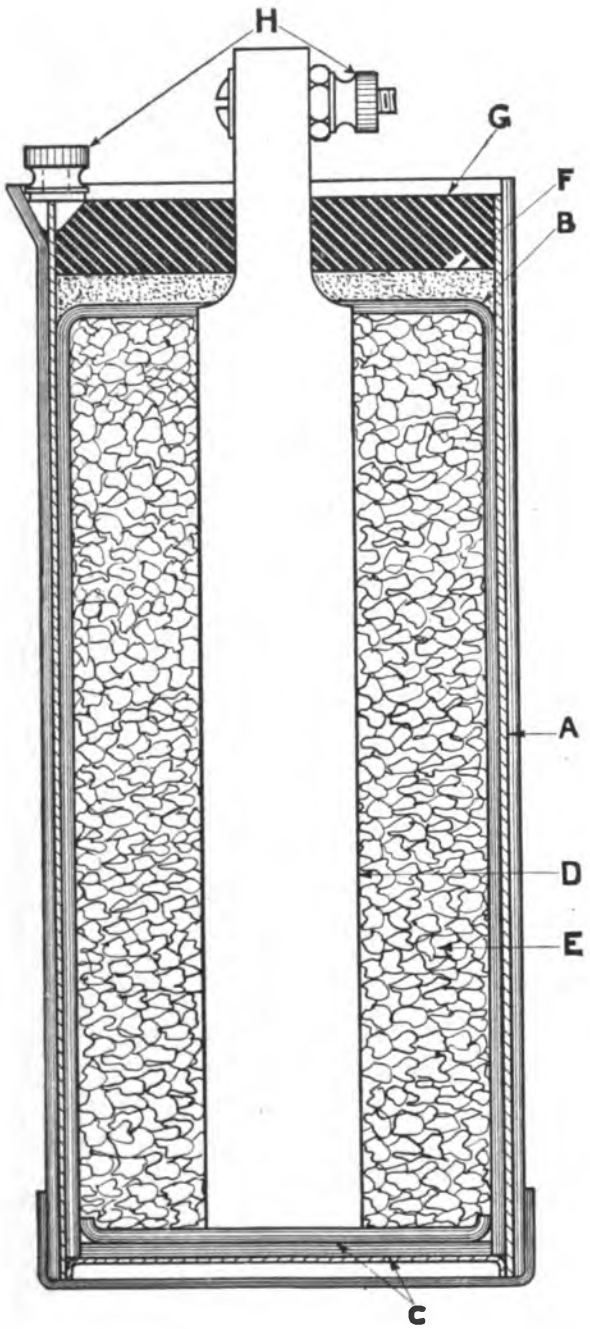
But speed is a paramount essential in this advanced age, and it is certainly understood that the Morse alphabet is far more rapid than the Continental. For instance, glance at the latter alphabet and imagine one trying to transmit the figures and punctuation characters, in competition with the Morse! A Morse telegrapher would be in the lead all the time. This is the only drawback I can find in the universal adoption of the Continental alphabet.

Let us make the Morse universal, not only for speed, but from the fact that telegraphy was born in the United States in the wonderful brain of Samuel F. B. Morse, whose memory the entire world should honor by universal adoption of the Morse alphabet.

I believe in giving honor to whom honor is due.

Construction of Dry Cells.

Local battery subscriber telephone sets. which are most frequently used on rural telephone lines, must be equipped with batteries to supply current for energizing the transmitters. In the early days of the telephone various types of wet cells were used for this purpose, but they gave trouble. The so-called "dry" cell did not have the objectionable features of the wet cell, and was, therefore, found to be much more suitable for use in the local battery telephones.



CROSS-SECTION OF DRY CELL.

The illustration shows the general construction of the "Blue Bell" cell, which is typical of that of other makes of dry cells. It consists of a cup of sheet zinc (A), having a lining of a thick piece of paper (B), similar to blotting paper, with two discs (CC) of this paper in the bottom of the cup. In the center of this cup is placed a carbon rod (D) and all the space between this rod and the paper lining is filled with a mixture (E), known as the "depolarizer," which consists of several chemical materials. This mixture is packed in tightly to within about one inch of the top of the zinc cup. The paper lining (B) is then folded in from all sides toward the carbon rod and flattened down, in order to prevent any possibility of the depolarizer touching the zinc cup, as this would short circuit the cell. A layer of clean dry sand or sawdust (F) is placed above the lining, on top of which is poured a seal of pitch (G) from three-eighths to one-half inch in thickness, completely filling the zinc cup. Binding posts (HH), attached to the zinc cup and to the end of the carbon rod, are supplied to connect the cell into a circuit.

The depolarizer consists of a finely pulverized mixture of carbon and a chemical called "manganese dioxide." There are first mixed together dry and are then moistened with electrolyte. The electrolyte usually consists of water in which are dissolved two chemical salts, ammonium chloride (commonly called sal ammoniac) and zinc chloride.

The principle involved in the action of the dry cell is the same as that of the wet cell, namely: When two electrodes or plates of dissimilar metals, or other materials which will carry current, are dipped into an electrolyte, or exciting fluid, an electric pressure, or voltage, is established between the two plates; and if the plates are connected together with a wire, an electric current will flow through the wire from one plate to the other. In the dry cell the zinc cup forms one electrode and the carbon rod surrounded by the depolarizer forms the other electrode, the two being separated by the paper lining of the zinc cup. The electrolyte in the depolarizer soaks through the paper lining and attacks the zinc, enabling the cell to deliver current. When the cell is connected into a circuit, current flows from the binding post on the carbon electrode through the circuit and back to the binding post connected to the zinc electrode. The dry cell has a voltage of approximately 1.5 when new.

Dry cells also have other uses in the telephone field, such as for furnishing ringing current in small exchanges where pole-changers are employed to ring the subscriber's bell, for testing the telephone lines coming into an exchange, and for the operation of interphone or house telephone equipments. Dry cells have also replaced, to some extent, gravity and other types of wet cells for furnishing the operators' talking current in small exchanges. Dry cells are also used extensively for other purposes, such as the operation of bells or other signals, the ignition of gas engines, etc.

MR. W. C. CARSWELL, manager Western Union Telegraph Company, Topeka, Kan., writes: "I enclose my check to cover two years' subscription to TELEGRAPH AND TELEPHONE AGE. Without it I would not be in touch with the best there is incidental to the business."

The Morkrum Printer.

The Morkrum direct keyboard printers have now been in regular service for nearly four years, a number of the sets being used by both the telegraph companies and several of the railroads. They have proven very efficient, being capable of handling about 1,000 messages per circuit. Some of the circuits of the Postal Telegraph-Cable Company have exchanged over 1,200 messages in a nine and one-half hour day. One young lady operator in the Postal's Boston office recently made the remarkable record of sending an average of 613 messages per day for ten consecutive days.

The Morkrum Company, Chicago, Ill., has developed a high-speed tape-operated system, in connection with its work on a direct keyboard printer.

The messages to be transmitted are first prepared on a tape with a simple keyboard perforator. This tape is then used to transmit the messages over the line. At the receiving end the message is printed direct on a blank, ready for delivery.

There are a number of unique features in the system. Cross perforated tape is used, thus making the tape much shorter, a message requiring only about one-sixth the length of a Wheatstone tape. This adds greatly in the convenience of handling.

For the line signal the Baudot method is used. A modification of the Baudot has been used in the Morkrum keyboard system, and has proved very successful.

The tape transmitter, synchronizing and selective mechanism have all been combined in one simple mechanism, known as the "Distributor." The Morkrum page printer is the same as that used in the company's keyboard system, which, having been in use for over four years, has been thoroughly tested and developed.

There are several advantages in the use of a tape system on long circuits, or on circuits where the volume of traffic is heavy. The capacity is much greater, since it is not limited to one sending operator. Several operators can prepare tape, which can then be transmitted over one wire. On long lines, where the allowable frequency of the line signals is limited, the full line time can be used by the tape system on account of its steady transmission. There is also an advantage in case of line trouble, in being able to prepare tapes which may be transmitted at high speed when the circuit is restored..

The Morkrum tape system has demonstrated its great reliability on long-line work, on account of the low frequency of its line signals, which makes it well adapted for use on lines in which there are repeaters, and gives greater margin on the balancing of the artificial line. The system has also proved its ability to operate satisfactorily through adverse weather conditions.

The Morkrum tape system is now in operation on several of the Western Union Telegraph Company's lines, and more are being installed.

Line capacities have been obtained as high as 1,135 messages in one direction in nine hours, and over 2,000 messages have been exchanged on a duplex circuit in a nine-hour day.

Mr. C. H. Hubbell, superintendent of telegraph of the Rock Island Lines, has made a very interesting application of printing telegraphy to railroad work. Three Morkrum tape circuits are in operation, viz.: Chicago-Des Moines, 358 miles; Chicago-Topeka, 583 miles, and Chicago-El Reno, 896 miles.

The Chicago-Des Moines and Chicago-Topeka circuits are worked without repeaters; the Chicago-El Reno circuit has two repeaters in it, and consists of iron wire the entire distance.

In case of wire trouble, or shortage of wires on the Chicago-El Reno circuit, a Topeka-El Reno circuit is operated, and all Chicago-El Reno business is relayed at Topeka. The machines at Topeka are arranged to print the messages, and, in addition, to automatically punch a duplicate tape, which is used to retransmit the message. This automatic relaying of messages is a most valuable feature, which will work great economies in relay offices, as automatic telegraphy is developed.

The Morkrum system is the invention of Mr. Charles L. Krum and Mr. Howard L. Krum, of Chicago, where the factory of the company is also located.

Telegraphic Connections.

A book that ought to be better known and more widely used by telegraphers is "Telegraphic Connections," by Thom and Jones. It gives mechanical information on a wide range of telegraph apparatus, and every telegraph engineer, wire chief and operator will find it a great help in his daily work. It gives very clear diagrams and practical information on the following subjects:

Polar relay, pole-changer, polar duplex, quadruplex, local connections, proportional currents, division of generator current, Gerrit Smith attachment, the working quadruplex, how to balance, quadruplex trouble and faults, margin, new quadruplex apparatus, new standard quadruplex, duplex loop, lamps in the circuit, combination loop, defective loop repeater, double-loop, duplex, Toye repeater, Milliken repeater, half Milliken, half Milliken (chemical) repeater, call-bell, the loop-switch, Postal-Telegraph loop, current distribution, Wheatstone automatic duplex.

In the diagrams the local and main circuits are distinguished by colored lines, or otherwise differentiated, so that they can be separately and readily traced with the least strain upon the eye. The descriptive matter is brief and to the point, and judging from the list of subjects covered, it is a very practical and useful book to have on the desk for ready reference and for study.

The price of this book is $1.50, and copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MR. JOH. KJENNERUD, manager government telegraphs, Stavanger, Norway, writes: "I cannot afford to miss the AGE after being a subscriber for so many years, so I send you $3.00 by International Money Order, for another year."

Compiling Telegraphic Cipher Codes for Bank Use.

BY JOHN T. GIBBONS, HARRIMAN NATIONAL BANK, NEW YORK.

All large banks find it advantageous to have their own exclusive telegraphic cipher code for domestic use, in order to secure secrecy and economy, and the American Bankers' Association, realizing the importance of this subject, has now a standing committee, whose duty it is to look thoroughly into the matter of code possibilities.

The volume of messages exchanged between banks is far greater than one would naturally suppose. Some institutions handle from two to three hundred messages a day. Strange as it may seem, no department of banking is organized in such a slipshod and unscientific manner as is this, because of the fact that so few people understand the peculiarities of the Morse code and do not think it necessary to call in expert advice. Of course, the defects of a poorly constructed code quickly come to the surface when the cipher is put into practical use, but it is then too late to remedy matters without abandoning the code entirely and issuing a new book. Because of the expense attached I have never known a code to be abandoned on account of imperfections, but faulty works have been used for years, causing annoyance and inconvenience almost beyond description.

The Morse code symbols are of four kinds: dots, dots with spaces between, dots and dashes, and dashes. The chances for errors from combinations of these are unlimited, even if the greatest care be exercised in the makeup of the code words, but in the hands of the inexperienced compiler blunders accumulate which are dangerous, by reason of the importance attached to the transfer of money and other weighty transactions by telegraph.

A practical telegraphic code for bank purposes consists of three parts:

(1) Tables, such as calendars, lists of fractions, cents and decimals, correspondence tables, foreign exchange, etc.

(2) Phrases, regular routine terms which have been found by practice to be of frequent occurrence in the bank's business.

(3) Code words, of five letters each, eliminating entirely words beginning with certain letters, the construction of the words to be phonetic, no double letters, no dictionary words, reducing to a minimum certain combinations of dot and space letters in the Morse code.

The construction of the words should be alphabetical, and range so far apart that in case of mutilation they could be temporarily deciphered with reasonable safety, pending correction by the telegraph company.

In assembling and selecting code words, a practical telegrapher should go over the entire list, eliminating the close contact of certain letters in words known to be subject to error. The book should not be too voluminous; if it is, it will be cumbersome. Most of the messages placed in a code are assembled by those who handle the book infrequently, and who, therefore, are not familiar with any delicate possibilities of a complicated work.

A mistake frequently made in compiling bank codes is in assembling a lengthy phrase, part of which is practical and part not, thereby killing the entire sentence. Prior to 1909, any code word could be used that was pronounceable up to ten letters, and any word up to fifteen letters, if it was in the dictionary. Many years ago there was a rule that unpronounceable words composed of symbols, such as XXBB, or letters and figures combined, such as XX45, should be charged for counting each letter or figure as a word. The two rules, old and new, prior to 1909, were, by usage, so abused by the public using unnecessarily lengthy code words, pronounceable and dictionary words grouped *en masse* (but not symbols), that the telegraph companies were compelled to call a halt and adopt a ruling along the lines laid down by the International Telegraph Convention, at Berne, Switzerland, in the summer of 1909. This ruling specifies that code words should be taken from the official vocabulary, as compiled by the International Telegraph Bureau, or that words of any length should be selected from dictionaries of the English, German, French, Italian, Dutch, Portuguese, Spanish and Latin languages; all groups of letters, when such groups are not dictionary words or combinations of dictionary words, would be counted at the rate of five letters, or fraction thereof, to a word; when such groups are made up of combinations of dictionary words, each dictionary word, when so used, would be counted as one word. When a word was pronounceable, but not found in the dictionary of one of the eight languages mentioned, or not taken from the official vocabulary, it was classed as an artificial word, and charged for on the basis of five letters, or fraction thereof, to a word.

A good bank code, properly balanced, consists of about 5,000 words, with 1,000 additional words for test or key words. With more words than that it would be difficult to handle. Test or key word formulas for the purpose of proving the authenticity of a message should be arranged with extreme simplicity. The formulas of some banks are so complicated that correspondents either fail to use them at all, or do so incorrectly, causing much delay in wiring for a correct word. The test or key words should be a part of the book proper, an explanatory letter being forwarded under separate cover.

A code book should be loosely indexed, with headings and subheadings only.

On through telegraph wires operators, if not watched closely, send the shortest messages first. If a code message, composed of words of five letters, be used, it will have an appearance of being much shorter than it really is on account of its uniformity. I know, as a fact, that such messages will be transmitted to destination very much quicker than long messages with unwieldy words. Another advantage of having pronounceable words and not from the dictionary is that, being unusual, they will be handled with greater care than if they were dictionary words.

While in charge of the telegraph department of one of the largest banks in the country, covering a period of five years, having access constantly to 200 private codes, including a complete library of all standard public codes, studying constantly their shortcomings and the possibility of building up something practical, and, at the same time, as nearly proof against mutilation at the hands of the telegraph companies as possible, has made me appreciate the great importance of studying this subject along scientific lines.

Great Damage to Telegraph and Telephone Lines by the Recent Storm.

Telegraph, telephone and railway companies suffered great damage to their out-door plant through the heavy snow and wind storm of March 1 and March 2. Pole lines were prostrated in all directions within a radius of a hundred miles from New York, and it will require a long time and much hard work to repair the damage and restore normal conditions.

Officials of the Western Union and Postal Telegraph-Cable Companies and the American Telephone and Telegraph Company stated that more than 2,000 poles were broken within the storm zone, the greatest damage being between New York and Philadelphia and westward, as far as Scranton, Pa. The amount of wire involved in this destruction amounted to over 800 miles. It is stated that the money value of the damage to the property of the two telegraph companies will exceed one million dollars, and that to the New York Telephone Company's lines will amount to $200,000.

The Western Union lost all of its own wires between New York and Philadelphia, and its only way of reaching the latter city, Washington and Scranton was by way of the underground cable of the American Telephone and Telegraph Company. By means of a very circuitous route to Buffalo connection with Chicago was established.

In speaking of the damage, vice-president Newcomb Carlton, of the Western Union Company, stated that it was worse than the results of the blizzard in 1888, because of the greatly increased mileage of the present day.

The Postal Company suffered heavily, but succeeded in making connections with Washington and Chicago by roundabout ways.

Large gangs of linemen are now engaged in the work of rebuilding the lines, and it will be many weeks before normal conditions are restored.

The overhead lines of the American Telephone and Telegraph Company and its associated companies suffered considerably, as did the telegraph lines. and had it not been for the availability of the Washington and Boston underground system, which, by good fortune, was just completed at the time of the storm, New York might have been in quite as sad a plight as it was five years ago on the day of President Taft's inauguration, when a sleet storm prostrated all electrical wires between New York and Washington. The telephone service was not completely disrupted, however, and there were circuits enough left to meet the pressing demands. The reason for this is that overhead cables are used to a large extent, and they withstood the unusual strains put upon them to a marked degree.

It is a remarkable fact that this destruction of property goes on from year to year with more or less severity, with no apparent abatement, and despite the stronger and more scientific construction, the lines are just as vulnerable in severe storms as they ever were. This is, of course, largely due to the extreme load of wires placed upon the poles, and when an extraordinary strain is placed upon the wires by the added weight of wet snow and ice or the force of wind, the poles readily yield.

The cost of repairing such damage to lines is necessarily great, and if anyone can devise a way to preserve them intact during severe storms he need not end his days in the poorhouse.

An interesting fact in this connection is that the concrete and steel pole line of the Pennsylvania Railroad across the New Jersey meadows remained intact, notwithstanding its extremely exposed location. After the many repeated experiences with the inherent weakness of wooden poles the question of adopting concrete poles, for important lines at least, will no doubt be given more serious consideration by telegraph and telephone companies.

There is no doubt as to the greater strength of concrete poles, neither is there any doubt as to their greater cost, but whether it would be more economical to build heavy lines with concrete poles at a high first cost, or spend the amount of money represented by the increased cost in repairing damage to wooden pole lines is a matter for the engineers to settle.

The interest of the public should not be overlooked in this connection, however. It is a serious matter in these times to deprive the business community of the normal means of electrical communication, and the results of heavy storms in recent years show unmistakably how much the world depends upon electricity for its orderly progress.

Telegraph, Telephone and Radio Papers Before the Institute.

At the meeting of the American Institute of Electrical Engineers in New York on March 13, three papers were presented; namely, "A Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation," by M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn.; Traffic Studies in Automatic Switchboard Telephone Systems," by W. Lee Campbell, general superintendent Automatic Electric Company, Chicago, Ill., and (under the auspices of the Institute of Radio Engineers), "The Goldschmidt System of Radio Telegraphy," by Emil E. Mayer, chief engineer of the Goldschmidt Company in the United States. The latter paper was illustrated by lantern slides.

EXTENSIONS IN SWITZERLAND.—The Swiss Government will expend $4,445,000 during the present year for new telegraph and telephone lines and cables.

Western Union Baseball Ticker Service.

At a meeting of managers of the first district, Southern Division, held at Richmond, Va., February 24, Mr. A. C. Kaufman, manager of the Commercial News Department, Western Union Telegraph Company, New York, gave an instructive address on the baseball ticker service now being rendered by that company.

After the morning session Mr. Kaufman and those attending the meeting were guests of superintendent J. S. Calvert at mid-day luncheon, at the Business Men's Club, where Mr. Kaufman delivered an interesting address to the members of the Richmond Rotary Club on "The Modern Telegraph."

Mr. Kaufman reviewed briefly and clearly the development of the telegraph from the first line constructed in 1844 between Baltimore and Washington to the present-day extensive system of the Western Union Telegraph Company, with its approximately 1,500,000 miles of wire and 25,000 offices. The cable systems and mileage of the world were also referred to. Figures, in respect of the number of wires entering the New York office of the Western Union Telegraph Company, number of employes on the pay-roll, and number of operators on duty at various hours of the day and night, were given.

Reference was also made to the former complementary relations between the Western Union Telegraph Company and the American Telephone and Telegraph Company, entered into for public service on a universal scale. The address was warmly applauded. In the evening the visitors were entertained at a box party at the Lyric Theater.

The out-of-town vistors were: Messrs. J. S. C. Murphy, district manager for Virginia; G. O. Summers, district manager for South Carolina, and E. T. Moore, district manager for North Carolina; and the following managers: Messrs. T. B. Kingsbury, Norfolk, Va.; T. A. Worthington, Newport News, Va.; W. E. Blow, Portsmouth, Va.; J. C. Strickland, Petersburg, Va.; W. M. Oakley, Lynchburg, Va.; J. E. Hammerly, Charlotte, N. C.; J. Shinberger, Wilmington, N. C.; E. Johnson, Charleston, S. C.; J. T. Gray, Columbia, S. C.; B. H. Legg, Greenville, S. C.

Manufacture of Wire.

In the manufacture of wire, bars of metal, four inches square, are heated and passed while hot and plastic through rapidly revolving rolls, reducing the bars to wire rods, which vary from one-quarter of an inch to one inch, or more, in diameter, depending upon the finished size of wire wanted.

The rods, which are formed into coils as they pass through the rolls, are dipped into acid baths to remove loose scale and provide a lubricant for drawing. Drawing consists of pulling rods, while cold, through holes of gradually decreasing diameter drilled in steel plates. During this process the particles of metal become elongated and strained, making the wire harder and more brittle. To restore it to a proper temper it is necessary to heat or anneal it.

When a very fine diameter is required there must be repeated annealings and drawings. This may be done until the bar, which originally was four inches square and four feet long, becomes reduced to a diameter of one one-thousandth of an inch and extended to 13,000 miles in length. Before so fine a size is reached the wire will cut into the steel of the die plate, so the usual die plates must be discarded and the drawing continued through holes drilled in diamonds, the diameters of these diamond dies decreasing by fractional parts of a thousandth of an inch.

Rules for Linemen.

Representatives of nearly all the electric lighting and transmission companies of Connecticut met at Hartford, on February 19, and voted to accept a set of standard precautions for linemen on transmission work which had been formulated by a committee of electrical men called together by the state public utilties commission. The committee was made up of representatives of the Western Union Telegraph Company, the Postal Telegraph-Cable Company, the Southern New England Telephone and Telegraph Company and electric light and power companies of Waterbury, Hartford, New Haven and New London.

How to Find and Remedy Telephone Troubles.

"Telephone Troubles and How to Find Them" is the title of a very practical booklet of fifty-six pages, written by Mr. W. H. Hyde, of Milwaukee, Wis. Mr. Hyde is a practical telephone man, and the manner in which he handles his subject shows that he is a close student of telephone apparatus. He points out the symptoms of telephone troubles, then tells the causes thereof. Knowing the cause, it is easy to apply the remedy.

Mr. Hyde uses plain language, devoid of technicalities, so that the contents of the book may be understood by anyone. The work covers troubles on overhead lines, cables, and in instruments and switchboards, of both the magneto and common-battery systems. The arrangement of the information is very convenient, and by the aid of many diagrams, the subject is made much more easily understood. A good description of telephone apparatus in general is given, and the pamphlet will be found valuable to all telephone inspectors and to everyone who uses a telephone, because it enables one to be his own telephone doctor.

The price of the booklet, which is paper covered, is twenty-five cents per copy. Copies are sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MR. M. FITZGERALD, an old-time cable operator, now retired and living at East Brewster, Mass., writes: "Herewith my remittance for the AGE. You are giving us wonderful value for the small subscription. The cable news is very interesting to me, as I like to hear about the developments in that branch of the service."

Edison-BSCO Type 452 Cell, 450 Ampere Hours' Capacity.

EDISON BSCO PRIMARY BATTERY

The Standard Closed Circuit Cell

The use of Edison Primary Battery on your telephone talking circuits will improve the transmission, strengthen the system, and reduce operating expenses for the following reasons:

A transmitter, to give the best results, should be supplied with a uniform current. Edison Cells are designed for hard service and the drop in voltage from beginning to end of life is very slight. This feature is important where clear transmission is a necessity.

Their use strengthens the system for the reason that long use of any particular set will not impair the transmission. Its superiority, in this respect, over the open circuit types, is marked, the latter quickly polarizing if discharged continuously for any considerable period with consequent drop in voltage, while the Edison Cells are not subject to polarization.

The active material costs much less per ampere hour for Edison Cells than for Cells of the open circuit type. Inspection and maintenance charges are negligible, the cells requiring no attention from the time set up until exhausted; this, considering their long life (200 to 450 ampere hours, according to size adopted), is an item worthy of notice; all the material you pay for is turned into current, nothing wasted account cells drying out, local action, or any of the troubles which affect a battery not built on correct principles.

Write for catalog, voltage curves or other information.

The Cheapest Form of Battery Energy.

TRADE MARK Thomas A Edison

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247 LAKESIDE AVENUE, ORANGE, N. J.

EDISON-BSCO
Complete Renewal showing the all-in-one assembled element.

THE RAILROAD.

MR. C. R. GRAY, president of the Great Northern Railway Company, and a former telegrapher, has been appointed president of the Western Maryland Railway Company, with headquarters at Baltimore, Md. Mr. Gray is a native of Arkansas, and began his railway service in 1882 as an operator on the St. Louis and San Francisco Railway.

JOHN C. STUART, vice-president of the Erie Railroad, New York, and a former telegrapher, died in Garden City, L. I., on March 4. Deceased began railroading in 1880 as an operator on the Chicago and Northwestern Railway, afterward becoming chief train dispatcher, and in 1898 he was appointed general superintendent of the Chicago, St. Paul, Minneapolis and Omaha Railway. He joined the Erie Railroad in 1903, and was elected vice-president in 1910.

TELEPHONE TRAIN CONTROL IN ENGLAND.—The Great Western Railway Company in England, is developing the use of the telephone for train control. The system is in operation at various places in that country.

WIRELESS TRAIN SIGNALS IN GERMANY.—Experiments have been made on the railway from Nuremburg to Grafenberg, Germany, with an electric system of communication, devised by Christoph Wirth. A car of a train carries receiving antennæ, and the telegraph or telephone lines running alongside the railway serve as sending antennæ. By these means a signal can be transmitted to the engine driver, or the Westinghouse brake can be set in operation.

E. L. King, Superintendent of Telegraph, Southern Pacific Company, San Francisco, Cal.

Mr. Ernest Lamarr King, whose appointment as superintendent of telegraph of the Southern Pacific Company, San Francisco, Cal., was announced in our issue dated March 1, was born in Dixon, Cal., August 16, 1875, and entered the telegraph service at Colusa, Cal., in 1890, as a messenger for the Postal Telegraph-Cable Company, becoming manager of the office in 1892. In 1893 he was manager of the Woodland, Cal., office. He entered the employ of the Southern Pacific Railroad, Sacramento Division, as operator in 1894, and filled positions at various points, later advancing to road-master's clerk, and then agent. In 1900 he entered the dispatcher's office at Sacramento as operator, afterward accepting a position in the superintendent's office as clerk, and in 1901 was promoted to be train dispatcher of the Sacramento Division.

In 1906 he went to Sparks, Nev., as chief train dispatcher for the Southern Pacific, but in the latter part of 1907 the position was abolished, and he returned to Sacramento as dispatcher. In September, 1910, he was promoted to be chief train dispatcher of the Shasta Division, Southern Pacific Company, with headquarters at Dunsmuir, and in October, 1912, he became trainmaster. In February, this year, he was appointed to his present position.

Telegraph vs. Telephone in Railroad Operation.

Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn., on March 13 presented a paper before the meeting of the American Institute of Electrical Engineers, New York, entitled "A Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation."

Mr. Clapp gave brief historical descriptions of the use of telegraph and the telephone on railroads, the first train having been handled by telegraph in 1851, and the first handling of trains by telephone on long stretches of main line track being in 1907.

In comparison with the telegraph, Mr. Clapp stated, the telephone circuits cost more to install and operate, but they effect a saving in the operation of the railroad, both directly and indirectly, as it is possible to move trains over the road more rapidly by their use.

The advantages and disadvantages, in comparing the telegraph with the telephone, are summarized by Mr. Clapp as follows:

In favor of the telephone: Universality, saving of time, rapidity of transmission, psychological effects, promptness in raising offices, no necessity of specially trained operators, saving in expense of railroad operation and best operation of circuit in heavy weather.

In favor of the telegraph: Flexibility in handling circuits, simplicity in installing, maintaining and operating, circuit best adapted for long distances, effects of distance in transmission, saving in cost of installation and maintenance, and the standard of maintenance.

In considering what are termed the four methods of communication, namely: by personal interview, by letter, by telephone or telegraph message, and by telephone conversation, Mr. Clapp called attention to the fact that the use of the last-mentioned method by the railroads in this country has not been carried as far as it should.

Meeting of Western Division of Railway Telegraph Superintendents.

In our issue dated March 1 we printed the preliminary programme of the meeting of the Western Division of the Association of Railway Telegraph Superintendents, to be held in Chicago, March 18.

According to the final programme there will be a general discussion on the "Use of the Telephone for Dispatching Trains and Handling Messages."

Mr. F. F. Riefel, of the Lake Shore and Michigan Southern Railway, Cleveland, Ohio, will present a paper on "Use of Motor Cars by Stationed or Section Linemen, Inspectors and Gangs."

Messrs. F. T. Wilbur, of the Illinois Central, Chicago; R. R. Hobbs, of the Louisville and Nashville, Louisville, Ky., and J. J. Ross, of the Michigan Central, Detroit, Mich., will report on "Auto-

matic Telephone for Railroad Intercommunicative Service Between Yards, Shops, Offices, etc."

There will be a general discussion on "Wire-Crossings over Railroad Tracks and Property."

Lackawanna's Wireless Service a Success in the Recent Storm.

The value of wireless telegraphy in the operation of railway trains in abnormal weather conditions was satisfactorily demonstrated on the Lackawanna Railroad during the severe snow and wind storm of March 1 and March 2, which seriously impeded railway traffic for several miles around New York. All of the telegraph and telephone wires were down as a result of the storm, but the Lackawanna Railroad's officials were kept fully informed by wireless as to conditions along the line. The new wireless station at Hoboken was put into emergency operation and communication was obtained with the wireless station at Scranton, Pa. Fast freight trains were thus dispatched and general superintendent E. M. Rine, at Scranton, reported by wireless that the trains would find the tracks open.

President W. H. Truesdale, of the Lackawanna, was particularly pleased with the reports from the Lackawanna Limited, on its way from New York to Buffalo on March 3. From the train were sent exhaustive reports of the exact conditions throughout the whole storm zone, as it proceeded on its way to Scranton. When the train arrived at Scranton fifty-five minutes behind its schedule, the operating officials there had a complete report on the situation. On the strength of this report a freight locomotive, with a caboose attached, was ordered to proceed with a gang of telegraph linemen to a point on the new Lackawanna cut-off, where some extensive repairing was waiting for them.

The wireless service also greatly aided three other railroads—the Erie, the New Jersey Central and the Lehigh Valley. All called upon the Lackawanna to forward messages to New York after the telegraph systems along these railroads had failed. These messages detailed conditions along the three lines named, and they were forwarded to Scranton by telephone and telegraph, after efforts to reach New York had failed. At Scranton the wireless station of the Lackawanna sent the messages to the Marconi station on the roof of the Wanamaker Building, in New York, and the Erie, the New Jersey Central and Lehigh Valley offices then received the reports by telephone from the Marconi station.

Until the opening of its own station in Hoboken, the Lackawanna officials were compelled to depend upon the Wanamaker Building station both to send and receive messages to the company's officials in Scranton and Binghamton. Besides the new station in Hoboken, it is now proposed to build a station, probably at Port Morris, approximately half way between Hoboken and Scranton, and another station at Bath, N. Y., about half way between Binghamton and Buffalo.

The Lackawanna has also decided to erect a wireless station at Dover, N. J., for local business.

RADIO TELEGRAPHY.

Mr. William Marconi, on March 3, in Rome, Italy, lectured before a large and distinguished audience on progress in radio-telegraphy. He received the congratulations of King Victor Emanuel, who was present, and was received in special audience the next day by Queen Margherita, who complimented him on the success of his work.

Mr. Edward J. Nally, vice-president and general manager Marconi Wireless Telegraph Company of America, reports that on account of the havoc played with telegraph and telephone wires on all routes out of New York, by the recent storms, there is an increased interest in the use of wireless on trains, and a number of important railroads have established negotiations with the Marconi Company, looking to the installation of wireless service on their systems.

Mr. John Bottomley, vice-president of the Marconi Wireless Telegraph Company of America, was present at the services held in New York on March 1, in memory of F. J. Kuehn, the wireless operator who lost his life in the sinking of the steamer "Monroe" on January 30. Mr. Bottomley praised young Kuehn as one of the army of wireless operators who never failed to do their duty, and who are deserving of the highest tribute which could be paid to them.

Radio Operator Suspended for Talking Too Much.—The Department of Commerce, Radio Service, has suspended for a period of thirty days the license of a radio operator who had indulged in unnecessary and unauthorized radio conversation and used profane and obscene language by radio. This is the second case where an operator's license has been suspended by the department because of not complying with the requirements of the law.

The "Nantucket's" Operator Was Reading Novel When Collision Occurred. — Adolph Doehler, senior wireless operator of the steamer "Nantucket," which collided with and sank the steamer "Monroe" off the Virginia capes on January 30, testified at the inquiry into the disaster that he was reading a novel before and at the time of the collision, and paid no attention to the wireless conversations and signals between other ships, although he had the receiver at his ear. He heard the "Monroe" and her sister ship, the "Hamilton," exchanging signals a few minutes before the accident, but paid no further attention.

Radio Engineers.

The regular meeting of the Institute of Radio Engineers was held at Columbia University, New York, in the evening of March 4. Mr. Louis Cohen presented a paper on "A New Method of Determining Logarithmic Decrements." Dr. L. W. Austin also read a short paper on "The Effect of a Parallel Condenser in the Receiving Antenna," showing the loss in strength of signals by such an arrangement. The Radio Engineers held a joint meeting with the American Institute of Electrical Engineers on March 13, as reported elsewhere in this issue.

The Lineman.*

BY W. I. CAPEN, VICE-PRESIDENT POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

There is often much interest expressed as to the work of a lineman and gangman during storms which, in the vast territory covered by the Postal Telegraph-Cable Company in the United States, are sure to be experienced several times each year. If the disaster is not caused by sleet and snow, it is by flood or cyclone.

A lineman on a station, during good weather, has as easy a life as any man who has to work for a living could possibly expect, and he recognizes this; but when a storm comes the conditions are different, and he stands ready to start out to perform the most arduous duties at any time of the day or night. There are but few business men who use the telegraph constantly who have any idea of the difficulties encountered in maintaining telegraph service during storms, and, of course, they never give any thought to the hardships endured by the linemen and gangmen to restore prompt communication after the lines have been torn down.

I remember one storm which occurred on Thanksgiving Day, a few years ago, and the call for linemen was sent out at the hour when most of them were partaking of their Thanksgiving dinner with their families and friends. In several instances, these linemen excused themselves from the dinner table and hastily gathered their heavy boots, storm coats, gloves and tools, and rushed for the railroad station to take the first train to the nearest point to the wreck which had been located by the wire chiefs. When the wreck was reached, which is usually by team from the railroad station, the linemen found wires broken by trees falling through them, the cross-arms wrenched off from the poles, and the poles themselves broken and down, sometimes for a mile at a stretch. The repairs to such a wreck as this would be comparatively easy were it not for the fact that, generally, such wrecks are caused by sleet and that the fallen wires have frozen into the sleet in a tangled mass, from which it is almost impossible for the men to get them out. It is seldom that the weather, after the sleet, does not turn into bitter cold, and this cold is accompanied by a sharp wind. It is this wind and cold that cause the sufferings of the linemen. However, a gang has never been known to "lay down" on their work, and they can always be counted upon to keep at work, regardless of conditions, until they get wires through, notwithstanding that they are out of reach of all communication. It is nothing unusual for them not to be able to get a change of clothing for two or three weeks from the time they leave home, because in cases of wrecks no useless baggage can be carried—all space has to be used for the carriage and cartage of material with which to restore the lines.

In cases of floods, bridges are generally carried downstream and, where overhead crossings are maintained, they are sure to be swept down, but in one case the writer remembers where one strong iron wire out of a line carrying twenty wires, remained intact. The stretch across this river was something like 1,200 feet, and one brave, young lineman, who weighed a little less than his companions, made a makeshift boatswain chair out of some rope and one of his small pulley-blocks and rode across the swollen river on this wire, carrying a line with which to pull across the other wires. In this way communication was restored within a few hours. The man took a great risk, but he did not seem to think he did anything more than his duty, much less even expect commendation; but the man at headquarters did not forget the lineman.

River cables are often damaged by snags or dragging anchors, making it necessary to raise the cable in the work of repairs. Sometimes a cable will come up very easily, until a point is reached near the snag, and then force enough cannot be put on to the sheath of the cable to raise it any further. At such times we have had our linemen dive and clear these obstructions, which are often at a depth where such work, as a matter of fact, should only have been undertaken by a man in a diving suit. With the obstruction removed, the work of raising is continued until the damaged portion of the cable is reached, when the usual repairs are made and communication restored, then the cable is dropped overboard, and the crew is free to be sent on other work. In the Missouri and Mississippi rivers it is not infrequent to lose a cable entirely during a big flood. It has been dragged out by some big snag and covered so deeply in the silt that it cannot be located. In such cases a new cable is installed as soon as flood conditions permit.

The linemen are in a class of their own, and, as a rule, they are made up of the sturdiest young men. They are of all nationalities, but they are linemen and have no other occupation.

* Postal Telegraph.

The Huertley Current Magnifier.

The Huertley magnifier of weak electrical currents depends upon the variation of resistance of two platinum wires forming two sides of a Wheatstone bridge. Each of these wires is mounted over a slit in a tube through which air is blown. The movement of the receiving coil, such as is used in a siphon recorder, is transmitted to these wires by silk fibers and the resultant movement causes one wire to be drawn further out of the stream of air, while the other is drawn further into it. The wires are maintained hot by passing a current through them, and thus each movement causes a considerable variation of resistance. In actual operation the movement is barely visible. The instrument is capable of receiving seventy-five words per minute with 0.7 microampere of current.

MR. W. M. GODSOE, superintendent Canadian Pacific Railway Company's Telegraphs, St. John, N. B., Canada, writes: "Enclosed find $2.50 for renewal of my subscription. I would not, for a much greater amount, care to miss an issue of your most valuable paper."

MUNICIPAL ELECTRICIANS.

MR. JOSEPH SMITH, superintendent of the police telegraph system, Rochester, N. Y., has resigned.

Fire Alarms Suffer by the Storm.

The "blizzard" of March 1 and March 2 did much damage to fire and police telegraph systems throughout the storm area, of which New York City was the center. The wires in New York and Brooklyn were affected, to some extent, by short circuits and crosses in the manholes, and, on account of the uncertainty of the service and the almost impassable condition of the streets, by reason of the accumulation of snow, firemen were detailed to patrol prescribed sections of the city for the purpose of sending signals to the fire-engine houses by prearranged means in case of the discovery of a fire. At night, lanterns were used for signal purposes.

In Newark, and other places, the fire-alarm systems suffered much damage by reason of the prostration of the pole lines carrying the signal wires, and special means had to be adopted to notify the fire stations in case of outbreak of fire.

Glass Telegraph Poles.

Some years ago some experiments were made in Germany with glass telegraph poles, but the poles did not prove satisfactory on account of the effects of variations of temperature. By the influence of heat and cold many cracks developed and the poles were rendered useless, necessitating their removal after a year's trial.

Experiments are now being made with concrete poles manufactured by Messrs. Schütz & Company, of Cassel, Germany. These poles have been in use for three years and have given satisfactory results as to their strength, and the weather has practically no effect upon them. They are designed especially for heavy loads.

Bound Volumes of Telegraph and Telephone Age.

Bound volumes of TELEGRAPH AND TELEPHONE AGE for 1913 are now ready for sale. This volume is full of interesting and instructive matter, and will be found valuable for reference and study. It has a comprehensive index, and covers the events of the year in a thorough manner. It also contains the index for the year 1912. The price is $3.50 per volume, sent by express, charges collect. Address TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

INDUSTRIAL.

Western Electric's Sales in 1913.

Sales of the Western Electric Company for the year 1913 were approximately $78,000,000, an increase of about $6,000,000, or over 8 per cent, over the 1912 sales. The company added upwards of 4,000 customers last year, bringing the number to approximately 36,000. The increase in business was quite general with customers of the various classes, sales being made to the Bell companies and telephone concerns outside of the Bell system, as well as many thousands of customers for electric light supplies.

The export business in 1913 was the largest in the history of the company, notwithstanding the conditions in Mexico.

G. R. S. SELECTORS ON WHEELING AND LAKE ERIE.—The Wheeling and Lake Erie Railroad has placed orders with the General Railway Signal Company, Rochester, N. Y., for selector equipment to operate in connection with three telephone circuits. The equipment will be installed as follows: Brewster to Toledo, including branches to Huron, Dalton and Orrville, dispatching circuit, comprising thirty-three selector stations; Brewster to Norwalk, including branch to Huron, message circuit, comprising twenty-three selector stations;

Brewster to Terminal Junction, including branch to Steubenville, message circuit, comprising twenty selector stations. The order specifies the standard equipment of the G. R. S. selector system, including selectors, bells, key cabinets and the necessary reactance and capacity units.

BOSTON TELEGRAPHERS MUTUAL AID ASSOCIATION ELECTION.—The annual meeting and election of officers of the Telegraphers Mutual Aid Association of Boston was held on March 1. J. B. Gatins was re-elected president; C. A. Hart, recording secretary, and W. H. Sullivan, secretary and treasurer.

MAGNETIC CLUB DINNER.—The next dinner of the Magnetic Club will be held at the Broadway Central Hotel, New York, on April 15. An excellent programme of entertainment is being arranged, and it is expected that an enjoyable evening will be passed. Mr. C. F. Leonard is president and Mr. W. B. Dunn, secretary.

PHILADELPHIA ELECTRICAL AID SOCIETY ENTERTAINMENT.—The Electrical Aid Society of the City of Philadelphia, Philadelphia, Pa., will hold its annual entertainment, banquet and dance Thursday evening, April 16. Mr. M. N. Redding is chairman of the entertainment committee and Mr. John A. Smith is secretary. The membership of the society embraces employes of the telegraph and telephone companies, the electrical bureau and railroad automatic signal service in Philadelphia.

LETTERS FROM OUR AGENTS.

CHICAGO POSTAL.

Mr. T. W. Sullivan, head of the Chicago messenger department, who was also proprietor of the Postal restaurant, resigned on February 15, to accept a position with the Marconi Wireless Telegraph Company, as head of the commissary department at San Francisco, Cal., and Honolulu, H. T.

Mr. W. G. Cooper, lately city auditor of Elyria, Ohio, has been appointed manager of the branch office of this company at 57 East Twenty-second street in this city.

Mr. C. W. Tatge, one of the oldest employes of this company in Chicago, has lately purchased a five-cylinder Ford car.

Mrs. E. W. Collins, the wife of general superintendent E. W. Collins, has been in New York for several weeks past, having been called there by the serious illness of a relative.

FRESNO, CAL., WESTERN UNION.

Miss Alice M. Pember, cashier at this office for the past three years, has been transferred to the Sacramento office as chief bookkeeper. Mrs. Belle Doster, of Atlanta, Ga., succeeds Miss Pember. Before leaving for Sacramento Miss Pember was presented with an Eastern Star pin by the force in this office.

Telegraph and Telephone Age

No. 7. NEW YORK, APRIL 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

"Do It Electrically" (*Continued*).

In the preceding installment of this article it was stated that the time is fast approaching when nearly all mechanical and other work will be done by means of electric power.

The future electrically equipped home therein described is not at all impractical. It merely seems fanciful to most of us because the public is not, as yet, fully awakened to a full knowledge of the multiplicity of useful and economical purposes to which electricity is adaptable.

Electricity enters the sphere of almost every industry and profession, and is a formidable competitor of other forms of utility in every case. In the household electric lamps, heating and cooking utensils lessen the number of the physicians' visits by establishing healthier living conditions. Gas jets and grate fires consume much oxygen and thereby cause debility; furnaces fill the rooms with more or less poisonous carbonic gas, which is even worse. Electricity consumes none of the oxygen in the air one breathes, or causes any harmful fumes, hence its use is an ideal preventive of disease and very desirable in the sick room. Electricity is also a health restorative in many cases, when properly applied. Medical batteries and vibrators wisely used quickly start the circulation and give vigor to a fatigued body after a few minutes' application. Last, but not least, the door may be effectually shut against the dreaded plumber when the water pipes freeze by merely installing an electric soldering iron, which may be applied to the frozen spots in the pipe; or better still, by winding the pipe with several layers of insulated high resistance German silver wire, and passing a strong current of electricity through the coil so formed, the danger of bursting the pipe or setting fire to adjacent woodwork when a flame is applied is thus entirely eliminated.

Of course, the public generally knows that electric door bells, burglar-alarms and many other devices are quite extensively used, but the great majority of persons do not use them because they have no idea how simple and easy a matter it is for any one possessing ordinary intelligence to install them. It is the expense incurred for installing these devices that usually deters one from using them. A complete door bell or reliable burglar-alarm outfit, including the house wire and battery, can be purchased for one dollar, and even less, in almost any electric supply store. There need be no other expense.

In order to show the simplicity of the operation of installing such devices and encourage the more general use thereof, it is only necessary to proceed as follows:

Procure a coil of twisted-pair of copper-braided wires of sufficient length to extend to those parts

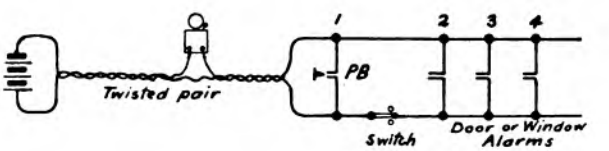

DIAGRAM OF DOOR-BELL AND ALARM CIRCUIT.

of the house it is desired to reach, and two or three cells of good dry battery. This braided wire will contain the two conductors necessary for making a metallic circuit. The first step is to connect the battery to the two conductors at one end, as shown in the accompanying illustration. The opposite ends of both conductors must be left open, in order that the loop containing the battery and bell cannot be closed except through one or more of the window, door, or other devices connected across the pair, like the rungs in a ladder, as shown at 1, 2, 3 and 4. The bell, however, should be connected in series with one conductor, and not between the pair. Then extend the wire to the push-button on the outside casing of the front door. This is easily done by boring a hole through the woodwork with a long auger or drill. The braided pair is then extended to the small brass connections of the devices on the various doors and windows, and connected as shown at 2, 3 and 4. These latter devices are so constructed as to leave the "rung," or cross-connecting wires, open as long as the

windows or doors remain closed. The opening of a window or door, however, allows the two springs to make contact, and thus close the bell circuit.

In order that windows and doors may be opened during the daytime without setting off an alarm, a three-point switch should be inserted in series with one conductor, as shown, just after the push-button for the door bell. By opening this switch all window circuits are disconnected and visitors may still ring the door bell by pushing the button. In case a burglar should gain access to the house through some unprotected point, further protection may be afforded by including electric matting in the circuit. A small mat, concealed under a rug or carpet on the steps of the stairway and connected to the twisted pair in the same manner, will quickly make known the presence of any one attempting to ascend. There are, of course, many other useful devices that may be included in the circuit, and each operated by the same common battery.

Persons interested in electrical matters can find no better or more interesting way of facilitating their studies than by experimenting with household utilities along the line suggested.

Telegraph and Telephone Patents.

ISSUED MARCH 3.

1,088,686. Transmitter for Wireless Telephony. To W. T. Ditcham, Twickenham, England.

1,088,879. Telephone System. To H. P. Clausen, Rochester, N. Y.

1,089,091. Receiving Device for Wireless Systems. To W. E. Stokes, jr., New York, N. Y.

ISSUED MARCH 10.

1,089,394. Call-recording System for Telephone Exchanges. To E. E. Clement, Washington, D. C.

1,089,673. Telephone Cut-off. To R. J. Robinson, Romulus, Okla.

1,089,825. Telephone Transmission Circuit. To H. C. Egerton, Passaic, N. J.

1,090,053. Telephone-locking Device. To J. W. Harvey, Sunset, Tex.

PERSONAL.

MR. R. F. SPAMER, formerly identified with the Western Electric Company, has been appointed general manager of the Electrical Experiment Company, Inc., New York.

MR. W. C. CARSWELL, manager of the Western Union office at Topeka, Kan., is chairman of the State and National Legislative Committee of the Commercial Club of Topeka, and is one of the leading and most active citizens of that place.

MR. J. J. GHEGAN, president of J. H. Bunnell & Co., New York, accompanied by Mrs. Ghegan and Charles E. Graham, vice-president of the same company, accompanied by Mrs. Graham, are making a vacation trip through Florida, and will go as far as Cuba before they return to New York, which will be early in April.

MR. EDWARD L. MORSE, of Stockbridge, Mass., son of Professor S. F. B. Morse, has finished the writing of the work on which he has been engaged for the last four years, entitled "The Letters and Journals of Samuel F. B. Morse." It will be published by the Houghton Mifflin Company, and will probably appear some time next autumn. "It has been a pleasant task," Mr. Morse says, "and I hope it will be found interesting, not only by all who have anything to do with the telegraph, but by a wider circle of readers."

MR. GEORGE M. MYERS, of Kansas City, Mo., the well-known old-time telegrapher and president of the Old Time Telegraphers and Historical Association, is the possessor of two parrots which speak the English language to the extent of being able to say "seven o'clock, seven o'clock." Mr. Myers had cherished a desire to own a parrot, so, during his recent trip through the West Indies and South America with his wife and daughter, he purchased two birds in Venezuela. They are eighteen months old, but do not seem to be inclined to extend their knowledge of English.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, March 30:

American Telephone and Telegraph Co.	122⅜
Mackay Companies	85
Mackay Companies, preferred	69
Marconi Wireless Tel. Co. of Am.	5
Western Union Telegraph Co.	62⅝

MESSENGER AS A NURSE.—The Western Union Telegraph Company at St. Paul, Minn., was recently called upon to supply a messenger to watch over and care for a sleeping baby while the parents attended the theatre.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. G. H. USHER, general superintendent, Atlanta, Ga., has returned from an inspection of the Mackay Telegraph and Cable offices in Texas.

COLONEL A. B. CHANDLER, former president of this company, has been seriously ill at his home in Brooklyn with pneumonia. He has passed the crisis, and is now considered to be on the road to recovery.

FRANCIS WILEY JONES, aged sixty-eight years, formerly electrical engineer of this company, died March 28, at West Palm Beach, Fla., where he has been accustomed for several years past to spend the winter months.

MR. S. E. ELLIOTT, chief operator at Nashville, Tenn., has been appointed acting manager, manager A. P. Martin having resigned to enter the life insurance business.

MR. E. P. COOPER, manager at Trenton, N. J., has been granted a leave of absence and will take a trip for pleasure and recreation through the South and West. During his absence Mr. A. J. Crouch, Mr. Cooper's assistant, will have charge of the office.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: P. C. Booth, Lawrence, Mass.; J. F. Hendricks, Cedar Falls, Ia.; E. J. Cline, Newport, Tenn.; Doris Hopkins, Victor, Col.; A. J. McGary, Salem, Ohio; H. V. Bogart, Zanesville, Ohio.

CONCRETE BASES FOR POLES.—This company is placing concrete bases around its poles on the levee in Cairo, Ill.

COPY OF T. M. B. A. REPORT WANTED.—Mr. Chas. P. Bruch, 253 Broadway, New York, has a complete set of the Telegraphers' Mutual Benefit Association annual reports from 1879 to date, excepting the report for the year 1885. If any of our readers has a copy of this report which he can spare, Mr. Bruch would be very glad to get it.

APPARATUS CATALOGUE.—The engineering department of this company has just issued a very complete catalogue of the company's standard equipment. All of the apparatus is illustrated and numbered for reference in ordering from stock. The book was compiled and gotten out under the personal supervision of Mr. J. F. Skirrow, associate electrical engineer, and is well arranged for reference, the indexes being especially complete. On the back of many of the sheets of diagrams is a list of the instruments needed to set up the equipment. The book is of the loose-leaf type.

Magnetic Club Dinner.

The regular spring meeting of the Magnetic Club will be held at the Broadway Central Hotel, New York, at half-past six o'clock, on the evening of Wednesday, April 15.

Mr. Edward Reynolds, vice-president and general manager of the Postal Telegraph-Cable Company, and Mr. John J. Whalen, manager New York operating department of the same company, will address the meeting.

The greater portion of the evening will be devoted to entertainment by professionals and acceptable souvenirs will be given to those present.

All acceptances should be in the hands of Mr. Joseph J. Cardona, treasurer, 253 Broadway, New York, not later than Tuesday, April 14.

Mr. C. F. Leonard, is president and Mr. W. B. Dunn, secretary.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, vice-president, sailed on the steamer "Mauretania," on March 17, for London, and Mr. J. C. Willever, United States manager Cable System, sailed on the steamer "Oceanic," on March 20, for the same destination. They will meet in London and will be absent about three weeks. Mr. Willever was accompanied by Mrs. Willever, and they will make a trip to the Continent before returning home.

MR. W. W. RYDER, general manager of the Western Division, Chicago, Ill., accompanied by assistant general manager M. T. Cook, division traffic superintendent T. W. Carroll, district plant superintendent W. W. Watt, division plant superintendent R. W. Whitehead, district commercial superintendent A. B. Cowan and district traffic superintendent W. J. Armstrong spent the week beginning March 9 inspecting various offices in Illinois and Iowa.

MR. F. W. LIENAU, assistant secretary of the company, has returned from Nashville, Tenn., where he spent a week on company business.

MR. JAMES MERRIHEW, formerly general superintendent of the Western Union Telegraph Company, New York, now retired, is spending the winter months in Florida, boating and fishing.

MR. G. E. PALMER.—A handsomely leather-bound volume, containing the autographs of the Western Union employes at San Francisco, Cal., was presented to Mr. G. E. Palmer, former chief operator in the San Francisco office, on the occasion of his departure to become division traffic engineer at New York. It also contains group portraits of the Pacific Division officials, the chief operator and his assistants, the main operating room and the telephone department.

Postal Telegraph of Texas.

MR. W. E. GRIFFITHS, assistant manager of the Dallas, Tex., office of the Postal Telegraph-Cable Company of Texas, has been appointed manager, to succeed L. A. Ott, resigned.

MR. R. W. FROST, chief clerk in the office of the Postal Telegraph-Cable Company of Texas, Dallas, Tex., has been appointed auditor to succeed Mr. W. L. Jones, who has been appointed general manager of the same company.

Mr. English's Merited Promotions.

A complimentary article is printed in the Lake Charles, La., *Daily Times* about the successful career of Mr. Shirley M. English, general manager of the Gulf Division of the Western Union Telegraph Company, at Dallas, Tex. Mr. English is well known in Lake Charles. About fifteen years ago he was an operator at Rayne, near Lake Charles, where he was receiving a salary of $35 or $40 per month. "The latest promotion of Mr. English," says the *Times*, "is not a surprise to his friends—to none who know him personally. It is looked upon as the most natural thing possible. Every man has a chance in this world, no matter how humble his beginning; but few of us are willing to pay the price. If success was easy there would be no failures, and all of us would be reveling in glory and ease; but success means application, loyalty, deprivation and unstinted tenacity; success comes only to those who care for it enough to work hard for it; and it does not come in a day.

"S. M. English was willing to pay the price for his success," the article continues. "When he was sitting up cold nights, working ten and twelve hours a day, for what would now seem a mere pittance, he had in his mind the idea that if he proved worthy it would not always be so hard. Those who know him say that many nights and days when he was an operator he went without sleep or rest when his company needed him and never was he heard to complain. Is it a wonder that his company found him a larger office, and gave him the chance he craved to make good? Is it a wonder that he was lifted from one rung of the ladder to another until he has finally reached the top?

"While general superintendent of the Postal at Dallas, it is told, the company was frequently short of night help, and dozens of times, even after a

hard and trying day in the office, Mr. English would spend the night at the key, working even harder than the men under him. In his dealings with his employes—and he has had thousands—he was always fair and just, but he demanded like treatment from them. They have understood that he required certain things of them, and when they felt they could no longer fill them in Mr. English's way they have been given a chance to work elsewhere.

"The rise of Shirley M. English," the article states in conclusion, "should prove an incentive for every young man to make the effort if he hopes for success. He won his way by working, by plodding, by being faithful and true to his employers, and for the time being forgetting about the quitting hour and pay day."

Dinner of District Commercial Managers.

An informal social dinner was recently held at the Hotel Gonfarone, West Eighth street, New York, by some of the members of the New York district commercial department of the Western Union Telegraph Company.

After an excellent meal had been served and all were enjoying the cigars so kindly donated by district commercial manager M. E. Pierce, remarks were made by Messrs. P. J. Casey, A. Lister, W. J. Ackerly, J. Veitch, C. W. Kay, J. J. Riley, C. B. McCann, A. Simon and M. E. Pierce. Mr. P. J. Casey acted as toastmaster.

The following were present: Special agent P. J. Casey, district cable manager A. Lister, cable agents J. N. Weisiger and G. W. Fascher, district commercial managers W. J. Ackerly, M. J. Brooks, J. T. Carberry, P. Kinman, C. B. McCann, M. E. Pierce, J. J. Riley, F. Spree, P. J. Sullivan and J. Veitch; managers B. F. Benson, W. H. Davis, J. H. Fleming, C. W. Kay, F. J. Nilan, W. A. Schudt, A. Simon and supervisor J. Leboffe. It has been decided to hold these dinners periodically and Mr. Lister, Mr. Veitch and Mr. Pierce were appointed a committee of arrangements.

Walter L. Jones, General Manager Postal Telegraph-Cable Company of Texas, Dallas, Tex.

Mr. Walter L. Jones, general manager of the Postal Telegraph-Cable Company of Texas, Dallas, Tex., whose appointment to this position was announced in our March 16 issue, was born in Belton, Mo., November 15, 1872. He first entered the telegraph service at Kansas City, Mo., with the Western Union Telegraph Company. In 1892 he resigned to accept a position with the Atchison, Topeka and Santa Fe Railroad in Colorado, and in 1893 entered the service of the St. Louis Southwestern Railway, as operator in the general offices of that company in Texarkana, Tex., where he remained three years. In 1896 he re-entered the commercial telegraph service, and for three years was employed by the telegraph companies and in newspaper offices in St. Louis, Kansas City and Chicago.

Mr. Jones resigned his position with the Western Union in Chicago in 1898, when the Postal Telegraph-Cable Company of Texas built its lines in the Southwest, and entered the service of the latter company as operator at Galveston, Tex. He has been with the Postal Company of Texas for fifteen

W. L. JONES, DALLAS, TEX.

years, serving one year as operator, four years as assistant chief operator at Dallas, three years as manager at Fort Worth and four years as manager at Dallas. In 1911 Mr. Jones was appointed secretary and auditor of the company, with headquarters at Dallas.

THE CABLE.

Western Union Cable System Liverpool Staff.

Since September 1, 1913, when the three cable companies, comprising the Western Union Cable Systems came together into a new and commodious office in the Exchange Buildings, Liverpool, Eng., changes in the staff have taken place.

On November 30 Mr. Beswick, superintendent of the Direct Cable Company, and Mr. Hodgkinson, superintendent of the Anglo-American Company, both retired on pension after long service, faithful and strenuous. Mr. Healey, superintendent of the Western Union, followed them, also on pension, in December. They were all held in high esteem by their respective staffs, who, most heartily united in giving a presentation to each, as a token of respect and good will.

The Liverpool superintendent of the system now is Mr. C. V. Auger, who was promoted from London, and it is confidently felt that the same harmonious relations between chief and employes will exist in the future as in the past. Mr. R. Williams is chief clerk.

New Belgian Cables.—The Belgian Minister of Marine has signed an agreement with the Eastern Telegraph Company for the establishment of two new submarine cables, one connecting Belgium with Porthcurno, on the British coast, and another connecting Loanda with Banana, in the Belgian Congo.

CANADIAN NOTES.

Mr. Charles R. Hosmer, Montreal, Que.

An interesting story of Mr. Charles R. Hosmer, former manager of the Canadian Pacific Railway's Telegraphs, Montreal, Que., is printed in the *Montreal Daily Mail*.

"I first saw Mr. Charles R. Hosmer, the well-known capitalist of Montreal," says the writer of the article who signs himself "The Wanderer," "just before he organized the Canadian Pacific Railway's Telegraphs in 1886, and it has been my pleasure to meet him many times since, both when he was manager of the Canadian Pacific Railway's Telegraphs and since he has devoted his time to his many other interests. Montreal has many examples of self-made men, of whom it is rightly proud, but of none has it reason to be more proud than of Charles Rudolph Hosmer. Born at Coteau Landing in 1851, he left school early and entered the old Grand Trunk station at Coteau as office boy. There he learned telegraphy, and having got his foot on the rung of the ladder, has been climbing steadily ever since. It was no small undertaking to establish a transcontinental telegraph line along the line of the just then completed transcontinental railway, but Mr. Hosmer and his associates, notably the present general manager of the Canadian Pacific Railway's Telegraphs, Mr. James Kent, were practical men, and they laid their plans with a practical knowledge of what was to be done which was only equalled by their faith in the future of the enterprise they were then launching. Since then the Canadian Pacific Railway's Telegraphs has reached the ends of the earth, being part of the all-red line from the Empire's heart to the other side of the Pacific Ocean, and as it has developed, so has Mr. Hosmer. He remained with the telegraphs for sixteen years, when he retired to give his attention to other interests. He is now president of the Ogilvie flour mills, a director of the Canadian Pacific Railway and of the Bank of Montreal, and is interested in more companies than my space will allow me to recapitulate. In addition, his philanthropic efforts are myriad, whilst as a patron of the arts and of sports, he is in the first rank. And to him, probably more than to any other individual citizen, does Montreal owe the erection of the Ritz-Carlton Hotel on Sherbrooke street."

THE TELEPHONE.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, New York, sailed for Europe on March 21 on the steamer "Imperator." He will spend five or six weeks in England and France resting.

Entertainment Hall in Buffalo New Exchange.—The new telephone exchange in Buffalo, of the New York Telephone Company, is provided with a general meeting hall, which is available for entertainments, including moving pictures. A cabaret show was recently given there, in connection with the semi-annual tea of the Friday Culture Club.

Boston Plant Chapter.—The Boston Plant Chapter Telephone and Telegraph Society of New England held its regular meeting at the American House, Boston, on March 24. Professor J. Ernest Woodland, of the Mechanics' Institute, Rochester, N. Y., delivered an address on "Twentieth Century Science," and conducted a number of demonstrations.

Long-Distance Telephony in France.—A long-distance telephone call in France can be made only after arranging for an appointment. A time is set for the call. If not on hand, the subscriber loses his place in the appointment list and must make a new appointment. If he exceeds his time limit the connection is cut off while he is talking.

Pacific Telephone Suit Settled.—The suit brought by the government against the Pacific Telegraph and Telephone Company to give up its holdings in the Northwestern Telephone Company and the Interstate Telephone Company, in Washington and Idaho, was settled in Portland, Ore., March 26, by the company agreeing to dissolve the combination and thus restore competitive conditions in the Pacific Northwest.

Form of Contract Between American Telephone and Telegraph Company and Independent Telephone Companies for Toll Service.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, New York, has made public the form of contract with the independent telephone companies for the use of the toll lines of the former company, which has been dictated by the United States Attorney-General.

Article I permits the subscribing company to directly connect its switchboard with a switchboard of the Bell Company, as provided.

In article II, the subscribing company agrees to supply and maintain all trunk lines connecting its exchange with that of the Bell Company.

Article III relates to the handling of business between the subscribing company and the Bell Company. The tolls for interchange communication shall belong to the Bell Company. Provision is also made for the settlement of differences arising under the agreement concerning matters of supply and maintenance of service.

A connection charge of ten cents, in addition to the regular toll, will be made for each communication to an exchange fifty miles or more from the subscribing company's exchange.

No connection charge, in addition to the regular toll, will be made for communications in exchanges beyond certain limits.

The provisions of the agreement are comprehensive and the directors of the National Independent Telephone Association have, by resolution, declared that they find that, in their best judgment, the contract clearly and fairly, in its details, carries into effect the spirit of the letter of Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, to the Attorney-General of the United States, dated December 19, 1913. The directors also commend the agreement as being fair, leaving the question as to whether it should be entered into by independents to each individual company, to be determined solely by the advantage or disadvantage that such company will receive from the connection.

RADIO TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, will sail on the steamer "Mauretania" on April 7 on a business trip to England, this time in connection with trans-oceanic traffic, which it is expected will be ready about June 1.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, accompanied by the engineers of the company, left New York on March 30 for Chatham and Marion Mass., to select a site for the new building which the company is about to erect in connection with the new high-power station to work with Norway for Norway and Northern Russia traffic.

MR. E. B. PILLSBURY, assistant traffic manager of the Marconi Wireless Telegraph Company of America, at New York, has returned from a two weeks' vacation spent in Florida and has now resumed the duties of his new office.

LONG-DISTANCE WIRELESS COMMUNICATION.—Communication was held, on March 14, between the wireless station at Nauen, Germany, and one at Windhoek, Cape of Good Hope, South Africa.

WIRELESS BUREAU.—The House Committee on Appropriations has been asked to appropriate $50,000 to establish a wireless research laboratory in connection with the Bureau of Standards at Washington.

WIRELESS IN SANTO DOMINGO.—A wireless station is to be erected at San Pedro de Macoris, Dominican Republic, to be operated in connection with the stations at Santo Domingo and La Romana. The wireless service is operated by the Dominican Government.

WIRELESS FOR OIL PIPE LINES.—The National Transit Company recently installed at Oil City, Pa., an experimental wireless telegraph station, placing two forty-foot poles 158 feet apart, with six wires three feet apart for the aerial, on the flat roof of the company's office buildings. Mr. H. W. P. Swisher, superintendent of telegraph, says: "Our object in putting in this station is to demonstrate, to our satisfaction, whether or not it would be practicable to install wireless outfits at our trunk oil pump stations, to be used when our land telegraph lines are down and out of service. Results, thus far, have not been as satisfactory as we could wish, but we are still experimenting."

Wireless Operator Fined and Another Prosecuted for Forgery.

The Secretary of Commerce recently approved a penalty of $25 to be collected from an amateur wireless operator in San Francisco, Cal., for a violation of the fifteenth regulation of the wireless act of August 13, 1912, in that the wave-length emitted by his wireless station exceeded, by 370 meters, the limit fixed by law for his class of station.

The amateur was given several warnings by the United States Radio Inspector and allowed a considerable length of time in which to properly adjust his station. There are several simple methods by which an amateur may determine the wave-length he is using, with which all amateur station operators should be familiar.

"A commercial wireless operator holding a license issued by the Department of Commerce," says Mr. W. D. Terrell, Radio Inspector, New York, "should be very careful to have the service record on the back of his license properly filled in and signed by the captain or official under whom he is employed.

"Recently, a commercial operator, either through ignorance or intent, forged the signatures of two captains, under whom he had served, to the license record. The Secretary of Commerce has referred the papers in the case to the United States Attorney, in order that prosecution for forgery may be instituted. Wireless operators must be taught to realize their responsibility under their licenses."

Mr. Lee Lemon in the Wireless Field.

Mr. Lee Lemon has been appointed commercial representative of the Marconi Wireless Telegraph Company of America, with headquarters in the Webster Building, at Chicago. He will be in charge of the business-getting organization of the company, with jurisdiction over the corps of assistants, who will be located in all of the larger cities of the Middle West. He has had a wide experience in the operating and executive branches of telegraphy, which will be valuable in the new service. He learned to telegraph when a boy, on the Pennsylvania Railroad, and soon entered the service of the Western Union Telegraph Company, serving that company in various Eastern and Western cities as operator, chief operator and manager, until his services were sought by the Baltimore & Ohio Telegraph Company. He remained with that company until the merger with the Western Union, when he was employed as chief operator by the Northern Pacific Railroad, in Montana.

In 1890 he entered the ranks of the Postal Telegraph-Cable Company, as manager at Altoona, Pa., from which position he was advanced to be manager of the offices at Baltimore, where he also served the city as superintendent of the fire and police telegraph. During his term of office with the city, he rebuilt the plant and station. His record at Baltimore was such that his promotion to the superintendency at Pittsburgh was a natural sequence, as was his further promotion to be superintendent at Philadelphia, which position he filled for seven years. On January 1, 1909, he was transferred to New York by the Postal Company, and made superintendent of the Eastern Division, which position he filled three years, with credit to himself and honor to the company.

Personally, Mr. Lemon is a man of high ideals and character, and he has a ready and wide grasp of all things telegraphic, which will fit him for the duties of his present position. His new work will offer fine opportunity for the exercise of the knowledge and experience he has accumulated during his varied telegraph career.

The Late John Gott.

The death of John Gott, at Brighton, England, on March 8, from pleurisy and pneumonia, as briefly announced in our March 16 issue, was read with much sorrow by telegraph engineers and electricians throughout the world. He was one of the few remaining pioneer submarine cable engineers, and the value of his work in electrical testing and practical telegraphy is widely known. His genial disposition endeared him to all who were associated with him.

Mr. Gott was born at Kendal, Westmoreland, England, in 1840, and entered the telegraph service early in life. His first employment was with the Electric and International Telegraph Company. About the year 1861 he was selected to serve at Naples, Italy, in the supervision of international traffic passing over the Italian Government landlines. In 1863 he went to Tripoli, where he was employed in the operation of the first Mediterranean cable, later going to Malta on this same work.

THE LATE JOHN GOTT.

In the year 1865 he was selected to accompany the steamship "Great Eastern" as one of the electrical staff when that vessel made her first attempt to lay a transatlantic cable. In 1869 he accepted the position of superintendent and electrician at St. Pierre, Miquelon, when the cable of the first French Atlantic Cable Company was laid.

Mr. Gott was one of the first men to work the mirror galvanometer for transmitting submarine cable messages, and the first to install Lord Kelvin's siphon recorder.

In the year 1870 he carried out a unique experiment, by which he transmitted wireless signals through a distance of about three miles at St. Pierre, Miquelon, using the earth as a conductor. In the same year he invented an instrument he called "Fault Searcher Coil," which has proved extremely useful in the localization of faults in subterranean lines. This invention led to devising a means for communicating between ship and shore through a picked up cable, without cutting the cable or disturbing the sheathing wires.

In 1877, in a paper to the *Journal of the Society of Telegraph Engineers*, London, he described an ingenious experiment he had carried out in telephonic transmission by means of a siphon recorder, in support of the theories of Professor Bell's telephone invention, which had, only shortly before that, been made public.

In the year 1881 he introduced an important modification of Lord Kelvin's formula for testing the measurement of the electrostatic capacity of condensers and cables, and the value of this method has been so well recognized by submarine cable engineers that it is now used as a standard test, and is known as Gott's capacity test.

In 1884, upon his retirement from the French Cable Company's service, he became chief electrician of the Commercial Cable Company, a position he held until his death.

In 1902 he made another important discovery, which is known as the "Gott Ratio Arm." This made it possible to avoid the necessity for making temperature corrections in tests for the resistance of Wheatstone Bridge coils, by introducing coils of manganin for one of the ratio arms. It also makes it possible to obtain measurements in modern units by means of a bridge wound to discarded standards.

Mr. Gott's crowning success, however, was his recent invention, whereby he made it possible to communicate between the Pacific Coast of the United States and Canada direct with Europe without the aid of human retransmission at intermediate stations. This fitting climax to his long career is acknowledged to have been the greatest triumph in telegraphy in the present century. By its means cables and landlines can be linked up together and the ordinary Morse method of operation used. He also, latterly, invented a new and improved system of quadruplex working.

Being a man of retiring disposition and great modesty, there is not so much on public record of his accomplishments in submarine cable telegraphy as there should be, but he was always ready to assist those who sought his advice, which was that of a man of sound judgment, ripe experience and kindly purpose. As chief engineer of the Commercial Cable Company, it fell to his lot to examine many proposed improvements, and to take part in many expeditions ashore and afloat. He was a deep student of submarine telegraph engineering problems, and had no peer in the testing and localizing of faults and breaks in submarine cables. He made some valuable suggestions for extending, in electrical testing, the use of curve sheets in the application of graphic methods to the localization of cable breaks. These suggestions were adopted and are largely used to-day. In the pursuit of his scientific researches he was restless and untiring, and, at times, he became so absorbed in his work that he often forgot both food and sleep.

His death is a deplorable loss to the telegraph profession, as well as to his many friends.

MR. J. M. A. MACK, Marshalltown, Ia., writes: "I wish to thank you for continuing my subscription. I consider that your magazine divulges much valuable and interesting information."

Full Use of Wires.

In our issues dated March 1 and March 16 we printed statements from several railway telegraph superintendents, relating to the extent of use of wires on their respective roads. We have received replies from other superintendents as follows:

Mr. G. O. Perkins, Chicago Great Western, Chicago, Ill.: The Great Western Railroad does not use the duplex nor the quadruplex, there being no condition that calls for such circuits.

"All telephone train dispatching circuits are simplexed. The mileage of such circuits is 560. Nearly all territory not covered by train dispatching circuits is covered by composite circuits, with a mileage of 801. With the exception of one district, all trains carry portable telephones or telegraphones."

Mr. R. R. Hobbs, Louisville & Nashville, Louisville, Ky.: "This company is stringing No. 9 copper wire for telephones and putting up four of them at a time, making two circuits for train and message service. These lines are mostly placed on independent poles. The physical line is transposed for phantom while being built. We are thus able to get two physical telephone circuits and one phantom telephone circuit out of the four wires, and, in addition, we are duplexing both of the side circuits, making seven distinct circuits out of the four wires. We have quadruplexed these side circuits successfully, and expect to do so wherever there is a demand for increased telegraph facilities. We figure that with four copper wires used simultaneously for telephone and telegraph it is possible to handle practically any division on the system and meet full requirements. Of course, when the dispatchers' divisions overlap, we string in an extra telephone circuit for this purpose.

"On our branches we have been able to utilize the existing iron Morse wire by building another iron wire, transposing for telephone service, then bridging this circuit on the main line copper circuit, giving the dispatcher direct service to all points on the branches.

"We have not, as yet, used any printing telegraph systems, but are experimenting with them, and will possibly be able to report results within a short time."

Mr. F. T. Wilbur, Illinois Central, Chicago, Ill.: "On our Chicago Terminal we have a twenty-eight-mile circuit, known as the tower line, with twenty offices, each being equipped with telephone selectors, and each office may signal another office selectively. We also have a fifty-six-mile circuit, terminating in a switchboard, so equipped that a telephone operator may selectively signal any one of sixteen stations, or any one of these sixteen stations may signal the switchboard. Simplex is also operated over this circuit. Practically all of our lines are equipped for telegraph simplex work. Phantom is operated over several of our dispatching and message circuits."

Mr. J. B. Murphy, Mobile and Ohio, Jackson, Tenn.: "The Mobile and Ohio is not using the quadruplex, simplex or any other method whereby more than one circuit may be obtained from a telegraph wire."

Mr. F. H. Van Etten, Chicago, Terre Haute and Southeastern, Chicago, Ill.: "We have three No. 9 copper wires between Terre Haute, Ind., and Faithorn, Ill., a distance of 150 miles, and two copper wires between Faithorn and Chicago, a distance of 135 miles. Two of the wires between Terre Haute and Faithorn form a metallic train dispatcher's telephone circuit. This circuit is simplexed and used as a through Morse circuit between Terre Haute and Chicago, 185 miles. By connecting one of the wires to the simplex at Faithorn for Chicago, the third wire between Terre Haute and Faithorn is connected to the second wire between Faithorn and Chicago, forming a through local wire between Terre Haute and Chicago. We also get out of these two circuits a phantom telephone line between Chicago and Terre Haute by using the metallic telephone pair as one side, and the local Morse wire as the other side of the metallic phantom circuit. There are twenty telegraph offices on the local Morse wire and four telegraph offices on the simplexed circuit. We have no duplex or quadruplex circuits, as our business does not require such facilities, but when the demand for more circuits arises we will use the duplex or quadruplex, as necessary, and still retain our present circuits."

Mr. H. Magiff, Central Vermont, St. Albans, Vt.: "The telegraph wires we released when we put up our telephone circuits furnished us with sufficient facilities for handling our business for the present without making any use of the telephone circuits, except that for which they were put up."

Mr. C. J. Steinel, San Pedro, Los Angeles and Salt Lake, Los Angeles, Cal.: "We are working some quadruplex and duplex circuits, in addition to our ordinary Morse. Aside from this, we have no special circuit arrangements in use at the present time."

Mr. W. M. Hayes, Pere Marquette, Detroit, Mich.: "We have installed a composite telephone circuit on our Petoskey division, between Rapid City and Beitner, a distance of twenty-seven miles, with intermediate telephones at Williamsburg, Tunk, Boardman, or a total of five telephones of the Western Electric's standard type. We have several telegraphone circuits, similar to this, in successful operation, and find that they work to great advantage on circuits not exceeding 100 miles in length."

Mr. E. A. Patterson, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.: "We have by no means reached the full working capacity of our wires, for the reason that, except in rare cases, additional circuits are unnecessary at this time. Like most large roads, the Chicago, Milwaukee & St. Paul is prepared to work quadruplex or duplex over practically the entire main line. On divisions where an additional telegraph circuit can be used to advantage we simplex the train dispatcher's telephone circuit, hook it up in tandem in some cases for a through wire, and work it single or duplex, as suits conditions. We have several composites and are thinking seriously of experimenting with a printer circuit."

(To be Continued.)

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, APRIL 1, 1914.

Telephone Train Dispatching.

The paper read before the recent meeting of the American Institute of Electrical Engineers in New York by Mr. M. H. Clapp, superintendent of telegraph of the Northern Pacific Railroad, in which he compares the telegraph with the telephone as a means of communication in steam railroad operation, will be read with much interest and profit by practical railroad people.

Mr. Clapp covers the subject very completely, and as far as we know, no communication of such a nature, so thorough and complete, has ever been presented publicly. He treats both sides of the subject very clearly and impartially, and points out the advantages and disadvantages of both systems in a manner that shows when and where either one would be superior to the other. Mr. Clapp has given the matter a close scientific study, and no one is better qualified than he to speak authoritatively on this subject.

One of the remarkable facts connected with the introduction of the telephone system of train dispatching is the rapidity with which it has been extended. There are, at the present time, about 70,000 miles of railroad in the United States dispatched by this means, and this is an excellent showing and proof of its superiority over the telegraph.

A curious thing about the introduction of the telephone method of dispatching trains is that the railroads were, in one sense, compelled to find a substitute for the telegraph, and, in adapting the telephone to their requirements, actually found something better, in most respects, than the time-honored telegraph system. Hence, what, at first, was a hazardous experiment, has proved to be a decided improvement and advantage and an economic gain.

The telephone system has many enthusiastic advocates, but Mr. Clapp fairly admits that it has its limitations, and that there are situations where the telegraph can better be employed. But for the actual work of train control the telephone stands superior. While the telegraph circuit is more simple than the telephone circuit, with its more complicated apparatus, the advantages gained by the use of the telephone are important enough to more than offset the sacrifice of simplicity of operation and low maintenance cost of the telegraph.

The paper is commended for its clearness and comprehensiveness, and is worth careful reading and study by all interested in the subject with which it deals.

Case of Violation of Mississippi Anti-Trust Law Adjusted.

A little over a year ago the State of Mississippi brought a suit against the Western Union Telegraph Company, the Cumberland Telephone and Telegraph Company and the American Telephone and Telegraph Company, for penalties on account of alleged infractions of its anti-trust laws.

The fundamental contentions of the State were based upon the ownership of Western Union stock by the American Telephone and Telegraph Company, and the agreement between that company and the Attorney-General for a disposition of that stock paved the way for an adjustment. An agreement has been made under which a decree will be entered, requiring The Western Union Telegraph Company, the Cumberland Telephone and Telegraph Company and the American Telephone and Telegraph Company to pay, in the aggregate, $50,000.

No objection is made either to the organization of the Bell System or to the relation of the companies to each other, and their transaction of the telephone business in Mississippi is not criticized. The legislature of Mississippi has approved of the adjustment by joint resolution.

This disposes of the only suit that was pending against any of the Bell companies, based upon a claim that any State anti-trust law was violated.

Lessons in Technical Telegraphy to be Printed in Book Form.

On account of the demand for back numbers of TELEGRAPH AND TELEPHONE AGE containing the

installments of the "Course of Instruction in the Elements of Technical Telegraphy," which has been running through these columns since October 16, 1911, we have decided to issue the lessons in book form, the cost of the volume to be $2.00 per copy. The lessons which have already appeared in our columns will be supplied to purchasers of the book in printed-sheet form, and when the book is completed a bound copy will be forwarded to each purchaser.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 9) As a form of energy, is the electrical current derivable from other forms of energy, and can it be converted into them?

How can sound waves be transmitted long distances?

What are the chief elements of a voltameter?

(Page 10) How can the chemical decomposition in a voltameter be detected and what are the effects of such chemical action?

How can the effects be increased?

If the chemical action in the voltameter is increased, do the deflection of the galvanometer and the pull of the electromagnet vary in the same proportion?

State why these effects are not produced in the same ratio.

How may we determine which effect is an accurate indication of the proportional change in current strength?

Does electrochemical decomposition give a definite measure of current?

How much silver will one ampere of current in a voltameter deposit in one second?

What other expression is equivalent to one ampere?

How much silver does one ampere (or one coulomb per second) deposit in one second?

How much current is consumed by an ordinary 16-candle-power, 110-volt, electric lamp?

What is the average current used in the transmitters of common-battery telephone exchanges and what are the limits of variation of current?

Upon what quality of the current does transmission depend?

(Page 11) Is it necessary to maintain a steady supply of current for talking and signaling purposes?

What is the method employed to secure a uniform current where storage-batteries are used?

Upon what does the strength of an electromagnet depend?

How may the attractive force of an electromagnet be increased?

How is the standard adjustment of battery relays obtained?

What are the names given to the three different current strengths used on battery relays?

What are trip relays and how are they adjusted?

(Page 12) In what cases are the chemical effects of a current injurious?

Is it the positive or negative current which corrodes water and gas pipes?

Why is the positive pole of the office battery always grounded?

What is the effect of loose connections in electrical circuits where dampness is present?

Why are underground cables particularly subject to electrolysis?

Why do return currents of street-railway systems corrode underground cables?

How are the electrolytic effects of stray currents from railroad systems minimized?

New Book.

WIRELESS TELEGRAPHY, by W. H. Marchant, London and New York, Whittaker and Company.

The general interest in wireless telegraphy and the wide-spread demand for practical information thereon have led to the production of many books on the subject in recent years. The latest of these is Mr. Marchant's "Wireless Telegraphy," and it is safe to state that it is one of the most comprehensive and satisfactory books of its kind ever published.

It is not a mathematical or a theoretical discussion, but a most practical work intended primarily for the use of those engaged in the practical operation of radio-telegraph installations and for students who already possess some knowledge of electrical science.

The subjects of the sixteen chapters are: Electric Oscillations and Waves; the Transmitter; the Receiver; Detectors of Electrical Oscillations; the Testing Buzzer; the Marconi System; Poulsen System; Telefunken Quenched-Spark System; Lepel System; Goldschmidt High-Frequency Alternator; Portable Installations and Small Power Sets; Measurements; Diagrams, their Interpretation and Preparation; Regulations and Instructions; Abbreviations, Codes, etc.; Localization of Faults. It will be seen from this enumeration that the scope of the book is a wide one, and that the work is up to date in its material.

The book has 241 pages and 154 illustrations, and the descriptive matter is very clearly written. It should have a place in the library of every student of electricity. By the term student we mean those who are engaged in the practical side of electricity as well, because such must, of necessity, be students in order to keep up with developments.

The price of the book is $1.60 per copy. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Course of Instruction in the Elements of Technical Telegraphy—LX.

(Continued from page 165, March 16).

[The Course of Instruction in the Elements of Technical Telegraphy, which has been running regularly in this journal since October 16, 1911, has met with wide-spread favor and is being studied diligently by thousands of telegraphers and others throughout the world. It is being translated into Spanish, and printed in South American electrical journals, and has attracted universal attention for its clearness of expression and its practicability. It has been endorsed by the officials of telegraph, telephone, cable and railroad companies, many of whom have acknowledged the improvement in the technical standing of their progressive employes, and they commend the course as being of the most practical kind of instruction.

This course was originally prepared by Mr. J. H. Penman, an eminent and well-known telegraph engineer, and is being published now for the benefit of those of our readers who desire to fit themselves for higher positions in the engineering branch of telegraphy, and it has been a valuable aid in this direction. It is elementary, and devoid of higher mathematics, yet it is fundamental in character and extremely easy to learn.

Each chapter is complete in itself, and the chapters are arranged in natural order so that the student acquires the knowledge step by step, in logical sequence. Each chapter is followed by test questions on the subject of the chapter, thus enabling the student to review his progress from time to time.

Back numbers containing these valuable lessons can be obtained at 10 cents per opy.]

Relay and Circuit Relationship—*Continued.*

"It is bad practice to attempt to relieve such a circuit by connecting with it relays of low resistance, made so by a series winding of coarser wire.

"The standard 150-ohm relay is a good average instrument for an average circuit, and is based on experiments embracing a number of average conditions.

"It is extremely bad practice to have high-resistance and low-resistance relays in the same circuit. Whatever the resistance of the relays employed, that of all should be uniform. One relay having a relatively long winding placed in circuit with a number of relatively short windings will itself work well, but at the expense of the others, whose efficiency will thereby be depreciated.

"If a plurality of lines are worked from the same battery, all should be substantially of the same resistance, even if the shorter or lower resistance ones have to be brought up by adding artificial resistance.

"The circumstance that a line having relays which have had their resistance decreased by multiple connections works well, is no proof or evidence that a line of like dimensions, but with relays of like low resistance and the winding serially arranged, will also work well.

"To change the relays of a line having many stations, so that their spools are joined in parallel, reduces the ampere-turns of each relay fifty per cent.

"Such a change, however, in addition to reducing the resistance of the several relays to one quarter of what they were before, largely decreases also the counter-electromotive force of self-induction and the magnetic inertia of each relay; the time constant of the relay being thereby reduced.

"For these reasons it is conceivable that in a line of many relays the advantages accruing from the parallel connections of the relay spools may outweigh the accruing disadvantages.

"When, therefore, a line is overloaded with relays, and relief by transferring a portion of the relays to other lines is inadmissible, the plan of connecting the spools in multiple, thereby reducing the resistance and reactance of the relays, is the most promising and feasible, and its adoption, generally speaking, will be attended by good results.

"To leave the relay magnet spools unaltered, and to shunt them by a resistance, is a plan which is well spoken of. It could scarcely fail to be satisfactory if a switch were placed in the shunt, so that the shunt of any particular instrument could be opened, to admit of the full operation of the maximum number of ampere-turns, while such particular instrument is being employed in receiving a message."

QUESTION PAPER.

(1-*a*) The current in the coils of an ordinary line relay is thirty milli-amperes, what are the relay ampere-turns?

(*b*) If the relay spools were connected in parallel, how would the ampere-turns be affected?

(*c*) How would the magnetizing force be affected?

(*d*) How would the self-induction of the relay be affected?

(2) Why is it bad practice to connect up a great number of relays in a single circuit?

(3) Under what conditions might relay parallel connections improve the working of the circuit?

(4) If a line relay were shunted with a resistance of 150 ohms, how would the relay ampere-turns be affected?

(5) Why is the self-induction of a circuit reduced by connecting the relay spools in parallel?

(6) Three wires of 1000, 800 and 500 ohms, respectively, are worked from one battery, the e. m. f. of which is 100 volts.

(*a*) How much current does each wire receive?

(*b*) What is the difference in current strength in the 1000-ohm circuit when the 500-ohm wire is open?

(*c*) If the resistance of the two short wires were increased to 1000 ohms each, would the opening of one wire affect the current in the others to a greater or less extent than in the preceding question?

(To be Continued.)

MR. J. BRAMOSO, government telegraph department, Cordoba, Argentine Republic, writes: "I thank you for having renewed my 1914 subscription to TELEGRAPH AND TELEPHONE AGE. For the past ten years I have been a constant reader of your valuable paper, and it is a great pleasure to me to inform you that my telegraph education is, to a great extent, due to my constant study of the invaluable articles found in each issue."

Annual Report of the American Telephone and Telegraph Company.

The annual report of the American Telephone and Telegraph Company, which is signed by President Theo. N. Vail for the directors, was issued March 16.

The continued growth of the Bell System, its earnings and expenses and general financial prosperity its attitude as to government ownership, its agreement with the Department of Justice, the sale of its Western Union holdings and its relation with the general public are all set forth in detail.

On the subject of government ownership and operation Mr. Vail says:

"Our opposition to government operation and ownership is not based on pecuniary, partisan, prejudiced or personal reasons. It is because of our interest in the upbuilding of a great public utility and its preservation."

"We are opposed to government ownership because we know that no government-owned telephone system in the world is giving as cheap and efficient service as the American public is getting from all its telephone companies. We do not believe that our government would be any exception to the rule."

He states that the common impression that the Postmaster General has made a report favoring the acquisition of the wire lines is erroneous. It is not a departmental report, he says, but merely the conclusions of three officials of the Post-office Department, transmitted without comment by the Postmaster General.

As to possible government purchase, Mr. Vail quotes Congressman Lewis, the Congressional exponent of government ownership, to the effect that there is no water in the Bell capitalization; and urges the stockholders not to be induced to part with their holdings through fear of confiscation.

He shows that there is a deficit in all government-owned systems, and says that every telephone system in the world adopts the Bell System as a standard, uses the Bell operating methods, and either uses Bell apparatus, or copies it. And yet there is not one, he continues, that gives an approximation to the facilities that the Bell System gives, or gives as good or as cheap service, all past prophecies to the contrary notwithstanding.

"These deficits are not the result of a definite policy to give a cheap service to individuals at the cost of all, but are due to errors in management, such as underestimates of values and cost of new construction; disregard of maintenance, depreciation, and, particularly, of obsolescence; impossible theories of operation, and a mistaken policy founded on promises, prophecies and assertions exactly the same in character as those now being used to bring about government ownership in this country, and upon a failure to understand and appreciate the advantages of private as distinguished from government organization."

"There are no sound reasons given," says the report, "or real advantages promised for government ownership and operation which do not apply to or cannot be secured by government regulation."

"Private initiative, invention, enterprise, risk, spurred on by the incentive of reward, have changed the face of the world, and the resulting unearned increment largely constitutes the wealth of nations; without it many of the great scientific industrial developments would have remained scientific curiosities, even if they had been evolved at all."

The advantages of one telephone system are clearly set forth, as are the differences between the exact technical knowledge required for operation and the judicial ability necessary for regulation.

"Government administration," the report says, "is more or less a game of politics, and while with government operation it may sometimes be possible to have efficiency, it will always be impossible to have economy."

"The government-owned European telephone plants, notwithstanding the low price of foreign labor, are carried at a much higher cost than those of the Bell System, and yet every one of them uses the Bell System as a model. The book value of the plant of the Bell System per station is less than sixty per cent that of Belgium; less than seventy-five per cent that of Austria; about eighty-five per cent that of Germany, Great Britain and Switzerland; and all of them government-owned."

Mr. Vail brings out the fact that Americans are better supplied with telephone facilities than any other people, having six times as many telephones per capita as Great Britain, and thirteen times as many as France, and that the rates here are as popular as those of any government-owned plant.

In showing the inability of the Post-office to operate the telephone business efficiently, he says:

"The success of the parcel-post has been set up as a reason for the government operation of the telephone and telegraph. Why it should be is hard to understand. The two services have nothing in common and are in no way comparable. The parcel-post is not, in any sense, a new service; it has merely increased the volume of the mails by removing some limitations as to size and weight of packages mailed, and making some reduction in rates of postage for merchandise."

"It would not be a question of capacity; the experiment would be disastrous principally because the postmasters are not fitted by experience or training for the telegraph or telephone business, but also because it would be secondary to their grocery-drygoods-notion shop, their principal business."

Another reason is that the telephone already reaches more places than there are post-offices.

Mr. Vail concludes his remarks on this subject by saying that,

"The American public has been educated to depend on the most efficient, most extended telephone service in the world. The relative number of the people reached is the largest and the average cost to each is the lowest of any important service in the world."

"Government ownership would be an unregulated monopoly."

"Regulation by commissions of high standing, composed of individuals of ability and integrity, and

good impartial judgment, is the greatest protection to the public interests as against private exactions that ever was devised; its effectiveness depends upon 'the standing with the public of the commission as a whole and the commissioners as individuals.'"

During the past year subscribers' telephone stations have increased until now there are 8,133,017, a gain of 676,943. These stations reach 70,000 localities, or 10,000 more than the number of postoffices. The total wire mileage is 16,111,011, of which 92 per cent is copper.

More than half the wire mileage is underground, the total underground plant representing a cost of $181,500,000.

The number of daily telephone connections showed a growth of nearly two million, reaching an average of 27,237,000 a day. Europe has only two-fifths of the telephone traffic of the United States.

The extension of the telephone plant during the year amounted to $54,871,856, making a total for fourteen years of $646,915,200. According to present estimates the construction for the current year will cost in the neighborhood of $56,000,000, of which the local resources of the companies will supply $25,000,000.

Large reserves have been made for maintenance, reconstruction and depreciation, and a steady improvement of service has been achieved.

The report says:

"The gross revenue in 1913 of the Bell System —not including the connected independent companies—was $215,600,000; an increase of over $16,000,000 over last year. Of this, operation consumed $75,400,000; taxes, $11,300,000, or one and one-half per cent on the outstanding capital obligations; current maintenance, $32,500,000; and provision for depreciation, $37,700,000.

"The surplus available for charges, etc., was $58,700,000, of which $16,700,000 was paid in interest and over $30,300,000 was paid in dividends.

"The total capitalization, including inter-company items and duplications, but excluding reacquired securities of the companies of the Bell System, is $1,390,242,470. Of this $620,127,086 is owned and in the treasury of the companies of the Bell System. The capital stock, bonds and notes payable outstanding in the hands of the public at the close of the year were $770,115,384. If to this be added the current accounts payable, $26,471,681, the total outstanding obligations of every kind were $796,587,065, as against which there were liquid assets, cash and current accounts receivable, of $72,237,885, leaving $724,349,180 as the net permanent capital obligations of the whole system outstanding in the hands of the public."

"We believe," continues the report, "that the valuation by the Interstate Commerce Commission, when completed, will confirm our repeated statements that the true value of our telephone plants is much greater than the book value."

In the case of the associated companies, excluding the American Telephone and Telegraph Company, particular attention is called to the per cent of net earnings and of dividend and interest disbursements to total plant and other assets:

Net earnings to plant and other assets..5.69 per cent
Dividends and interest to plant and other assets .....4.92 per cent

In other words, the property employed earned less than six per cent per annum, and the dividends and interest paid were less than five per cent upon the value of the property, which could not be considered unreasonable.

Taken by itself the American Telephone and Telegraph Company shows net earnings of $40,576,746.19, an increase of $2,669,101.93 over 1912. The total outstanding capital stock and bonds were $504,207,300, which represent payments into the treasury of over $24,500,000 more than the par value of the capital obligations.

The number of shareholders, 55,983, showed an increase of 5,686 during the year.

The engineering evolution of the telephone which has been accomplished by the engineers, is reviewed, with special reference to the marked improvement of telephone exchange equipment and methods of operation, and the extension of transmission in the underground circuits between Boston and Washington, and in the work of connecting the Atlantic and the Pacific for telephone communication. At headquarters the Bell System has a force of 550 engineers and scientists, a staff unequaled in the world, wholly engaged on studies of these subjects.

In describing the work of the legal department, the co-operation of the Bell System with the Interstate Commerce Commission is shown, and the correspondence is given, setting forth the agreement with the Department of Justice.

Mr. Vail shows how the disposal of $30,000,000 of Western Union stock was brought about so as to separate completely the two companies. During the three years of association the gross revenue of the Western Union increased forty-five per cent, the wages of operators were increased fifty-five per cent and large sums were set aside for revenue and reconstruction.

The report says that the financial condition of the Western Union, with some $15,000,000 net of liquid assets, was never better.

Under the pensions, disability benefits and insurance plan, in 16,054 cases employes of the Bell companies participated in the benefits and the payments have aggregated over one million dollars.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

How Submarine Cables are Made, Laid, Operated and Repaired.*

Although it is more than sixty-four years since oceanic telegraph communication was established, the first submarine telegraph line being laid between Dover, England, and Calais, France, in 1850, and although there are now upwards of 322,000 nautical miles of submarine cables in operation throughout the entire world, the great majority of the public seems to know very little about the making, laying and operation of cables. The general belief is that a submarine cable is very large in diameter and contains numerous electrical conductors; some people even suppose that a submarine cable is a sort of pneumatic tube through which the original message is passed. Submarine telegraphy has heretofore been described in scientific books and publications, but the technicality of such descriptions leave nothing but a vague and confusing comprehension to any but students of the science. The purpose of this paper is, therefore, to impart a general knowledge of "How cables are made; How they are laid; How they are operated; and How they are repaired."

HOW CABLES ARE MADE.

It was not until the value of gutta-percha as an insulating material became known that submarine telegraphic communication was seriously entertained, and it will, no doubt, be interesting to devote a little space here to a description of this valuable product without which submarine telegraphic communication could probably not have developed so extensively as it has during the past three decades.

Gutta-percha is the gum product of certain wild-growing trees which are found in the Malay and Sunda Archipelago. The gutta-percha used in the manufacture of submarine cables is of a refined character, all impurities being removed therefrom. By the purification process the weight of gutta-percha in its natural state is decreased from twenty-five per cent to fifty per cent. It is considered, when used in this purified condition, to be practically indestructible, so long as it is kept submerged in water of a cool temperature. In fact, this theory has been practically proved recently when a submarine cable which had been lying at the bottom of the ocean for over thirty years was brought to the surface during a repair and the gutta-percha found in as good a condition as the day the cable was first laid. No deterioration had taken place.

For years after gutta-percha trees were first discovered to have commercial value there was reckless destruction of them. It was then the practice to cut down the trees to get the sap from them, and it is estimated that not less than 26,000,000 gutta trees were destroyed annually in Borneo for that purpose. When it is considered that it takes from twenty-five to thirty years before a gutta tree will yield any valuable sap, it can easily be understood what effect this wholesale destruction of the gutta tree has had upon future market supplies and prices of submarine cables.

Gutta-percha trees are evergreen and reach a height of between sixty and seventy feet. There are a number of species of these trees. The quality of gutta-percha yielded by each tree varies according to species. The data of the quantity of gutta-percha yielded by an adult tree is very conflicting. Two pounds five ounces have been taken from a felled tree at least 100 years old, while other adult trees only yielded eleven ounces. The method of bleeding trees is now different from the method in vogue years ago. Formerly it was the custom to fell a tree and make a series of incisions along its entire trunk from which the sap would run into small receptacles. This custom was followed by making incisions in trees without cutting them down.

The governments of the countries in which the gutta-percha tree is found now prohibit the felling of the tree. The present method of extracting the sap is very much the same as the method used in North America for extracting the fluid from maple trees. The bark of the tree is pierced at various parts and small drain tubes are inserted, through which the sap flows into receptacles. These drains are allowed to remain in the trees throughout the entire year. The trees are said to yield more sap after the rainy season. The color of the sap when taken from the tree is milky-white, but soon changes into a dark brown. The gum collected from the trees is made up into bricks and taken to the coast by the natives, where they trade it, its value being based upon its weight. It was not long before the natives acquired some of the business instincts of modern civilization, and bricks of gutta were found to contain stones, iron implements, etc., concealed in them to give them artificial weight.

The conductor through which the electric impulses are transmitted is composed of the purest quality of copper. It varies in size according to the length of the cable and speed required by the operating company. From all practical standpoints copper is superior as a conductor of electricity to any other metal. It is a well-known fact that some metals are better conductors of electricity than others. Copper offers less resistance to the transmission of the current than any other metal, except one or two, like silver and platinum, which are too expensive to be used as conductors of electricity. This resistance varies in proportion to the size and weight of the conductor. In other words, the electric impulses will not pass through a copper wire weighing 100 pounds per nautical mile with the same freedom and speed as it would pass through a copper wire weighing 200 pounds per nautical mile, and so forth. In some of the modern Atlantic cables over 700 pounds of copper per mile and 360 pounds of gutta-percha are used.

It should be borne in mind that cables are lying at the bottom of the ocean in depths ranging from two to three thousand fathoms, or between two and three miles deep, and as the lifting of a cable from such a depth involves a great strain upon it and all the materials used in its construction, it will be un-

* Postal Telegraph.

derstood that flexibility must be seriously reckoned with. While there is a good deal of flexibility in copper, yet a single copper wire would not have the same flexibility or tensile strength as a number of smaller copper wires, with an aggregate weight no greater than the single wire. Consequently, in order to provide this flexibility, without affecting the conductivity, it is customary to use a number of smaller copper wires making up the desired weight of copper per mile. This bunch of copper wires is used as one conductor, just as a number of fine wires are used in flexible corded electric light conductors, instead of a single wire of the same conductivity. If this flexible cord contained just one wire instead of a number of small wires, it would not stand handling or twisting without soon breaking.

The copper conductor covered with the gutta-percha insulating material is called the "core" of the cable. In the early experiments made with gutta-percha some difficulty was experienced in making it adhere to the surface of the copper conductor. In the present construction of cores a material called Chatterton's compound is used to overcome this difficulty. The wires are first heated to cleanse the surface and they are then steeped in Chatterton's compound, which is a chemical mixture of tarry materials. This, then, furnishes a base upon which the gutta-percha will adhere. The gutta percha is applied hot and is squeezed on to the copper conductor by a machine through which the copper strands of wire pass, continuously enveloping the wire throughout. Some of the cable manufacturers apply the gutta-percha in two or three coatings. It is claimed by some that the latter method insures safer insulation, inasmuch as an imperfection in the first application of the gutta-percha is covered by the second or by the third.

The conductor in present-day cables consists of a large central copper wire surrounded by a number of small copper wires or copper ribbons, the total making up the required weight of copper and conductivity per mile. Another advantage of the stranded type of conductor over the solid wire is that if the solid wire should contain a mechanical imperfection, or should break for other reasons inside of the gutta-percha insulation, electrical continuity would cease, but in the case of a stranded conductor even if one wire should break the remaining wires would still conduct the current, as it is not likely that all of the copper wires of a stranded conductor would break in the same place.

The quantity of gutta-percha used for insulating submarine cables also varies according to the length of the cable and size of the copper conductor, in order to obtain the proper electrical results. The core is manufactured in lengths of approximately three miles and is coiled temporarily on drums. These lengths of core are later joined together during the process of completing the manufacture of the cable. The jointing of these lengths of core is of the greatest importance. It is done by hand and requires skillful workmanship. If, for example, any dust or gases are allowed to remain or to form in the gutta-percha whilst making such a joint, it may mean the loss of thousands of dollars to the company owning the cable, because it is possible that this weakness may not become apparent until the cable is submerged in the sea, and thus placed under great pressure when the most minute impurity or gas bubble in the joint would manifest itself and cause faulty electrical continuity. Such faults are most difficult to localize and sometimes remain in the cable for years before they can be found and removed, in the meantime causing great trouble in the operation of the cable and loss of money. Furthermore, the deep-sea cable jointer must be a man of temperate habits and in good health. While it may seem almost inconceivable, yet numerous joints made by skilled, but intemperate or unhealthy jointers, have proved faulty through what was believed to be the injurious exudations from the pores of the fingers—this will give some idea of the extreme delicacy and importance of perfect jointing.

(To be Continued.)

Death of George Westinghouse.

George Westinghouse, aged sixty-eight years, the eminent electrical and mechanical engineer, and founder of the Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa., died in New York on March 12. Mr. Westinghouse was the inventor of the well-known Westinghouse air-brake and many other mechanical and electrical appliances now in use all over the world. It was he who, several years ago, put the alternating-current system on a firm and broad foundation, in the face of much opposition in this country.

He constructed and took out patents for a complete automatic telephone exchange system, the value of which, however, was not appreciated at the time, and the patent expired before the telephone people saw the necessity and practicability of such a system.

Among Mr. Westinghouse's many activities, he, in the eighties, founded the Union Switch and Signal Company.

He was a man of remarkable intuition and ability, and was honored by kings and various educational and professional institutions throughout the world.

The funeral was held on March 14, and among those who attended were: Messrs. G. G. Ward, vice-president and general manager of the Commercial Cable Company; Nikola Tesla, the well-known scientist and inventor; T. Commerford Martin, secretary of the National Electric Light Association, and many others prominent in the electrical and other engineering professions.

"Air Plants" on Telegraph Wires.—In Porto Rico air plants find lodgment at points on insulated telegraph and telephone wires, where the insulation becomes rotted. The plants take root and thrive at such places.

Marconi Patents Upheld.

Judge Veeder, in the United States District Court in Brooklyn, N. Y., on March 18 handed down a decision in favor of the patents of the Marconi Wireless Telegraph Company of America.

The suit was brought by the Marconi Wireless Telegraph Company of America against the National Electric Signaling Company, of Pittsburgh, Pa., and was based upon the following patents: No. 11,913, originally issued July 13, 1897, to Mr. Marconi; No. 609,154, issued August 16, 1898, to Sir Oliver Lodge; No. 763,772, issued June 28, 1904, to Mr. Marconi. The latter patent is the counterpart of the patents of Marconi which were sustained in Great Britain and France by the courts of those countries.

The opinion reviews the art of electrical transmission of messages without wires from the middle of the last century down to the present time, and assigns to the three patents in suit positions of the utmost importance in the development of that art.

At the end of his discussion of the art prior to the first Marconi patent, Judge Veeder states: "But no one had described or demonstrated a system of wireless telegraph apparatus adopted for the transmission and reception of definite intelligible signals by such means. This was the state of scientific knowledge and practice when, in 1896, Marconi applied for his first patent."

After an exhaustive discussion of the first Marconi patent the opinion states: "Accordingly, I find that the evidence establishes Marconi's claim that he was the first to discover and use any practical means for effective telegraphic transmission and intelligible reception of signals produced by artificially formed Hertz oscillations."

After an exhaustive discussion of the Lodge patent, the opinion states that the first Marconi patent, although practicable for moderate distances, left a problem to be solved, because it did not keep up the energy of the transmission, and continues:

"Lodge solved the problem by a compromise between the radiotory and oscillatory qualities of his transmitter, on one hand, and between the absorbing and cumulating qualities of his receiver, on the other hand. He was the first to realize that if he could get a long train of waves he could afford to diminish the amplitude of the first few of them, the desired result being secured by accumulative effect.

As to the third patent in suit, Marconi patent 763,772, the counterpart of which was sustained in Europe, the opinion devotes nearly fifty pages to a most learned and technical discussion, concluding as follows:

"That this apparatus overcame the difficulties emphasized by Lodge is not disputed. Where Lodge compromised, Marconi reconciled * * * With this definite control over radiation, effective selectivity was maintained. So far as possible with a coherer, it enabled full use to be made of the principle of sympathetic resonance. In combination with the increased available energy in the transmitter the distances over which messages could be sent was enormously increased. With this apparatus Marconi communicated across the Atlantic in 1901 and the claims in issue constitute the essential features of apparatus which has since made possible communication over a distance of 6,000 miles. It has been used in more than 1,000 installations by Marconi, and is admittedly an essential feature of the wireless art as at present known and practiced."

Mr. Edward J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company, commenting on the decision of Judge Veeder in favor of the patents of the Marconi Company, states:

"The Marconi Company is much gratified by this result, in that the court sustains the validity of all three patents and holds that the Lodge patent and the Marconi patent, having the longest term to run, are infringed. The eulogistic remarks in the opinion as to both Signor Marconi and Sir Oliver Lodge as inventors are also exceedingly gratifying to the company."

Mr. Nally is of the opinion that the ruling would be upheld in the higher court, if an appeal should be taken, and that this decision will have a far-reaching effect on competing wireless companies and upon steamship companies proposing to acquire wireless telegraph apparatus from competitors of the Marconi Company.

"Practically all other companies use the basic principles involved in these patents," said Mr. Nally. "In some of them there is a slightly different form, but they all use the Lodge patent in some way or other, and they also use Mr. Marconi's four-circuit tuning principles. These patents cover devices which tend to make commercial wireless telegraphy a practical thing and a financial success.

"By this decision, Marconi is now, for the second time, officially recognized in this country as the inventor who made commercial wireless telegraphy a possibility, and without Marconi and Lodge there would be no practical wireless telegraphy, and to them belongs not only the credit for the invention, but the returns. The Marconi Wireless Telegraph Company of America does ninety-six per cent of the wireless business of this country, which is constantly growing, and with the opening of its new high-power stations for handling trans-oceanic business, as well as the increasing demand for wireless equipment on ships at sea and on the Great Lakes, and the likewise growing interest in wireless for railroad train service, as evidenced by the inquiries coming to us since the recent severe snow storms, when the land lines were completely prostrated and the wireless train service practically the only means of communication afforded the railroad companies: broader fields are opening up for demonstrating the value to the world at large of the Marconi inventions, and their applicability to commercial purposes. The Marconi Wireless Telegraph Company of America is prepared to meet this demand," said Mr. Nally in conclusion, "and is constantly at work on improved methods of transmission and reception."

The Washington-Boston Underground Telephone Cable.

In our issue dated March 16 announcement was made of the practical completion of the underground telephone line between New York and Boston, thus consummating the project planned five years ago to build an underground telephone system between Washington and Boston.

It will be remembered that on March 4, 1909, electrical communication with Washington was entirely cut off from the rest of the country by reason of a sleet storm, and news from the capital of the inauguration ceremonies was delayed several hours. It was this circumstance that led the American Telephone and Telegraph Company to its decision to lay a cable underground from Washington to New York and Boston, and thus avoid a repetition of such a disastrous event, at least as far as telephone communication is concerned.

The Washington-New York section was completed some months ago, and the Boston-New York section early in March, this year.

Mr. Bancroft Gherardi, engineer of plant of the American Telephone and Telegraph Company, New York, in a lecture in April, 1913, gave a description of the construction of the Washington-Boston cable.

In carrying out the work it was not a case of starting new and fresh and laying new conduits and cables over the entire 435 miles. There were stretches between New York and New Haven, between New York and Philadelphia and between Boston and Providence where old cable was in successful daily use. The company's engineers developed the new type of cable to fill in the links between Providence and New Haven and between Philadelphia and Washington. Could the new type of cable have been used the entire distance the problem would have been less difficult. But to scrap some 220 miles of cable was an expense which seemed hardly justified. The engineers, however, overcame the difficulties of this dual type of construction, and welded the complete line into a working unit. As it is, forty-seven per cent of this 435 miles consists of the previous type of cable, and fifty-three per cent of the new type.

The interesting feature of this cable, from an engineering standpoint, is that it is so constructed that practically all of the circuits in it may be phantomed, and so that these phantom circuits, as well as the side circuits, of which they are made up, can be loaded. The difficult work in connection with the design and construction of the cable was to have the circuits sufficiently well balanced, so that they could be loaded and phantomed without bringing in objectionable cross-talk.

In the middle of the cable there are fourteen pairs of No. 10 B. & S. gauge conductors. Outside of these there are thirty-six pairs of No. 13 gauge conductors. In the spaces between the No. 13 gauge conductors and the No. 10 gauge conductors, six pairs of No. 13 gauge conductors were put in, because there was space for them. At the outside of the cable eighteen pairs of No. 16 gauge conductors were placed for the same reason. All of the No. 10 gauge pairs and the No. 13 gauge pairs, except the six put in between the tens are arranged so that they can be phantomed. That is to say, they are arranged in what is known as a "quad formation." Each of these quads is built up by taking two twisted pairs and twisting them together, giving due attention to the length of twist employed on the pairs, and in twisting the pairs together. By this construction an arrangement is obtained which can be phantomed, providing certain necessary balances of capacity exist.

The loading coils are spaced at intervals of about 1.4 miles, the side circuit coils and phantom coils being placed at the same point. This spacing was determined by the capacity of the conductors, the side circuits having a mutual capacity of about .070 mf. per mile and the phantom having a mutual capacity of about .1 mf. per mile.

The distance from New York to Washington is 235 miles. The most efficient circuits in this cable are the No. 10 phantoms. They have a transmission efficiency equivalent to only thirteen miles of standard cable. That is, they are nearly twenty times as good as standard cable and decidedly better than unloaded aerial No. 12s. The physical No. 10 circuits have a transmission efficiency between New York and Washington of sixteen miles of standard cable. The phantom 13s twenty-one and a half miles of standard cable and the physical 13s twenty-eight and a half miles of standard cable.

Between Boston and Washington the only circuits reliably available for commercial service are the phantomed No. 10s. These give a transmission efficiency between test-boards of twenty-six miles. This is sufficient to insure the service in case the open-wire lines are down, although it is not expected that they will be used in this way, because it is not likely that there will be so many breaks in the lines that the cable would have to be used at any time all the way from Boston to Washington. All open-wire lines are not likely to be down at the same time both north and south of New York City. The cable intersects the open-wire lines at numerous points between these two places, so that patches can be made at short intervals.

The total length of line between Washington and Philadelphia is 135 miles. This necessitated the manufacture of cable weighing, in all, approximately 3,000 tons, requiring 1,500 reels with about 500 feet of cable per reel. There are in the neighborhood of 10,000 loading coils in use on the new section, and in their manufacture about 155,000 miles of iron wire were used for the cores and 7,000 miles of insulated copper for the windings. The cable weighs 9,070 tons, of which 2,982 tons is copper conductors, 5,630 tons is lead sheath, and 458 tons is paper insulation. The total cost has been about $5,000,000.

The line in the main consists of four ducts, made of creosoted Southern yellow pine, it having been found from experience that ducts made in this way are very durable. The construction work also made necessary the use of a great amount of concrete.

The New York-Boston section is practically of

the same construction, and, with the New York-Washington section, gives a continuous stretch of underground work 435 miles in length.

There is no underground telephone conversation in the world comparable to this Boston-Washington service. It is four and a half times as long as the longest European service. Even the New York-Washington underground is more than twice as long as the longest European underground.

There are 18,000 miles of underground duct which connect with this Boston-Washington line, which serves the densest population in the United States. It traverses most of the great cities on the Atlantic seaboard.

The conduits are carried partly in trenches along the highways and over bridges. In digging the trenches two methods were employed, by trenching machines and by trenching plows drawn by horses or mules.

The Goldschmidt System of Radio-Telegraphy.

At the meeting of the American Institute of Electrical Engineers, on March 13, a paper on the Goldschmidt System of Radio-Telegraphy was read by Mr. Emil E. Mayer, chief engineer of the Goldschmidt Company in the United States.

Mr. Mayer described the Goldschmidt high-power radio generators, particularly the 100-kilowatt units for transatlantic communication. Starting with a frequency of 10,000 cycles, produced in the ordinary way, tuned circuits are employed to produce an alternating field, which, acting with the rotation of the rotor, produces a frequency of 20,000 cycles. In turn, this 20,000-cycle frequency, through tuned circuits, is again combined with the rotation to produce 30,000 cycles. Such addition of frequencies is limited only by the copper, iron and insulation losses, but for the best output it is necessary to keep the magnetic leakage low and to limit the number of reflections to four or five.

One of the machines described has 400 poles. Revolving 3,000 times per minute, it produces, first, 10,000 cycles, and, ultimately, 50,000 cycles. The rotor weighs five tons and measures four feet one inch in diameter. The poles are 0.4-inch wide, with one conductor per slot, each conductor consisting of a bundle of No. 40 insulated wires. Both rotor and stator are made up of iron sheets 0.002 inch thick, separated by paper 0.0012 inch thick. The air gap measures but 1/32 inch, although the peripheral speed is about 625 feet per second. The sending key is in the excitation circuits, enabling the interruption of five kilowatts to control the 100-kilowatt output of the generator.

Since April, 1913, two such 100-kilowatt machines have been in operation at Neustadt, near Hanover, Germany, and at the Tuckerton, N. J., station. The towers used are 625 feet high, supporting thirty-six wire double-cone antennas, which are stretched to forty-foot masts arranged in a 1,500-foot circle The towers are supported on glass insulators.

The most notable feature of the receiving apparaus is the "tone-wheel," which makes and breaks the receiving circuit. If the receiving circuit is excited by a 50,000-cycle signal and the tone-wheel makes and breaks the circuit 50,000 times per second, no sound is heard in the telephone, but if the tone-wheel makes and breaks the circuit 49,000 times per second, a tone having a sound frequency of 1,000 cycles will be heard in the telephone. The result is a musical note, which penetrates "static" and permits of close tuning.

Using these devices the Goldschmidt company has been able to telegraph from Eilvese, Germany, to Tuckerton, N. J., since the beginning of January, 1913. Mr. Mayer also intimated that his company has under way a telephone transmitter which will modulate sufficient energy to transmit speech wirelessly over long distances.

In the discussion of Mr. Mayer's paper, Mr. R. H. Marriott pointed out that messages from the Tuckerton station can probably be received over a minimum radius that includes Hanover, Germany, Spain, Peru, Alaska and the North Pole. At night, under the best winter conditions, it is even probable that the waves could be detected at 40,000 miles were such a terrestial distance available.

Mr. E. F. W. Alexanderson, of Schenectady, N. Y., referred to the great difficulties besetting the design of a machine like the Goldschmidt high-frequency alternator, and referred to his earlier construction of a 15,000-cycle "trigger" alternator for use in wireless telephony. Later, a constancy-controlling device was instead developed, employing the general principle of the transformer.

Dr. Lee De Forest compared the advantages and disadvantages of the Goldschmidt system with the Poulsen arc for producing high frequencies. The Goldschmidt apparatus, he pointed out, has the drawbacks of high cost, complication of circuits and lack of flexibility. The Poulsen equipment has the disadvantages of requiring occasional changes of electrodes, attention to the gas supply and the water-cooling supply, and lower efficiency.

Dr. M. I. Pupin commented on the fact that he had lectured on the principle of the machine described by Mr. Mayer five or six years before Mr. Goldschmidt actually developed it. From his own investigations he detected in the secondary a very large number of frequencies, recognizing 136 harmonics within the limit of audibility. In this type of machine, however, Dr. Pupin declared that he had never placed much confidence on account of its large magnetic leakage, large losses, crowding of many currents requiring iron and copper conducting area, etc.

Mr. John S. Stone pointed out how Mr. Mayer's paper revealed the recent increase in wave-lengths, resulting in the gradual but rapid departure from the highly damped wave train of the early open-spark systems, and finally leading to continuous or undamped wave trains. Had the wave lengths used at the Tuckerton station been made to correspond to the fundamental of the antenna, or approximately, 1,500 meters, instead of 6,000 meters, the radiating power of the antenna, said Mr. Stone, would have been sixteen times greater, while the receiving or absorptive power of distant receiving stations would have been similarly increased approximately sixteen-fold. Such a wave length would require, however, a frequency of 200,000 cycles.

A Comparison of the Telegraph With the Telephone as a Means of Communication in Steam Railroad Operation.*

BY M. H. CLAPP, SUPERINTENDENT OF TELEGRAPH, NORTHERN PACIFIC RAILROAD, ST. PAUL, MINN.

[NOTE.—An abstract of this paper was published in our March 16 issue, but owing to the practical importance of the paper it has been decided to reprint it practically in full.—*Editor.*]

The replacement of the telegraph by the telephone, to any extent, really began only six or seven years ago. It is only during this short period of time that extensive installations of telephone dispatching and message circuits have taken place, although beginning about fifteen years ago there were numerous telephone circuits erected between terminals and principal offices on some of the railroads. These long-haul talking circuits did not primarily replace the telegraph, but, in most cases, merely provided additional means for communication.

While trains were handled for short distances, principally in and about terminals, beginning back in the early nineties, it was not until the latter part of 1907 that any real attempt was made to handle trains on long stretches of main-line track by telephone. The Chicago, Burlington and Quincy road was one of the first to use telephone train-dispatching circuits on its main lines, and by the latter part of 1908 this company had a considerable mileage of its lines dispatched by telephone. The principal railroads in the East and the middle West at once began to install telephone circuits, so that at present there are some 70,000 miles of railroad in the United States dispatched by telephone. The use of the selective-ringing telephone circuit for the dispatching of trains was soon followed by the use of the same kind of circuit for the handling of messages. The growth of the telephone message circuit has, however, been very much slower than that of the dispatching circuit. The primary reason for this is the fact that the telephone message circuit does not meet the conditions on the average railroad to the same advantage as does the dispatching circuit, there being more complications to meet than in the case of the dispatching circuit. In general, the message circuit requires a considerable amount of traffic to justify its use. However, it will only be a question of time when all telephone dispatching circuits are paralleled by telephone message circuits.

The outside and inside plants used by different railroads necessarily vary to a large degree on account of the different sizes, resources, locations and conditions of the railroads served. A description will be given, therefore, of the system on one of the large transcontinental railroads with which the writer is most familiar, with particular reference to the condition about seven years ago, when the present extended use of the telephone for dispatching trains and handling mssages had its beginning. It will not be necessary to describe in detail the pole line used to carry the wires, either telegraph or telephone. It will be sufficient to say that these lines in the United States are, in a great majority of cases, constructed in accordance with the specifications of the Western Union Telegraph Company, which is substantial construction. These pole lines have at least thirty-five poles to the mile, where the number of wires to provide for is considerable, and, in some cases, forty, fifty, sixty and even seventy and eighty poles per mile are used.

At first iron was universally used for telegraph wires, the size most used being No. 8 B. W. G., thoroughly galvanized. This practice, in general, was not changed as far as the rail roads were concerned, except that a considerable amount of copper was put up for long-haul circuits. Of course, copper wire is used quite extensively near large centers or along the seacoast, or wherever corrosion would be troublesome. When copper wire is provided, No. 9 A. W. G. is generally used.

The average cost per mile for furnishing and erecting a No. 8 B. W. G. iron wire, including insulators, tie wires and pins, is about $25. This wire makes a very good telegraph circuit up to 400 miles without any intermediate offices. At this distance the wire can be worked either singled, duplexed or quadruplexed. With intermediate offices on the line the distance would be cut down to about 200 miles. The matter of line insulation has a very important bearing on the distance that an iron wire, or, in fact, any telegraph wire can be successfully operated. The distances named assume a high grade of insulation. This mileage for the operation of iron wires, however, is ample for almost any division of a railroad, so that iron wire is very generally used in railroad local circuits, copper wire being used between terminals and the principal points along the line. On the Northern Pacific system, when telephone circuits began to be extensively installed, about seven or eight years ago, there were the following mileages of copper and iron wires in use:

Copper	4,000 miles
Iron	11,500 miles

There were practically two through copper wires from St. Paul to Tacoma, a distance of a little less than 2,000 miles; all the rest of the circuits on and between the different divisions were iron. At that time this wire plant was considered a very good one for the purpose for which it was intended.

The cost per mile for providing and erecting No. 9 B. & S. gauge copper wire, including insulators, pins and tie wires, varies greatly with the price of copper, but assuming fifteen-cent copper, it would be, on the average, about $38.

The equipment of a telegraph office is comparatively simple and needs no description. The following costs will be of interest in comparison with the cost of telephone equipment.

A way station can be cut in on a telegraph wire, including the battery (gravity) in the office, at a total average cost of	$12.00
A switchboard (peg type) large enough to take care of ten wires, in and out, can be provided and installed at a cost of	$42.00

*Full extract of a paper presented before the American Institute of Electrical Engineers, New York, March 13.

The cost of providing and installing a twenty-five-line Western Union switchboard, with twenty wires cut in and out, and eight sets of telegraph instruments with necessary tables and battery, is about $140.00
Nineteen-conductor cable (No. 14 A.W.G.) suitable for connecting the wires from the line into the offices, can be provided and installed at an average cost of.....30 cents per foot
The average cost of providing and installing a quadruplex set would be about.....$200.00
The average cost of providing and installing a single-line repeater set would be about..... $50.00

At terminals, of course, more apparatus is necessary than at the way-stations along the line. However, a cost of $400 would provide and install the equipment in almost any terminal or relay office along the line, except the very largest. While the figures named are approximate, and are averages for conditions on the transcontinental line with which the writer is most familiar, they are believed to be reasonable and to give some idea of the cost of providing telegraph circuits along a railroad.

On a railroad on which the telegraph is the only means for transmitting intelligence quickly from point to point on the system, except for short distances in and around terminals where the telephone is used extensively, telegraph communication is used by all departments and by a large percentage of the employes on all occasions and on all subjects. In fact, it is no exaggeration to say, in general, that the sending of telegraph messages is made so easy that a great many more messages and words are sent than necessary. The telegraph office is usually located close to the superintendent's office at division points, and at general headquarters is made as accessible to all departments as possible. In headquarters buildings, where a considerable amount of space and a number of floors are used, pneumatic tube systems are provided in order to carry the messages back and forth between the different offices and the telegraph office.

A considerable amount of railroad business is, from its very nature, urgent and requires as quick action as possible; for example, reports on the progress of trains over the division, the meeting of the various emergencies that arise, messages about shipments of different kinds, reports of the location of equipment along the road, and similar business.

Each section of railroad has, between terminals, at least one message wire and one dispatcher's wire, unless it is a very unimportant section, such as a branch line, where one wire, in a great many cases, serves the purpose for handling both the messages and the dispatching. The length of railroad that can be handled by one telegraph message or dispatching wire depends upon the amount of traffic handled, the size of the towns along the line, kind of country through which the railroad is built, etc. On a busy single-track railroad, 100 miles would be a fair limit for telegraph dispatching of trains by the use of one circuit. The facilities necessary for handling the messages would, in a great many cases, be the same as those required for the dispatching, although there would be a great deal more variation in handling the messages than the dispatching. On an important section of railroad there is usually one message circuit that cuts into all offices along the line (way or local circuit) between the two terminals, with other circuits cutting into the more important points.

In order to handle the message service to and from the general headquarters a system of through circuits is provided between the different division points and the general offices. If the length of the railroad system requires it, relay and repeater stations are established. For example, on the Northern Pacific system there are four relay offices between St. Paul, Minn., and Tacoma, Wash. In these offices are located, with a few exceptions, the multiplex telegraph equipments (duplex and quadruplex); there the business is relayed to different offices and terminals to which direct wires are not provided. The wire testing is also handled at these points. On most railroads in the West the operators in the relay offices are on the pay-roll of the superintendent of telegraph and are handled directly by him. This arrangement tends to give uniformity to the telegraph service on the system.

The cost per message for handling communication by telegraph will probably average more on a railroad than the message cost of the commercial companies, because the messages are handled on the railroad in smaller offices, and on circuits on which the number of offices is larger. The labor cost per message in Northern Pacific relay offices is a trifle over two cents; in offices along the line it would be hard to say what is the actual cost per message, on account of the multifarious duties of the operators at most of these points.

The principal advantages of the telegraph are its simplicity and its small cost, both as regards installation and in maintenance; this statement being made, of course, in comparison with the telephone. There are no very complicated circuits in connection with the telegraph, especially at the great majority of the offices along the line. The ordinary lineman has no difficulty in learning how to install and maintain sets of telegraph instruments, and with a little experience, he is able to install duplex and quadruplex apparatus, and Western Union peg switchboards. In general, no particular care is necessary in running telegraph circuits, with respect to one another, in order to avoid induction either in the offices or on the line. In making the last statement, however, the author fully appreciates that telegraph circuits have been seriously interfered with by induction in certain cases; the conditions in mind are those which exist, as a rule, on the great majority of railroads where the telegraph is used. Also, a telegraph circuit will operate under defective maintenance conditions, such as loose connections, unsoldered joints, defective office and cable-box wiring, high resistances in series with circuit, etc., where a telephone circuit would completely fail. In other words, the telegraph circuit usually has a considerable amount of margin in operation and will stand a large amount of neglect and abuse. The cost, as already indicated, is small for both line wires and office equipment, and while copper wire is used to some extent, iron

wire serves the purpose in a great many cases where it would not be possible to use it in connection with the telephone. The telegraph, also, has the advantage of being a very accurate means of communication. A telegraph sounder makes very clear and distinct signals, and to an expert operator, there is no question as to what has been transmitted; and, if the wire is working at all, the distance is not much of a factor, because the sounder is in a local circuit.

The great disadvantage of the telegraph is its lack of universality. It requires a specialist in order to operate it; that is, an operator who has spent a considerable amount of time, years in some cases, in order to qualify for the work. When carrying on a telegraphic correspondence, one is always working through some one else, never directly. This condition is satisfactory in handling some kinds of business, but not for all kinds. The train conductor out on the line can, in the case of an accident, send messages by telegraph to his superior if there is a telegraph office near at hand in which operators are on duty, and accomplish certain results; however, if he can talk directly with his superintendent, a great deal more can be accomplished. The same is true of the section foreman out on the line, the superintendent in his office, and other employes on the division.

There is a decided lack of ability to secure information of the thousand and one emergencies that arise on a railroad, by telegraph, as quickly as desirable. This is due, first, to the fact that comparatively few employes on the system can use the telegraph directly, and second, to the fact that the telegraph is slower as a means of transmitting intelligence than its great competitor, the telephone. It takes longer to transmit a train order by telegraph than by telephone. This disadvantage of the telegraph is especially noticeable when one attempts to discuss any subject over the wire by telegraph, even between expert operators; and where it is obligatory to write out the necessary questions and answers in the form of messages to be sent and received by operators, the superiority of the telephone is even more evident.

The telegraph is at its best in handling messages that are comparatively brief, making definite statements or reports, or answering definite questions. As soon as one attempts to ask several questions on different phases or points of a subject, in other words, attempts to discuss it, the telegraph becomes a comparatively slow means of communication.

Trouble is also experienced from delay in getting the offices along the line to answer their calls. In case several wires are looped into an office, and the operator is busy, he may not hear the call when made, or, perhaps, will pretend that he does not, and it is impossible to prove definitely whether or not the call came in properly. Some attempts have been made to meet this difficulty by providing a telegraph selector at each station that would respond to a certain combination of signals and ring a bell for the particular station desired. However, this device has not been used to any extent by the railroads.

There is, also, the trouble experienced in obtaining operators, which, in recent years, has become a serious problem, especially when times are prosperous. A railroad which depends at present entirely upon the telegraph has considerable difficulty in securing operators of any kind, without much regard for their ability. There has been a great falling off not only in the supply, but in the grade of men who enter this field. Twenty or thirty years ago, the conditions were strikingly different, for the reason, perhaps, that there were not then the many opportunities for men to enter electrical pursuits that there are to-day. Then there is the influence of the labor organization. Practically all railroads have a strong labor organization of telegraphers with which to contend. In making promotions, the labor union appears always to desire to have seniority in the service made the primary consideration, and ability or fitness for a position the secondary consideration. In general, this seniority idea tends to drive the best men out of the service and prevents the ablest men from learning to telegraph.

The outside plant necessary in connection with the telephone is substantially the same as that required for the telegraph, except that in practically all cases copper wires are used. Two wires, however, are necessary, in order to provide a metallic circuit, and they must be arranged side-by-side on the cross-arm and transposed at frequent intervals, in order to avoid induction and cross-talk from other circuits. All cables used in looping telephone circuits into offices must have their conductors arranged in twisted pairs, in order to avoid cross-talk.

The great difference between the telegraph and the telephone plants is in connection with the inside plant. Instead of the comparatively simple telegraph apparatus, already described, the telephone equipment is more or less complicated. There is, first, the private-branch exchange, which has become so important a part of railroad operation in so many places. These exchanges are, in a great many cases, rented from the telephone companies at the usual rates. However, there are numerous exchanges privately owned and operated, the latest type to be used being the automatic switchboard. Arrangements are made to bring into these branch exchanges the telephone lines of the railroad between the different division points and terminals, to facilitate ready intercommunication. Also, in some cases, arrangements are made so that a railroad official can talk from his office over the lines of the railroad company to any subscriber's station in the public exchange system in a distant city or town.

The cost of telephone circuits for use between the exchanges along the line depends, of course, on the kind and the size of line-wire used. The cost, per mile, of a No. 9 A. W. G. copper circuit in place, on the basis of fifteen-cent copper, is about $75. The cost, per mile, of a No. 6 A. W. G. copper circuit, on the same basis, would be about $150. The latter circuit would give, under ordinary conditions, satisfactory telephone transmission up to 1,000

miles, while the former would be satisfactory up to about 500 miles.

The telephone-dispatching and message circuits are the most interesting and peculiar to the railroad service. The provision of a means of selectively signaling the different stations along the line was a problem that took some time to solve satisfactorily. These selectors have different designs and principles of operation. In general, the selection is made by a step-by-step mechanism which responds to a certain number of pulsations or combinations of pulsations sent over the line, making it possible to arrange a large number of selective combinations, and thus signal any given station at will, without disturbing the others. Selectors are now made that are very efficient in operation, and will call selectively as many as 125 stations on the same line. At the stations along the line a special form of telephone set is installed for the use of the operators. These sets have a certain combination of apparatus and wiring that provides a so-called "booster" effect in transmission. This is secured by a switch which is so connected in the circuit that when the operator is talking, the receiver is short-circuited, and when the operator is listening, the receiver is connected directly to the line and the transmitter disconnected. Head telephones are provided, so that the operator may have free use of his hands. In the dispatcher's office, special telephone sets are used, which are wired like the sets at the way stations, except that breast-plate transmitters are usually provided, so that the dispatchers can move about sufficiently in making entries on the train sheets, which are usually of considerable length and width. Some of the railroads have experimented with, and are using with some success, loud-speaking transmitters and receivers for the dispatchers. This apparatus, however, has not been developed to the point where it can be used successfully in all cases. Loud-speaking apparatus is greatly to be desired, as the dispatchers complain quite generally of the hardship of wearing continuously the head telephone and the breast-plate transmitter.

The batteries used at the way stations are, in most cases, composed of dry cells; they are also used in the majority of cases for the line-battery in the dispatcher's office. These cells are, on the whole, the most economical, as the line current necessary to operate a selector is rarely over ten milliamperes, and, in some cases, is as low as 1.5 milliamperes. However, small generators are used in some cases to furnish the necessary ringing current; storage cells, also, are used, and both are economical where the circuits are long and there are numerous busy stations on them. In a few cases secondary battery is used at the way stations, but it is not general practice, primary cells being, in the great majority of cases, the most economical. Wet primary cells are often used for providing the current for the dispatcher's transmitter.

The cost of providing a selector circuit ready for operation under average conditions is as follows:

Cost, per station, of providing and installing the selector and telephone equipment, protectors and wiring, both outside and inside of the offices, $80.

Cost of providing and installing the necessary telephone and selective apparatus, including the battery, in the office of the dispatcher, $250. Assuming that a telegraph pole line is already available, the cost of a suitable telephone circuit has already been placed at $75 per mile, so that the cost of providing and installing a selective telephone circuit along 100 miles of railroad, where there are thirty offices to serve, would be a little over $10,000.

A telephone circuit, such as described, can be used either as a dispatching circuit or as a message circuit. In arranging for the handling of messages by the telephone, the operator at the terminal office usually remains on the line continuously, thus requiring signaling in one direction only. Often, separate rooms are provided for the telephone operators; but, in some cases, they are placed on opposite sides of the same tables which the telegraph operators use, with good results. The number of messages that can be handled on a telephone message circuit will average twice the number that can be handled by telegraph between the same offices, especially if a typewriter is used in receiving.

Two very useful and time-saving auxiliaries which are available with a telephone system are installations of telephones in booths or boxes along the railroad right-of-way at so-called "blind sidings" (where no regular operators are employed, and where there may be not even a station building) and portable telephones for the use of the train crews. Telephones of these types can be used to great advantage by the trainmen in handling the many emergencies that arise, and are also of material assistance to the dispatcher, in reducing train delays. Order forms for use of the trainmen are usually provided along with the telephones installed in booths or boxes, and, in some cases, special forms of registers are provided, in which the order forms are placed so that three copies can be made of all orders transmitted to the trainmen, one copy in each case being given to the engineman, the second copy to the conductor, and the third copy remaining in the machine as a record.

The portable telephone has obvious advantages in the respect that it can be used at any point along the road, by making temporary attachment to the telephone line-wires. Some of the railroads, however, have installed telephones in boxes or booths along the right-of-way every half mile; in such cases portable telephones could hardly be used to advantage. The telephones along the right-of-way are usually connected to the dispatching circuit, so that the trainmen can talk directly to the dispatcher. Where telephones are provided every half mile, they are usually connected to a separate line-circuit, and provisions are made at way stations for switching it to the dispatching circuit.

(To be Continued.)

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The internal resistance of both dry and gravity cells varies considerable during the life of a cell; the condition of the zinc is a governing factor in the gravity and the accumulation of gas on the plates when current flows increases the internal resistance of the dry cell. With the EDISON-BSCO the internal resistance is practically constant during the entire life of the cell, and the resistance of the microphone is (as it should be) maintained uniformly.

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THE RAILROAD.

Meeting of Western Division, Association of Railway Telegraph Superintendents.

The regular meeting of the Western Division of the Association of Railway Telegraph Superintendents was held at the La Salle Hotel, Chicago, March 18, and proved to be one of the largest and best divisional meetings ever held. There were in attendance thirty-nine active and twenty-four associate members, as well as fifteen visitors from the Eastern Division and from the telegraph and telephone companies.

The meeting was called to order at 10 a. m. by Mr. E. C. Keenan, chairman. The first business was the election of Mr. F. T. Wilbur, of the Illinois Central, as secretary, following which a general registration was made and approval of the minutes of the previous meeting.

The chairman briefly outlined the programme of the day, consisting of the reading and discussion of four papers, the regular deliberations closing at about 5:30 p. m. An executive session was then held, and the meeting finally adjourned at 6:30 p. m. A schedule of the papers was published in our issue of March 16.

The papers brought out very good discussion, which was generally participated in.

One of the pleasantest incidents of the meeting was the attendance of Mr. W. W. Ryder, general manager Western Division, Western Union Telegraph Company, Chicago. The chairman took occasion to refer to the good work done by Mr. Ryder when he was an active member of the Association, and extended the congratulations of the members present.

On the suggestion of the chairman, many of the members and visitors stayed over Thursday, March 19, to attend the exhibition of the National Railway Appliances' Association, where many interesting devices and materials were seen.

Those present were:

Active members—William Bennett, Chicago and North Western, Chicago, Ill.; F. E. Bentley, Terminal Railroad Association, St. Louis, Mo.; E. A. Burkitt (general foreman telegraph), Illinois Central, Chicago, Ill.; W. J. Camp (assistant manager telegraphs), Canadian Pacific Railway, Montreal, Que.; G. A. Cellar, Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.; E. A. Chenery, Missouri Pacific, St. Louis, Mo.; J. P. Church, Wabash, Decatur, Ill.; M. H. Clapp, Northern Pacific, St. Paul, Minn.; W. P. Cline, Atlantic Coast Line, Wilmington, N. C.; W. L. Connelly, Chicago, Indiana and Southern, Gibson, Ind.; G. A. Dornberg (chief lineman), Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.; P. W. Drew, Minneapolis, St. Paul and Sault Ste. Marie, Chicago; R. F. Finley (engineer), New York Central Lines, Chicago; W. H. Hall, Missouri, Kansas and Texas, Denison, Tex.; W. M. Hayes, Pere Marquette, Detroit, Mich.; E. D. Hubbard (general foreman), Grand Trunk, Battle Creek, Mich.; C. H. Hubbell, Chicago, Rock Island and Pacific, Chicago; L. M. Jones, Atchison, Topeka and Santa Fe, Topeka, Kan.; E. C. Keenan (general superintendent), New York Central Lines, Chicago; V. T. Kissinger, Chicago, Burlington and Quincy, Chicago; L. A. Lee, Pittsburgh and Lake Erie, Pittsburgh, Pa.; C. E. Marsh (chief clerk general superintendent), Kansas City Terminal, Kansas City, Mo.; W. Marshall, Canadian Pacific Railway, Toronto, Ont.; J. McMillan, Canadian Pacific Railway, Winnipeg, Man.; C. E. Nutter (assistant superintendent telegraph), Atchison, Topeka and Santa Fe, Topeka, Kan.; M. B. Overly (engineer telephone department), Cleveland, Cincinnati, Chicago and St. Louis, Indianapolis, Ind.; C. A. Parker, Denver, North Western and Pacific, Denver, Col.; E. A. Patterson, Chicago, Milwaukee and St. Paul, Chicago; W. H. Potter, Southern, Washington, D. C.; C. S. Rhoads, Cleveland, Cincinnati, Chicago and St. Louis, Indianapolis, Ind.; F. F. Riefel, Lake Shore and Michigan Southern, Cleveland, Ohio; T. Roder (supervisor telegraph and telephone service), Grand Trunk, Montreal, Can.; J. J. Ross, Michigan Central, Detroit, Mich.; J. B. Sheldon, Union Pacific, Omaha, Neb.; F. H. Van Etten, Chicago, Terre Haute and Southern, Chicago; H. A. Vaughan (assistant superintendent telegraph), Chicago, Burlington and Quincy, Lincoln, Neb.; W. C. Walstrum, Norfolk and Western, Roanoke, Va.; F. T. Wilbur, Illinois Central, Chicago; C. A. Worst (assistant superintendent telegraph), Chicago, Burlington and Quincy, Chicago.

Associate members—F. A. Cannon, superintendent of right of way, Mountain States Telephone and Telegraph Company, Denver, Col.; W. L. Cook, general manager Reliable Electric Company, Chicago; A. B. Cowan, district commercial superintendent Western Union Telegraph Company, Chicago; G. M. Dodge, president Dodge Institute of Telegraphy, Valparaiso, Ind.; Aug. F. Eyermann, special agent Southwestern Telephone and Telegraph Company, St. Louis, Mo.; J. H. Finley, sales engineer Automatic Electric Company, Chicago; A. G. Francis, agent Chicago Telephone Company, Chicago; W. E. Harkness, Hall Switch and Signal Company, New York; G. K. Heyer, railway sales engineer Western Electric Company, New York; P. G. Hill, division plant superintendent Western Union Telegraph Company, Chicago; E. E. Hudson vice-president and sales manager Thos. A. Edison, Inc., Orange, N. J.; B. A. Kaiser, American Telephone and Telegraph Company, New York; J. A. Kick, sales engineer Western Electric Company, Chicago; J. M. Lorenz, salesman Central Electric Company, Chicago; H. W. Lucia, assistant engineer sales General Railway Signal Company, Rochester, N. Y.; L. H. Merrill, railway agent North Western Telephone Exchange, Minneapolis, Minn.; Val. B. Mintun, special agent Missouri and Kansas Telephone Company, Kansas City, Mo.; C. S. Pflasterer, National Carbon Company, Cleveland, Ohio; H. O. Rugh, general manager, Railway Electric Manufacturing Company, Chicago; W. W. Ryder, general manager, Western Division, Western Union Telegraph Company, Chicago; A. Dwight Smith, sales engineer Northern Electric Company, Ltd., Montreal, Que.; H. M. Sperry, sales manager General Railway Signal Company, Rochester, N. Y.; H. G.

Thompson, vice-president Edison Storage Battery Company, Orange, N. J.; H. T. Vaille, railroad agent Mountain States Telephone and Telegraph Company, Denver, Col.; R. W. Whitehead, division plant superintendent Western Union Telegraph Company, Chicago.

Visitors—J. C. Browne, general supervisor telephones Missouri Pacific, St. Louis, Mo.; P. F. Frenzer, chief operator Union Pacific, Omaha, Neb.; H. C. Hewes, assistant general foreman telegraph Illinois Central, Kankakee, Ill.; S. E. Klunder, Holtzer-Cabot Electric Company, Chicago; A. J. Kohne, chief clerk to general superintendent telegraph New York Central Lines, Chicago; E. W. Kalb, signal engineer Buffalo, Rochester & Pittsburgh, Rochester, N. Y.; F. A. Merrill, general foreman Pere Marquette, Grand Rapids, Mich.; G. A. Nelson, manager Gordon Primary Battery Company, New York; E. Parsons, district plant superintendent Western Union Telegraph Company, Cleveland, Ohio; N. S. Richmond, assistant sales manager, Manhattan Electric Supply Company, Chicago; L. R. Robinson, division supervisor of lines Western Union Telegraph Company, Chicago; W. Rogers, telegraph engineer Missouri-Pacific, St. Louis, Mo.; R. C. Rootger, special agent Central Union Telephone Company Springfield, Ill.; W. W. Watt, district plant superintendent Western Union Telegraph Company, Chicago; A. Young, district plant superintendent Western Union Telegraph Company, Minneaponlis, Minn.

Lackawanna Wireless Statistics.

On account of the total prostration of its pole line for a distance of about forty miles east of Dover by the storm which began on Sunday afternoon March 1, the Lackawanna Railroad handled all of its telegraph work by wireless between Hoboken, N. J., and Scranton, Pa., for a period of ten days, during five of which there were no other means of communication.

During the ten days 1,125 messages were sent and received, and on March 6, 120 messages were handled by wireless between 9 a. m. and 6 p. m., many of these messages containing fifty words or more.

In addition to wireless installations at Scranton, Pa., Binghamton, N. Y., and on the Buffalo Limited train, wireless stations were installed at Hoboken and Dover.

The Lackawanna now has five stations as follows:

Location.	Call.	Wave Length.
Hoboken	W B U	2,100
Dover	W B X	1,000
Scranton	W P T	1,620
Binghamton	W B T	1,620
Train No. 3	W H T	1,000

The superintendents of telegraph of several of the railroads entering New York propose to hold a meeting at an early date to look into the advisability of making arrangements for the installation of wireless telegraphy for the benefit of all of the railroads entering New York City. The disastrous storm of March 1 prostrated the telegraph and signal wires and rendered them useless for at least a week. The loss sustained by the companies on account of lack of wire facilities was very large. The railroad officials are anxious to adopt every means to safeguard telegraph communication in the future—wire or wireless.

New Orleans Convention of Association of Railway Telegraph Superintendents.

The thirty-third annual convention of the Association of Railway Telegraph Superintendent will be held at New Orleans, La., May 19, 20, 21 and 22. As this meeting will be one of extraordinary importance, a large gathering of members is expected. The preliminary programme shows that papers of unusual worth to the railway telegraph and telephone interests will be presented by well-known authorities, on a wide range of subjects pertaining directly and indirectly to railway train operation.

While there will be an abundance of work laid down for the members, their entertainment during their spare time will not be neglected. Mr. W. A. Porteous, manager of the Western Union Telegraph Company at New Orleans, is the resident member of the entertainment committee and he is arranging a very enjoyable programme, and promises the members and their families a good time during their stay in the famous old city.

Mr. P. W. Drew, of the Minneapolis, St. Paul and Sault Ste. Marie Railroad, Chicago, Ill., is secretary of the association.

William Kline, aged seventy-eight years, formerly superintendent of telegraph of the Lake Shore and Michigan Southern Railroad, at Toledo, Ohio, died in that city March 19. He was a native of Albany, N. Y., After leaving school he became a messenger in Buffalo, and later entered the service of the Southern Michigan and Northern Indiana Railroad at Adrian, Mich., afterwards becoming chief operator. On the consolidation of the various independent railroads into the Lake Shore and Michigan Southern, Mr. Kline was appointed superintendent of telegraph with headquarters at Toledo. This position he held until his retirement from active service, four years ago. The first magneto telephone was introduced in Toledo by Mr. Kline in 1876 and a test was made of it in the presence of the Mayor of that city. Mr. Kline was also the first to introduce the typewriter in Toledo.

Pennsylvania Railroad Wires Underground.—The Pennsylvania Railroad Company has decided to place its telegraph and telephone wires between Trenton and Rahway in underground conduits. The conduits will have six ducts. The directors have appropriated $300,000 for this undertaking. Traffic on the road was badly delayed as a result of the damage to the telegraph and telephone lines during the recent storm.

(Continued on page 213.)

THE RAILROAD.

(*Continued from page 210*)

STRONG POLE LINE ON LACKAWANNA RAILROAD.—In reconstructing its pole lines, which were damaged or destroyed by the recent storm in the neighborhood of New York, the Lackawanna Railroad Company is using carefully selected twenty-five-foot poles to carry twenty-five wires. It is thought that this class of construction will better withstand the ravages of wind and sleet storms.

ACQUISITION OF RAILROAD TELEGRAPH SYSTEM.—The entire telegraph system of the New Orleans, Mobile & Chicago Railroad Company, extending 400 miles from Mobile, Ala., to Middletown, Tenn., went into the control of the Western Union Telegraph Company on March 14. The line was formerly under lease to the Postal Telegraph-Cable Company.

MR. JAMES B. NORCROSS, chief clerk in the telegraph department, Maine Central Railroad, Portland, Me., has been appointed superintendent of telegraph, with headquarters at the same point, to succeed Mr. E. A. Hall, retired.

THE CONTINENTAL TELEGRAPH COMPANY, a subsidiary of the Chicago, Milwaukee & St. Paul Railway, has taken over the telegraph line of the Idaho & Washington Northern Railroad.

MR. W. C. WALSTRUM, superintendent of telegraph Norfolk & Western Railroad, Roanoke, Va., was a recent New York business visitor.

MR. ELTON A. HALL, superintendent of telegraph, Maine Central Railroad, Portland, Me., has retired.

James D. Reid Memorial.

At a meeting of the trustees of the Reid Memorial Fund, held in New York, March 19, the Committee on Design and Plans reported, recommending the erection of a granite monument surmounted by a Scotch market cross, bearing a bronze medallion portrait of Mr. Reid and a bronze plate containing the inscription.

The committee also reported that there is room on the cemetery lot for the erection of the monument at the head of Mr. Reid's grave without disturbing the grave or the slab now marking it, and, of course, without disturbing any other graves near by.

Further subscriptions of about $300 will make the amount collected sufficient to erect a monument as planned, and efforts are now being made to raise the additional funds necessary. It is hoped that this can be done within the next few weeks, so that the work may be completed during the coming summer.

ERRORS IN TELEGRAMS.—Judge Dana Harmon of the Bristol, Tenn., court decided in favor of the defendant in a suit for damages brought against the Western Union Telegraph Company by a Bristol merchant, on account of an error made in a code telegram from San Francisco to Bristol. The judge held that the company was protected by the Tennessee laws as well as by the Federal laws.

NEW YORK TELEGRAPHERS' AID SOCIETY.—The annual election of officers of the New York Telegraphers' Aid Society on March 24 resulted as follows: President, A. M. Lewis (third consecutive term); vice-president, J. F. Zeiss; treasurer, T. M. Brennan; financial secretary, C. A. Kilfoyle; recording secretary, Mary E. Saunders. Executive committee, E. F. Howell, R. J. Marrin, J. L. Young, and E. J. Oakley. Auditors, F. J. Nurnberg, J. F. E. Hopkins and H. M. Heffner.

WIRELESS IN LIFEBOATS.—The new Allan Line steamer "Alsatian" has been provided with two motor-driven lifeboats, equipped with an installation of wireless telegraphy, capable of communicating over a distance of 100 miles. One use to which these boats will be put is to scout ahead of the steamer in foggy weather, and to report by wireless the whereabouts of ice or other dangerous bodies. Two such lifeboats will be placed on the "Calgarian," and the new Cunard steamer "Aquitania" will have four of them.—London *Electrical Review.*

TELEPHONE RELAYS.—The British and German telephone departments are engaged in making experiments with telephone relays on lines from London to Cologne and Berlin, using the Anglo-Belgium submarine cable. The line from London to Brussels is equivalent to twenty-two miles of standard cable; Brussels to Cologne, eight miles, and Cologne to Berlin, twenty miles. By inserting a telephone relay at Brussels the speech between London and Cologne was equal to that through only twenty miles of standard cable, so that even between London and Berlin speech could be heard. Two types of relays were employed, namely, the Brown relay, of a new form, and the Lieben-Reisz relay.

INDUSTRIAL.

"VAC-M" LIGHTNING ARRESTERS.—The National Electric Specialty Company, Toledo, Ohio, has just issued a thirty-page catalogue of its "Vac-M" lightning arresters. This type of arrester is based upon the vacuum, which has a low resistance to static and high-tension electricity. This permits of a wider gap between the electrodes than is practicable in air, thus giving the instrument greater efficiency. Excellent illustrations and brief descriptions are given of test sets, and different types of "Vac-M" arresters for police call boxes, telephone circuits, cable work, etc. A chapter on installing ground wires is given, besides other matter of value in the line of protection for electrical apparatus.

MR. E. F. SWEETSER, manager Western Union Telegraph Company, Burlington, Iowa, writes: "Am enclosing a renewal of the subscription of the office force at Burlington, Ia. Every issue is watched for, and its contents keenly read and discussed by various employes of the office. The AGE is kept on file on my desk, subject to inspection of any employe interested. Aside from keeping in touch with certain sentimental affairs in connection with the telegraph, inestimable worth is obtained from reading the items written by 'those who know' about things electrically."

MUNICIPAL ELECTRICIANS.

MR. EMIL H. SCHMIDT, superintendent of the fire telegraph bureau, Rochester, N. Y., has been appointed superintendent of fire and police telegraph, and Mr. Joseph Smith, formerly superintendent of the police telegraph bureau, has been appointed chief operator.

NEXT CONVENTION OF MUNICIPAL ELECTRICIANS.—Circumstances having arisen that will prevent the holding of the next convention of the International Association of Municipal Electricians at Cincinnati, Ohio, Mr. Clayton W. Pike, chairman of the Executive Committee, Philadelphia, is taking a mail vote of the members as to their preference of Atlantic City, N. J., or Atlanta, Ga., as the place for the convention.

OBITUARY.

GRANT WHEATON, aged forty years, a lineman for the Postal Telegraph-Cable Company, at Syracuse, N. Y., dropped dead on March 14.

ERNEST W. EMERY, aged fifty-five years, traffic chief of the Associated Press, Washington, D. C., died on March 29.

MISS EFFIE PIERCE, for more than thirty years manager of the Western Union office at Boothbay Harbor, Me., died at that place on March 11.

HENRY C. PATTERSON, for many years connected with the Thomas A. Edison, Inc., Orange, N. J., dropped dead in Decatur, Ill., March 13. He installed the first electric lighting plants in Berlin, Germany, and Milan, Italy.

THOMAS ALLEN, a member of the United States Military Telegraph Corps during the Civil War, died in Sacramento, Cal., March 12. He served in 1861 and 1862 in West Virginia under Captain Thomas B. A. David, superintendent.

GEORGE F. BRIGHAM, aged eighty-seven years, a forty-niner of the telegraph, died in Sharon, Wis., on March 15. He was born in Fredonia, N. Y., November 18, 1827, and in 1849 entered the employ of the New York and Erie Railway as operator at Dunkirk, N. Y.

W. S. BURLEIGH, aged sixty-seven years, an old-time and military telegrapher, died in Philadelphia March 25. He was an operator for the Pennsylvania Railroad in 1860, and when the civil war began he was appointed military telegrapher to Governor Curtin of Pennsylvania and served in that capacity to the end of the war. For the past twenty years he had been confidential clerk for a Philadelphia brokerage firm.

ROBERT W. MARTIN, aged sixty-nine years, a widely-known old time telegrapher, died in New York March 25, after a lingering illness. Mr. Martin was born in Barrytown, N. Y., and entered the telegraph service in 1856 at Peoria, Ill. Having become an unusually brilliant operator he worked in many of the large cities in the United States, finally entering the service of the United Press in 1883 as assistant night manager of the New York office. He later became night manager and subsequently cable editor. He was foreign editor of the Laffan Bureau for several years but his wide reputation was based on his expertness as a telegrapher, and he had no superior in this respect. He was a writer of considerable ability and the author of many humorous articles which found their way into print in the periodicals of the day.

Mr. Martin was a member of the United States Military Telegraph Corps in the Department of the Cumberland in 1864. Eight years ago he suffered two strokes of paralysis from the effects of which he never recovered.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Frank M. Aldridge formerly of this office, lately retired, and one time manager of Ilion, N. Y., office, died in this city March 22.

Harvey W. Dutcher, a well-known operator of this office, died suddenly March 23.

INDIANAPOLIS. WESTERN UNION.

Mr. D. F. Warren, formerly quadruplex chief, has been appointed printer chief. W. E. Warren succeeds Mr. Warren as quadruplex chief.

Night wire chief R. B. Dungan, who had been in poor health for several weeks, died recently. L. F. Schetter has been appointed night wire chief to succeed Mr. Dungan, deceased. Messrs. A. W. Toops and T. L. Gard are in charge of the repeater department.

Morkrum printer circuits have recently been set up to Chicago and New York and are working quite satisfactorily.

BOSTON WESTERN UNION.

W. D. Landon, aged fifty-four years, general foreman fifth district, Eastern division, died at his home in Somerville, Mass., February 16. The funeral services were attended by a number of his

friends among the employes of the company at Boston, after which interment was made at his birthplace, Essex Junction, Vt. Mr. Landon had been in the employ of the Western Union for twenty-eight years.

PHILADELPHIA WESTERN UNION.

On account of the blizzard which struck this city on the morning of March 1 the increase in work was so very heavy that the Philadelphia operators were unable to handle it and neighboring cities were called on for assistance. New York furnished twenty operators, Pittsburgh six, Baltimore five, and a number of broker operators came in to render assistance. We were obliged to relay business for all points east of New York for the entire United States, except east of New York, and the volume of business handled was enormous. Pittsburgh later sent five repeater chiefs, who are still here. A large number of extra repeaters and duplex sets had to be set up in a hurry.

Philadelphia has lost three of its oldest operators within one month. James Hoffman, formerly of New York, but of late years in the Philadelphia office, died at Riverton, N. J., on February 20; Wm. F. Jones, aged sixty-eight years, and for fifty years employed in this office, died at his home on March 4. He had been night operator at the weather bureau for many years; Levi J. Lutz, aged forty-seven years, died at his home in this city, March 15, after a long illness.

CHICAGO POSTAL.

Several operators from the Chicago offices of this company visited the Colonial Theatre in a body on the evening of March 17 to witness a performance in which Mr. Walter McCullough, a former operator, took a prominent part.

ST. LOUIS A. T. AND T. NOTES.

Mr. Frederick C. Nitsche, late chief testboard man at Kansas City, Mo., has been appointed to a like position at St. Louis, vice Mr. L. P. Brazell, transferred to Chicago. Mr. Nitsche was a member of the St. Louis testroom force from October, 1905, to July, 1912, when he was appointed chief testboard man at Kansas City. In returning to the scene of his early struggles, he rejoins a circle of old friends, who are more than pleased at his advancement.

Mr. P. G. Trotter, late senior testboard man, has resigned, and will go into business for himself. On the eve of his departure "Buck" was surprised by a crowd of the boys, who made him the recipient of a handsome leather suitcase as a souvenir of their regard.

Mr. W. D. Staples, superintendent of the fifth division, was in town this week, showing absolutely no traces of the hard usage to which he was subjected in the automobile accident in Wyoming last fall. His complete recovery from its effects was the subject of general congratulation.

Telegraph and Telephone Age

No. 8. NEW YORK, APRIL 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

Questions and Answers.

Among the unanswered questions received from correspondents at various times are the following:

(1) "What is St. Elmo's fire, and what causes it?"

A. St. Elmo's fire is the name given by superstitious Spanish sailors many years ago to the luminous glow which may, now and then, be seen on the top of masts and other insulated sharp points on ships at sea when the air is highly charged with electricity. It is simply what we now term a brush-discharge light, and is caused by the tendency of sharp points on insulated conductors to dissipate electricity into the air, where the charge is always greatest.

(2) "How is the total capacity or output of an electric generator determined and indicated?"

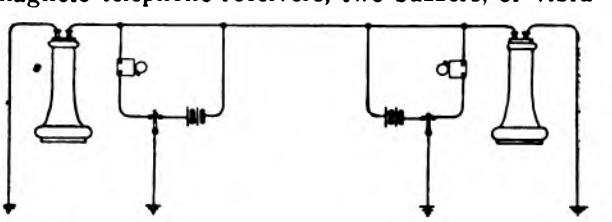
A. The commercial capacity or output of a generator is equal to the maximum amount of electric energy the wire with which the armature is wound will safely carry; that is to say, the greatest quantity of current, or number of watts the armature windings can continually carry without overheating. The safety output is usually expressed in volt-watts, volt-amperes, or both, as may be seen by the marked plates invariably attached to some part of the casting.

(3) "What is an electric spark tube, and for what purpose is it used?"

A. A spark tube, properly speaking, is a glass tube so thoroughly exhausted of air that disruptive sparks from an induction coil cannot pass through it, and by means of which different degress of exhaustion may be determined, and certain phenomena noted by observing the changes in color and character of the sparks as vacuous space is decreased or increased. For illustration, let us take a closed glass tube having leading-in wires at each end, and filled with air at ordinary pressure, through which sparks from an induction coil are passing, and observe what takes place as the vacuum is developed. If this tube is now connected with a mercury pump, it will be found that soon after exhaustion begins the sparks become less defined. After a fairly high vacuum has been obtained, the sparking not only seems to increase in volume, but changes to a dark-bluish color. From this point on, sparking decreases gradually, until the vacuum becomes so high that the sparks can no longer break through. A spark tube, in connection with an electric lamp undergoing the process of exhaustion, would indicate, by the stoppage of sparks, when a proper vacuum has been obtained. This experiment also discloses the fact that while air at normal pressure is a good insulator, it becomes a comparatively fair conductor at a certain degree of rarefaction, and again becomes an insulator of high order under extreme rarefaction.

(4) "How can I install an inexpensive telephone circuit between my house and business office, one block distant?"

A. One of the simplest and cheapest methods we can think of is shown in the accompanying illustration. The entire outfit consists of two magneto telephone receivers, two buzzers, or vibratory bells, two three-point switches, two sets of dry battery, and one line conductor. In this arrangement the receiver must serve as both transmitter and receiver, and for that reason must be changed from ear to mouth, or vice-versa, according to whether one is listening or speaking. The operation of calling is very simple. The normal position of both switch levers, when the circuit is idle, is on the left-hand discs. This leaves both bells cut in, and grounds both ends of the wire through the bell circuits. In this position both batteries are removed from the line, being left open at the right-hand discs. Consequently, there can be no waste of battery material while the circuit is idle. To call up the distant station the only operation required is to turn the home-switch lever to the



SIMPLE LOCAL TELEPHONE CIRCUIT.

right for a moment, after which restore it to its original position, and wait for a return signal, which the person called will give by the same method. As soon as the signal has been answered both persons immediately turn the switch lever to the central or "open" position, thus removing both bells and batteries from the telephone circuit proper, which, as may be seen, is already permanently grounded at both ends of the line. Conversation may then be carried on by alternately using the telephone as a receiver and a transmitter This method is known as the magneto system, and represents the manner in which the original telephone was used when conversing.

Telegraph and Telephone Patents.

ISSUED MARCH 17.

1,090,627. Signaling Device for Party-Line Telephones. To T. Kernan, East St. Cloud, Minn.

1,090,821. Telephone System. To F. R. Parkerm, Chicago, Ill.

ISSUED MARCH 24.

1,090,990. Electric Transmission of Energy. To I. Kitsee, Philadelphia, Pa.

1,091,127. Wireless Receiving Apparatus. To R. R. Goldthrop, Hartford, Conn.

1,091,193. Telephone Exchange System. To E. E. Clement, Washington, D. C.

1,091,242. Direction Indicator for Electrochemical Telegraph Systems. To. W. K. Queen and T. F. Pickett, Needham Heights, Mass.

ISSUED MARCH 31.

1,091,768. Method of and Apparatus for Selective Wireless Telegraphy. To F. G. Sargent, Westford, Mass.

1,091,832. Selective Signaling System. To E. R. Gill, Yonkers, N. Y.

1,091,965. Telephone Mouthpiece Protector. To C. Russell, Columbus, Ohio.

13,710. (Reissue). Telephone Exchange System. To H. G. Webster, Chicago, Ill.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, April 13:

American Telephone and Telegraph Co.	120⅜
Mackay Companies	82
Mackay Companies, preferred	69
Marconi Wireless Tel. Co. of Am.	5
Western Union Telegraph Co.	62½

PERSONAL.

MR. CHARLES BRIGHT, F. R. S. E., M. Inst. C. E., M. I. E. E., London, England, recently visited Panama on business.

DR. MICHAEL I. PUPIN, professor of electromechanics at Columbia University, New York, will deliver two lectures on "The Electromagnetic Theory." The first lecture will be given at the Engineering Socities' Building, New York, on the evening of April 29. The date of the second lecture will be announced later.

MR. CHARLES R. UNDERHILL, chief electrical engineer of The Acme Wire Company, New Haven, Conn., delivered a lecture on the subject "Electromagnets" before the Lehigh University Electrical Engineering Society, at South Bethlehem, Pa., on the evening of March 24, and a similar lecture before the Cornell University Branch of the American Institute of Electrical Engineers, at Ithaca, N. Y., on the evening of March 27. These lectures before engineering societies of universities are given with a view of expanding the knowledge regarding the actual characteristics of electromagnets of various types, and numerous experiments are made before the audiences in order to clearly show the fundamental features of design for both alternating and direct-current electromagnets. Mr. Underhill has done extensive research work in connection with electromagnets, covering a period of many years, and is, at the present time, actively engaged in this branch of design, so that these lectures are of particular value to those interested in the practical design of electromagnets and their varied application.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. H. A. TUTTLE, president of the North American Company, Minneapolis, Minn., accompanied by his wife, has returned from Nassau, Bahamas, where he spent the month of March.

MR. M. M. DAVIS, electrical engineer and chief engineer of telephones, New York, has returned from a business trip to Indianapolis, Ind., and Chicago.

MR. H. O. FRANCE has been transferred from the Watertown, N. Y., office to take the position of manager at Rome, N. Y.

NEW BETHLEHEM, PA., OFFICE.—This company has moved to new quarters in Bethlehem, Pa., where an up-to-date office has been fitted out.

M. J. DORAN, aged fifty-nine years, a well-known old-time telegrapher, and latterly identified with the legal department of this company in New York, died at his home in Flatbush on April 1. He had been in the employ of the company for seventeen years until about a month ago, when he retired. Mr. Doran was a native of Fredericton, N. B. In September, 1876, he was employed in the main office of the Atlantic and Pacific Telegraph Company in New York. He was one of the team that made the remarkable record of 1,180 ordinary messages in eight and one-half hours on a duplex to Philadelphia. Mr. Doran was one of the most brilliant telegraphers of his day and had a circle of friends.

TELEPHONES IN PACIFIC STATES.—This company has begun long-distance telephone service in the Pacific Northwestern States, including the cities of Seattle, Spokane, Tacoma, Ellensburg, Wash., and Portland, Ore.

Rapid Work by Postal Operators.

The *Postal Telegraph* for April prints the records of the work done in 1913 by seventy-nine operators in the main office of the Postal Telegraph-Cable Company, at 253 Broadway, New York, and some remarkable records are shown.

Robert McCartney, working the New York-Chicago local nights with Clyde L. Forsey, in Chicago, handled 146,708 messages; the largest number.

Morris L. Schwinger's record of 146,480 messages and hourly average of sixty-three messages on the New York-Philadelphia local, is the second largest in numbers and the fastest record. Jacob H. Lieberman worked the Philadelphia end of the wire.

Ralph Thomson, handled 111,423 messages, being an average of sixty an hour, which were handled at the Pittsburgh end by Homer Brown. They worked 1,847 hours. In these 111,423 messages, only one message out of every 15,917 contained any error; in other words, only seven of the 111,423 messages handled by them during the year contained any error.

Miss G. M. Sharron holds the record for the highest average number of messages handled per hour among the women operators.

Records of Thos. P. Brooks, 52,714 messages, and Morris J. Schwerin, 52,479 messages, are free from errors.

Miss Sadye Lustbader handled 80,074 messages, the record in numbers handled among the women operators.

Miss Ella C. Ferguson, with one error and 58,600 messages, heads the women for accuracy.

The average number of messages per hour by the thirty-three piece-work operators ranged from thirty-two to sixty-three, and for the forty-six non-piece-work operators from eighteen to thirty-seven.

MAGNETIC CLUB DINNER.—The regular spring meeting of the Magnetic Club was held at Broadway Central Hotel, New York, April 15. Mr. Edward Reynolds, vice-president and general manager, and Mr. John J. Whalen, manager New York operating department, Postal Telegraph-Cable Company, made addresses, and the evening was concluded with entertainment by professionals.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, vice-president, is due to arrive in New York from England on Wednesday of this week on the steamer "Olympic."

Western Union Election.

At a meeting of the board of directors of the Western Union Telegraph Company, held April 15, Mr. Newcomb Carlton was elected president of the company in place of Mr. Theo. N. Vail, and the following preamble and resolutions were adopted as a tribute to Mr. Vail:

WHEREAS, Mr. Theodore N. Vail has retired from the directorate of the company, and also from the presidency, and

WHEREAS, the connection of Mr. Vail with the board of directors of this company and his administration as president have been attended with signal benefits to the company, which the board of directors wishes to recognize, and its appreciation of which it desires to spread upon the records of the company, now, therefore, it is

RESOLVED, that the board of directors hereby expresses its very great regret that Mr. Vail has severed his connection with this company, and retired from the administration of its affairs as president.

FURTHER RESOLVED, that the board of directors of this company hereby expresses its high appreciation of the great benefits the company has received from Mr. Vail's administration and as a member of the directorate. Among the benefits so received the board desires specially to enumerate the acquisition of the cable lines, and the inauguration of the deferred cable service, which has resulted in great benefits to the public and to the company; the inauguration upon the land lines of the system of night and day letters; the extension of service by improved connections and facilities to many additional localities; the inauguration of the pension plan for the benefit of employes; the reconstruction and improvement of the physical condition of the lines, and the re-arrangement of the company's organization, resulting in improved discipline and service and increased facilities to the public.

FURTHER RESOLVED, that the board of directors extends to Mr. Vail the thanks of the stockholders whom it represents, and the individual appreciation of its members, for the services which he has rendered this company, with the wish that he may long be spared to render to the companies with which he remains connected the benefits of his unusual administrative abilities, his ripe experience and sound judgment.

An executive committee and additional officers were also elected as follows: Executive Committee —Wm. H. Baker, Henry A. Bishop, Newcomb Carlton, Henry P. Davison, Thos. H. Hubbard, Robert S. Lovett, Mortimer L. Schiff.

G. W. E. Atkins and B. Brooks, vice-presidents; Wm. H. Baker, secretary; A. R. Brewer, treasurer; E. Y. Gallaher, comptroller.

Annual Meeting of the Western Union Telegraph Company.

At the annual meeting of the stockholders of the Western Union Telegraph Company, held in New York, April 8, the number of directors was reduced from thirty to twenty-one and the representatives of the American Telephone and Telegraph Company retired from the board. The following were re-elected directors: Oliver Ames, William Vincent Astor, Henry A. Bishop, Newcomb Carlton, Robert C. Clowry, Henry P. Davison, Chauncey M. Depew, Edwin Gould, George J. Gould, Thomas H. Hubbard, Robert S. Lovett, Edwin G. Merrill, Jacob H. Schiff, Joseph J. Slocum, James Stillman, and the following new directors were elected: William H. Baker, Henry W. DeForest William Fahnestock, Percy A. Rockefeller, Mortimer L. Schiff, William H. Truesdale.

The by-laws of the company were amended so as to provide that the affairs of the company shall be managed by a board of twenty-one instead of thirty directors, as at present, and that seven of the directors, including the president, shall constitute an executive committee.

CATALOGUE OF PLANT SUPPLIES.—The general superintendent of plant has issued a 115-page, quarto catalogue of apparatus, material and tools used in connection with the inside plant. The book gives general information and instructions for ordering apparatus and material, and is intended

for the plant department in making requisitions, but it contains much general information, making it useful for many employes for reference. The work is very complete and gives brief descriptions, dimensions, code numbers and uses of the equipment. The names of the articles are arranged alphabetically in large, black-face type, which facilitates reference.

ROBERT C. BLISS, aged sixty-five years, manager for the Western Union Telegraph Company at Cincinnati, Ohio, died of pneumonia on April 11. He was born in Hamilton, Ohio, and entered the Western Union service about forty years ago, but in the meantime served other interests. He returned to the Western Union service and in 1902 became manager at Cincinnati and held this position at the time of his death. Mr. Bliss was a most capable and conscientious official and was highly esteemed by his superiors and subordinates.

THE SALE OF STOCK TO EMPLOYES.—About 4,200 shares of Western Union stock have been taken under the recent offer to employes at the allotted price of 61⅛, subscribers to receive the April dividend of one per cent, which brings the price per share down to 60⅛. Three-fourths of these shares were taken under plan A, which provides for the payment of the stock in twenty-four monthly payments and the other fourth under plan B, fully paid.

THE CABLE.

JOHN BEATTIE, aged seventy-three years, accountant of the Commercial Cable Company, New York, died on April 5 at St. Luke's Hospital, after a surgical operation for intestinal trouble. Mr. Beattie was born at Dumfries, Scotland, in June, 1841, and joined the Commercial Cable Company on the day it opened for business, December 24, 1884. He was a most upright man, and his genial disposition won for him many friends. He was an industrious worker and devoted to the interests of the company which employed him. In spite of his age he retained all the energies of younger men and was found at his desk every day until his recent illness. He served in the Civil War and was attached to the Seventy-ninth New York Highlanders under Colonel Andrew D. Baird. Mr. Beattie's remains were interred at Greenwood Cemetery on April 8.

WEEK-END CABLE LETTERS TO GERMANY.—The German Atlantic Cable Company has instituted a week-end cable letter service to and from Germany over its New York cable. The charges from New York are $2.00 for twenty-five words or less and eight cents for each excess word.

CABLE CONCESSION.—The concession granted to the India-Rubber and Gutta-Percha Company for establishing submarine cables between Pernambuco and the West Coast of Africa by way of the Island of Fernando Noronha, has been transferred to the South American Cables Company.—*London Electrical Review.*

NEW HIGH-SPEED SYSTEM OF TELEGRAPHY.—It is stated that Messrs. Siemens and Halske, Berlin, Germany, are developing a new system of automatic telegraphy in which a perforated strip, having five parallel rows of holes, is used at the transmitting end, with five corresponding relays at the receiving end. Very high speeds are obtainable.

THE TELEPHONE.

MR. T. P. SYLVAN, assistant to the vice-president of the New York Telephone Company, New York, lectured on the telephone industry at the West Side Branch of the Young Men's Christian Association, New York, April 6.

MR. W. R. ABBOTT, general commercial agent of the Chicago Telephone Company, Chicago, has been appointed general manager of the company, to succeed Mr. H. F. Hill. Mr. Abbott has been in the telephone business since 1889 and is a member of the Telephone Pioneers of America.

MR. W. B. EDDY, special agent, commercial department, New York Telephone Company, Albany, N. Y., was a recent New York business visitor.

COMMITTEE ON ELECTROLYSIS.—Messrs. H. S. Warren, electrical engineer; F. L. Rhodes, outside plant engineer, and A. P. Boeri, protection engineer, American Telephone and Telegraph Company, New York, constitute the committee representing the telephone company in the joint national committee on electrolysis.

TELEPHONE IN CONSTANTINOPLE.—The newly installed telephone service in Constantinople was formally opened to the public March 28.

TELEPHONY IN CHRISTIANIA.—The Norwegian Storthing has been asked for an appropriation of $262,640 for a new central telephone station in Christiania, and for transforming the present system to an automatic one.

Death of Frank B. Knight.

Frank B. Knight, aged sixty-six years, special agent of the Southwestern Telegraph and Telephone Company, Dallas, Tex., and a well-known old-time and military telegrapher, died in that city April 1. He was a native of New York State and learned telegraphy on the line of the old New York, Albany and Buffalo Telegraph Company at Geneva, N. Y. He was later employed on the New York Central Railroad at Syracuse, N. Y., and on the breaking out of the Rebellion he joined the military telegraph corps. At the close of the war he entered the service of the Western Union Telegraph Company at Rochester, N. Y. In 1870 he was appointed chief operator of the Union Pacific Railroad at Omaha, afterwards becoming manager of the Western Union office in that city. In 1880 he left the telegraph service to enter that of the American Bell Telephone Company as special agent in a large territory west of the Mississippi River. This position he held until 1905, when he was transferred to the Southwestern Telegraph and Telephone Company, in a like capacity, with headquarters at Dallas, Tex., which position he held at the time of his death.

Mr. Knight was very popular among telegraph and telephone officials and employes and had many friends in both services.

He was operator at the residence of General U. S. Grant when the latter was running for the

presidency, and received the announcement of the General's election. Mr. Knight was a member of the Telephone Pioneers of America.

Telephone Atmosphere Cleared.

At the annual meeting of the American Telephone and Telegraph Company, held in New York, March 31, President Theo. N. Vail made the following statement:

"The agreement between the Attorney-General and this company is set forth in the annual report. [See our issue. dated April 1, for abstract of this report.] In accordance with its terms the details of a working agreement have been arranged, which is generally acceptable to the independent telephone operating companies.

"The suit brought by the United States against the Bell Companies in Portland, Ore., has been disposed of by a 'consent decree.' This decree does not disturb any established relations, but in the case of Spokane, where the Bell Company had purchased but not yet merged the opposition company, the question of the merger is left to the determination of the local authorities. If they do not consent to a merger the Bell Company is to sell the securities of the opposition company. In the case of the Northwestern Long-Distance Telephone Company, a toll line having some interstate connections, whose securities were purchased by the Pacific Company, the decree requires the sale of those securities and also requires the restoration of the connection of that company with the opposition exchanges which have been merged with the Bell exchanges. It also requires the sale of the Independent Long-Distance Company's small interstate line.

"This decree and the working agreement dispose of all questions between the Department of Justice and the company. establish a satisfactory working arrangement with the independent companies, and afford a basis upon which the business of the company may, in future, be conducted.

"While insistent upon a settlement that would meet with their interpretation of the law, the Attorney-General and his assistants were most desirous of bringing about one that would disturb, as little as possible, the business, and meet, as far as possible. the local public wishes and advantages.

"The stock of the Western Union Telegraph Company. in accordance with the agreement with the Attorney-General, has been sold to absolutely independent interests, and the representatives of this company will retire at the annual meeting to be held in April.

"The recognition of the good faith of the company in its efforts to co-operate with city, state and national regulatory bodies in the solution of questions as to rates and service is constantly growing and broadening, with, as a result, a marked tendency to better and more stable public relations.

"There has never been a time in the history of the company. so far as I am familiar with it, when the business has been so free from vital questions of policy or proceeding as now, and when the constantly recurring questions of franchises and rates were proceeding so satisfactorily.

"There is not a single suit pending in any State or Federal court, claiming any violation of any 'anti-trust law,' State or Federal.

"Arrangements have been made by some of our associated companies to finance themselves for the immediate future and to repay some of the money advanced to them by this company, to such an extent that it is not expected that it will be necessary for this company to issue stock or any new securities at least before the first half of 1916."

Messrs. Charles R. Bangs and Alfred E. Holcomb were elected directors to succeed S. L. Schoonmaker and N. W. Harris. The other directors were re-elected.

RADIO-TELEGRAPHY.

Mr. E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, and Mr. William W. Bradfield, manager of the English Marconi Company, London, sailed for England on the steamer "Mauretania" on April 7. Mr. Bradfield spent two weeks in this country and inspected the new Marconi stations at Belmar and New Brunswick, N. J.

Dr. Elihu Thomson, of Swampscott, Mass., on March 23 addressed the Commercial Club, Boston, Mass., on the possibilities of wireless transmission. He expressed the belief that transatlantic wireless telephony would be in practical use within a few years.

Speed of Wireless Waves.—In a lecture in Paris, on March 28, Professor Henry Abraham said, in referring to the work of determining longitude by wireless, that wireless waves travel at the rate of 186,000 miles a second.

Wireless Telephony.—Successful transmission of the singing voice, but not the words sung, has, says the *London Electrical Review*, been effected from the station at Laeken, near Brussels, to the Eiffel Tower, 225 miles away.

Wireless on Harbor Police Boats.—Wireless telegraphy has been installed on some of the Rotterdam, Holland, river police boats so as to avoid the waste of time of transmitting communications and instructions between headquarters and the boats.

"Jack" Phillips Memorial Opened.—The cloister built at Godalming, England, in memory of "Jack" Phillips, the wireless operator who lost his life in the "Titanic" disaster, was formerly opened on April 15, the second anniversary of the loss of that steamer.

Arrested for Intercepting Wireless Messages.—M. Jhidkovsky, chief telegraph engineer at Zhonerinka, Russia, has been arrested on the charge of intercepting wireless messages from the war office at St. Petersburg and communicating them to a foreign government.

Audiphone Amplifier.—The DeForest audiphone amplifier was tested on board the United Fruit Company's steamer "Almirante" recently. Musical notes from a piano were heard and signals from the Arlington, Va., and Santa Marta, Colombia, stations were clearly reproduced. Captain W. H. Bevan, of the "Almirante," predicted that soon he would be hearing, while on the Caribbean Sea, an opera produced in New York.

THE LODGE PATENT.—Judge Van Vechten Veeder, in the United States District Court in Brooklyn, on April 7, handed down a supplementary memorandum to his decision in the suits brought by the Marconi Wireless Telegraph Company of America against the National Electric Signaling Company. In the memorandum Judge Veeder holds that the Marconi company is not entitled to damages for the infringement of the Lodge patent by the National Electric Signaling Company because of the long time that has elapsed since the patent was first infringed. An appeal from Judge Veeder's decision in both suits brought by the Marconi Wireless Telegraph Company of America has been taken on behalf of the National Electric Signaling Company.

OBITUARY.

W. F. HART, aged fifty-seven years, chief operator for *The Enquirer*, Cincinnati, Ohio, was stricken with apoplexy while at work on April 11 and died in a short time.

E. J. DAVIS, formerly night chief operator of the Western Union Telegraph Company in New Orleans, La., died in that city April 5. He had been in the company's service in New Orleans for thirty-three years.

THOMAS MARRIN, aged fifty-five years, a well-known old-time telegrapher, died at Millburne, Philadelphia, Pa., April 10. Mr. Marrin was an old New York telegrapher and moved to Philadelphia in 1883, where he had since been engaged in other lines of business.

G. W. MILLAR, of New York, aged seventy-four years, who has for over thirty years supplied the telegraph manila paper used by the telegraph and railroad companies for their blanks, died in New York on March 28. Mr. Millar was well known to the telegraph people and was a thirty-third degree mason. Mrs. Millar died on April 3, less than a week after the death of her husband.

The Military Telegraph Pension Bills.

On March 30, Colonel William Bender Wilson, president of the Society of the United States Military Telegraph Corps, and Mr. A. A. Zion, chairman of the society's committee on Congressional action, appeared before the House Invalid Pension Committee at Washington. Colonel Wilson addressed the committee and presented a strong argument in favor of the army telegraphers' pension bill now in their hands. He cleared up several matters that had seemed to be misunderstood by the committee, and answered many questions which helped to place the whole matter in a way that left nothing to be done in order that the committee should be correctly advised of the duties performed by the telegraphers in the army corps during the Civil War. Messrs. Wilson and Zion also, on the same day, met a sub-committee of the Senate Pension Committee. They made practically the same argument as was presented before the House Committee and questions were answered which cleared up in the minds of the members of the sub-committee all doubt as to the justice of the telegraphers' pension bill now before the Senate. Both Messrs. Wilson and Zion feel confident that the bills now before Congress will be favorably acted upon at this session.

How to Save.

We are frequently asked by members of the telegraph and telephone services located at distant points from New York how they can become investors in the Serial Building Loan and Savings Institution of New York, which pays five per cent to depositors, and which is so highly endorsed by telegraph and telephone officials. It is only necessary to make remittances by certified check, express or money order to Mr. E. F. Howell, secretary, 195 Broadway, New York, or 253 Broadway, New York. On receipt of the amount to be placed on deposit Mr. Howell will issue a bank-book, showing the deposit the same as is done by other banking institutions. In this connection it will be interesting to state that an operator in Michigan recently wrote the editor of TELEGRAPH AND TELEPHONE AGE as follows: "I have to thank you for recommending the Serial Building Loan and Savings Institution to me many years ago. I became a member, and in a few years I found I had, with interest, to my credit $1,000. I then withdrew it and paid for a substantial home. I am consequently possessor of a home I never expected to have."

An Excellent Book on Telephony.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the best books of its kind on the market. As its title implies, it deals with electricity and magnetism as applied to telephony, and the subject is presented in such a clear manner that an understanding of it comes with little effort. The author, Mr. Cummings, is a practical telephone man, and in his daily work he has encountered many difficulties and problems. He analyzed and investigated them to find the causes and has, based upon this valuable experience, written a book that every telegrapher and telephonist should study. This is an excellent book for beginners, and for advanced students as well, as it keeps the principles clearly before them, and so long as the road is clear their progress will be easy. This book is now being used as the basis for the "Questions and Answers," which are now appearing regularly in these columns. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, New York, at $1.50 per copy.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

Protection of Duplexes Against Alternating-Current Disturbances.

BY A. J. EAVES, ENGINEERING DEPARTMENT, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The accompanying sketch shows the Postal Telegraph-Cable Company's practice in protecting duplex sets against extraneous alternating-current disturbance.

From the main line to the artificial line, in front of the polar relay, is a resonant shunt circuit composed of an air core inductance coil of fixed value and two 3-m.f. adjustable condensers. This shunt can be made resonant to any frequency by adjusting the condensers to the desired capacity.

When the incoming alternating current reaches the dividing path at the junction of the resonant circuit and the main line the greater part will flow to the ground via the resonant circuit and artificial line, the remaining portion flowing to the ground via the main line coils of the polar relay, non-inductive shunt, artificial line coils of the polar relay and artificial line as one path; and three other paths; namely, grounded condenser at the split, grounded condenser on the lead and through the machines.

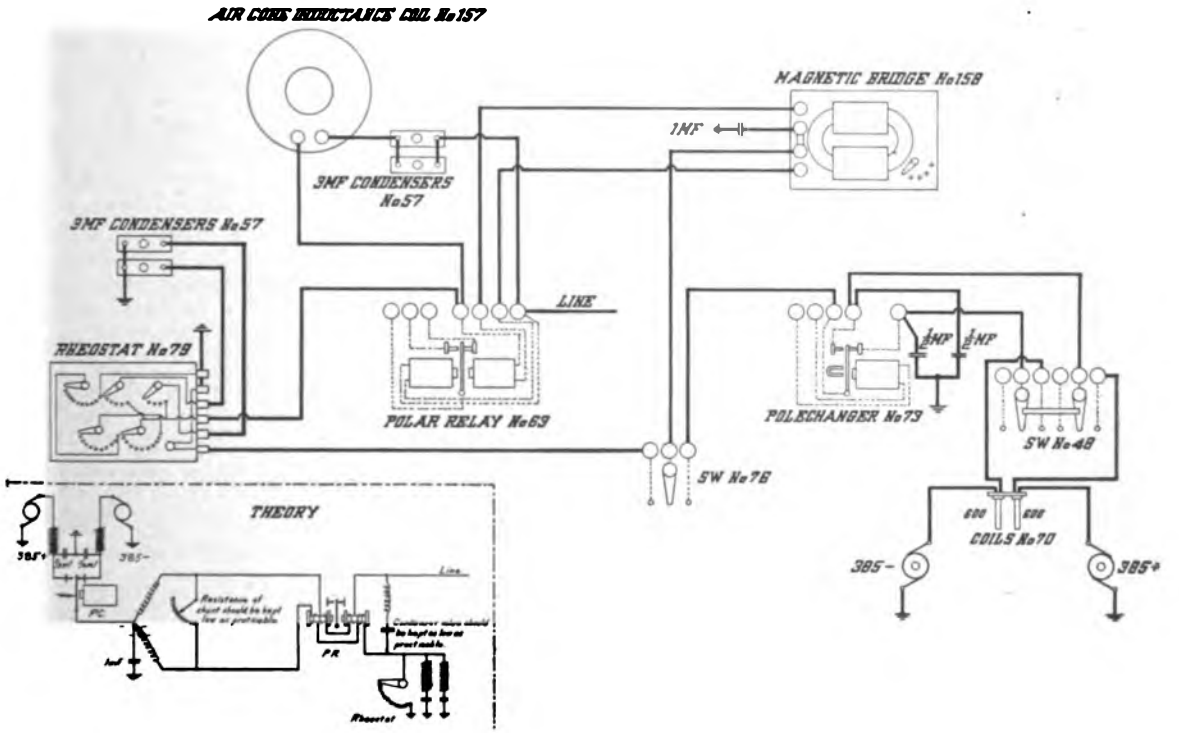
To choke out as much of the alternating current from the coils of the relay as possible and force it to the ground through the resonant shunt and artificial line, an impedance coil of high inductance is placed in the main line behind the relay, and a like inductance is placed in the artificial line for balance, the two coils with their cores joined forming a magnetic bridge.

The purpose of the non-inductive shunt across the magnetic bridge serves to alter the inductance of the bridge and to supply a non-inductive path for the received signaling current to accelerate its rise in the relay coils until the current has built up in the magnetic bridge.

By changing the resistance of the non-inductive bridge shunt the current is varied in one side of the joint inductance, thereby altering the inductance and the effect of the impedence to the incoming current. The minimum impedance is obtained by keeping the resistance of the non-inductive shunt to its lowest degree and the maximum to its highest or opening the shunt. This arrangement permits of a wide range of inductance values.

The note, "Resistance of shunt should be kept low as possible," is to guide the attendant in adjusting, so that a minimum impedance will be in the path of the signaling received current after a maximum reduction of the disturbing alternating current is reached.

The note, "Condenser value should be kept as low as practicable," is to prevent an unnecessary surplus of capacity being used in the resonant shunt which will reduce the efficiency of the relay.



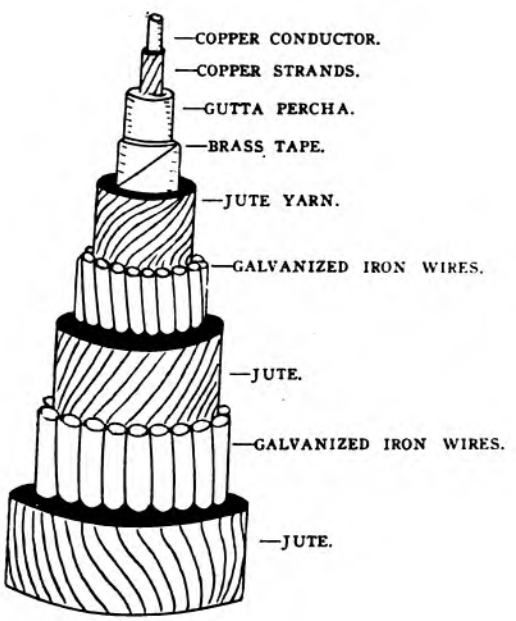
PROTECTION OF DUPLEXES AGAINST INFLUENCE OF ALTERNATING CURRENTS.

THOUGHT TRANSFERENCE.—A correspondent of an electrical paper announces an important discovery. "A few hundred volts," he says, "controlled into a small, strong and continuous current, a few inches in diameter, will not only convey sound in the form of ordinary conversation, but will transfer thought from brain to brain." There is only one thing lacking in this particular case. The writer evidently has not practically tested the latter application, with himself as the receiving element, or, perhaps, he got the connections reversed.

How Cables Are Made, Laid, Operated and Repaired.

(*Continued from page 199, April 1.*)

One of the greatest enemies of submarine cables is the teredo, an aqueous worm. These worms, in some parts of the sea, particularly near land, are very abundant, and if they can work their way through the outer covering of the cable on to the gutta-percha insulation, they not infrequently interrupt communication by boring minute holes through the gutta-percha to the copper conductor, allowing an escape of electricity, and, consequently, faulty operation of the line. To guard against this the core of present-day cables is covered with brass tape. This brass tape is impervious to the assault of the teredo. The completed core, with the brass taping, is covered with jute yarn, a coarse hemp steeped in a tarry preservative. This jute yarn is wound round the core to serve as a bedding for the outer



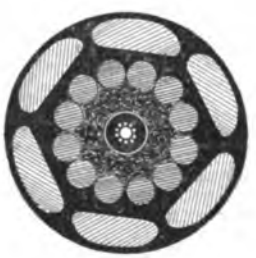
SHORE END TYPE OF CABLE WITH VARIOUS LAYERS STRIPPED.

protecting wires. After several servings of the jute yarn have been applied to the core, the whole is then covered with galvanized iron wires, which vary in number and thickness according to the depth of water the cable is to lay in. A cable laid in deep water must necessarily be of lighter weight than one laid in shoal water, because if it were too heavy the strain of raising it in very deep water would be so great as to render it impossible to recover the cable for repair purposes. Furthermore, in the deep water there is very little to injure submarine cables. The cable rests in a soft bed of decomposed shell-matter, known technically as globigerina-ooze. Cable recovered from places where it has been lying in deposits of this kind has been found to be in almost a perfect condition after thirty years' submersion.

Where the cables approach the shore and are subject to the effect of motion in the water it is necessary to guard against deterioration and corrosion by protecting the core with a heavier armoring. Thus, the cables vary in thickness from one inch in diameter, deep-sea cable, weighing about two and a half tons per mile, to four and a half inches in diameter, shore-end ice cable, weighing, approximately, sixty tons per mile. Nearly all the shore-end types of cable have two sheathings of galvanized iron wire as an additional protection against chafing and corrosion. The inner sheathing is made of small iron wires and the outer sheathing of heavy wires. The iodine contained in the seaweed found in shore deposits has a corrosive effect on the sheathing wires.

All long submarine cables have only one core, it being electrically impossible to work submarine cables with two conducting wires for great distances, because the current which passes through one wire induces a current into the second wire, thereby setting up interference with and mutilation of the signals. The longest cable with two cores in it is the cable of the Commercial Cable Company, between Canso, N. S., and Rockport, Mass. This cable is about 528 nautical miles long.

The outer protecting wires of submarine cables are steeped in tar and are covered with tarred tape or yarn. This is to protect them, as far as possible, against the corrosive effect of any chemical deposit over which they may lie. The number of outside protecting wires also varies according to the depth of water in which the cable is laid. This number must be decided upon scientific principles. It must always be borne in mind that a cable has



SHORE END CABLE. (HALF SIZE)

DEEP SEA CABLE. (ACTUAL SIZE)

to be so constructed that it can be recovered again from the bed of the ocean. It must, therefore, not be made either too stiff or too flexible, and the size and number of wires and the shape of their windings is an engineering problem which has to be carefully calculated in the manufacture of the cables.

During the process of manufacture daily tests are made by experts of the electrical and mechanical fitness of the manufactured cable and the completed cable is then coiled in large tanks, where it is kept under water until the time arrives for transshipment to the cable steamer which is to lay the cable.

At the present time nearly all the oceanic telegraph cables are manufactured in Europe. The principal submarine cable manufacturing plants are the Telegraph Construction and Maintenance Company, at Greenwich, England; the India-Rubber Gutta-Percha and Telegraph Works Co., at Silvertown, London, Siemen's Brothers and Company, at Woolwich, London, and the Norddeutsche Seekabelwerken of Nordenham, Germany.

(*To be Continued.*)

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, APRIL 16, 1914.

The World's Debt to the Telegraph.

What the world owes to the telegraph is beyond calculation, and it is safe to say that no other agency has contributed so much to its commercial development as has the telegraph. It does not require any deep or philosophic argument to prove the truth of this assertion, and yet, strange to say, the telegraph gets little or no credit for what it has done for mankind. It has made possible the newspaper of the present day and has been the most powerful agency in the wonderful development of the railroad and in facilitating the world's commerce. These are the principal activities which owe their present highly developed states to the telegraph, and yet, when men get together to discuss the marvelous progress of the world, a word is rarely spoken concerning the real power behind it all.

Newspaper men point with pride to the great work they are performing for humanity; how the development of the printing press and news-gathering agencies have made this possible; and how the improvement in the methods of making paper has made the modern newspaper so cheap that all who can read may know what is going on in all parts of the world within a few minutes or, at most, a few hours after the events have occurred. They fail, however, to give the telegraph any credit for all of these things, and yet were it not for the telegraph there would have been no incentive for these great improvements.

The facility of gathering the news of the world which the telegraph made possible rendered it necessary to improve the mechanical side of the newspaper. The telegraph brought the news to the paper office so rapidly and in increasing volume that quicker methods of getting it into the hands of the public became imperative, hence from this point on it is easy to trace the rapid development of the printing press.

Thus it may be truly said that the modern newspaper is the offspring of the telegraph, and it may also be said with equal truth that the modern railroad is largely dependent on the telegraph. Without the telegraph high speeds and dense traffic would not be possible, and yet we seldom hear of railroad men giving it any credit for its share in the wonderful developments that have taken place. The reason for this habit of ignoring the telegraph is probably due to the fact that the telegraph does its work in silence and its power is not seen, while, on the other hand, men can see the results of their inventive and constructive work in the newspaper and the locomotive.

In referring to the telegraph we do not mean land lines alone, but submarine cables as well. The cable has been powerfully instrumental in knitting all parts of the world into a social and commercial unit, and is entitled to a large share of credit, and lastly comes the wireless telegraph to keep the mind of man throbbing in unison whether he be on land or at sea. It requires no strong imagination to realize how much the telegraph has done for the advancement and happiness of mankind. It is the cornerstone of progress along the lines indicated, and many others as well, and, we contend, it is entitled to a large share of credit for the world's material achievements.

Universal Telegraph Alphabet.

It is interesting to note that the Mexican telegraph authorities have adopted the Continental telegraph alphabet, to take effect on June 30 on all government lines.

The situation in Mexico, in respect to telegraph alphabets, has been peculiar and intolerable, there being three different codes in use up to the present time—a veritable Babel. How the service was conducted as well as it has been under such adverse circumstances is a wonder, but the authorities have at last realized that such a situation is indefensible and dangerous, and have concluded to simplify matters by adopting the Continental alphabet as the only one to be used after the date mentioned. The order to make this change was promulgated on February 28, thus giving the operators four months' time in which to familiarize themselves with the new code.

The Mexicans recognize the advantage and necessity of using the Continental code, because of the

important feature of interchangeability of services, *i. e.*, from land lines to cable, and radio-telegraphy. Thus an operator can engage in any one of the three services and change from one to another at any time without detriment to the work. This is as it should be, and is in line with what we have been advocating since the first of the year. The same action will have to be taken in the United States sooner or later, and to effect the change is not such a tremendous task and risk that some would have us believe.

The Mexicans had a telegraph alphabet of their own which, no doubt, they were reluctant to sacrifice to the modern spirit of progress, but it should be said to their credit that they had the courage to lay aside national prejudice in order to fall in line. It is useless for one country to stand out against the entire world in this matter, and it may be that the government itself will some day require the adoption of the international alphabet in the land lines of this country.

Growth of Ideas in Printing Telegraphy.

In communication to a London electrical paper, Mr. H. H. Harrison, a well-known English electrical engineer, gives an interesting review of the growth of ideas in printing telegraphy. At a recent meeting of the Post Office Institution of Electrical Engineers, in London, Mr. Hume Bell referred to the work of arranging the Western Union Multiplex printing telegraph (the Murray multiplex in American form) so as to secure synchronism by effects generated locally from the signals themselves, and not requiring special correcting signals. "This," states Mr. Harrison, "is an interesting illustration of the surprisingly slow growth of telegraphic ideas. I," he continues, "recently came across a British patent granted to W. H. Burnett, dated 1860, fifty-four years ago, in which double echelon multiplex working is fully set out together with cadence tappers and locked keyboards. A five-unit alphabet was described in addition. Yet it took twenty years for these methods to come into practical use and some years later before the five-unit alphabet was recognized as *the* alphabet. To this day printing telegraphs are invented which stand self-condemned by their alphabet.

"Again, in 1899, a patent was taken out in which two translating mechanisms are alternately employed, one being set while the other is effecting printing, and it is only at the latter end of 1913 that a telegraphic printer arranged on these lines has appeared; I refer, of course, to the automatic system of Siemens and Halske. The generation of speed correction from the arriving signals has been the mainstay of the Hughes printer for about forty years, but no attempt appears to have been made to apply the idea to modern high-capacity printing telegraphs until Mr. Donald Murray brought forward his automatic system in 1900. In this system, as is well known, the correcting impulses are generated entirely from the signals themselves and the idea has also been applied to receiving perforators by Mr. S. G. Brown. A year later Mr. F. G. Creed brought out his Wheatstone tape-receiving perforator, based on the same idea, and Mr. Bille has followed him.

"In 1903 Mr. Murray sent a long, illustrated communication to the British, French, German and other Administrations, in which he fully described the advantages and disadvantages of applying to the multiplex the method of correcting from the signals themselves, and he described a complete working arrangement for a multiplex printing telegraph based on the Baudot, but with corrections formed from the signals themselves. Mr. Murray informed me that none of the Administrations displayed any interest in the matter, and the idea lay dormant for some years, until it was applied by the French Administration to the Marseilles-Algiers circuit. The wonderfully ingenious Siemens and Halske automatic printing telegraph recently perfected embodies the same idea of correcting from the signals themselves, but it is readily applicable and, indeed, is a necessity with automatic systems.

"Mr. Murray and Prof. Rowland," says the writer, in conclusion, "appear to have been the first to propose the application of the principle to multiplex printing telegraphs, and the French Administration to carry it out in practice. So far as multiplex printing telegraphs are concerned, the disadvantages would seem to outweigh the advantages of abolishing the extra signals, so far as land-line working is concerned, but for ocean cables the arrangement promises to be valuable, a fact already indicated by its application to the Baudot across the Mediterranean."

Course of Instruction in the Elements of Technical Telegraphy.

The course of instruction in the elements of technical telegraphy, which has been printed in installments in these columns without a break since October 16, 1911, was concluded in the issue dated April 1.

These articles have met with a wide reception and have been greatly appreciated especially by the student element of the fraternity, and in order to supply the constantly increasing demand for them we have decided to issue the entire course in book form.

Not only have students expressed their appreciation of the articles, but practical telegraph engineers as well, as they are constantly referred to by the latter to refresh the memory as to the underlying principles of the art. A careful study of this book will give one a safe groundwork in telegraph engineering that will place the student in a position to readily grasp practical details.

The price of the book has been fixed at $2.00 per copy. Send orders to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MR. E. EAKIN, Michigan State Telephone Company, Detroit, Mich., writes: "Thank you kindly for renewing my subscription. I find your publication invaluable to me, both while in the radio work and in telephone work which I have been in."

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 12) Are the heating effects of an electrical current always desirable?

Does a current develop heat in all parts of a circuit?

Can the heating effects always be detected by measuring instruments?

Give examples of the utilization of the heating effects of the current.

(Page 13) Also give examples of the damaging effects of heavy currents.

What is the simplest method of guarding against overheating?

What is a fuse, and what is the action upon a fuse of heavy electrical current?

How are fuses rated?

Do fuses give uniform results under all conditions?

What is the danger of using a fuse to carry more current than that for which it is rated?

Why is it important not to over-fuse?

How are proper sizes of fuses determined?

Why is it of the utmost importance to strictly follow specifications in installing fuses?

What device is used for protection against heavy currents?

(Page 14) Describe the general construction of a circuit-breaker.

When the current is too small to be effectively cared for by either fuse or circuit-breaker, what protective device is generally employed?

What is the action of a heating coil when it operates?

Describe the construction of a heating coil.

Are heating coils made for small currents only?

Do automatic devices offer protection against fire risk caused by loose connections?

What is the danger where several strands of tinsel in a cord are broken?

What are the safeguards to be employed against dangers arising from defective cords?

Why do instrument and switchboard troubles increase in damp weather?

(Page 15) What is the effect of switchboard leakage, and what damage is likely to arise therefrom?

How can these dangers be guarded against?

How can high and waterproof insulation be obtained?

What is a direct current, and what is an alternating current?

What is a continuous current, and a pulsating or fluctuating current?

What is a single-phase current, and what is a multiphase or polyphase current?

How are multiphase or polyphase currents produced?

(To be Continued.)

No. 4 East of Old.

BY WALTER P. PHILLIPS.

A recent visitor from Chicago brought to me, in Bridgeport, Conn., a pleasant message from Dr. William D. Gentry, for the last twenty-five years a resident of the windy city. It was nearly fifty years ago that "WD" awakened memories of Dixon F. Marks on No. 4 East. There had been no sender in the New York office to quite equal him since the first years of the Civil War, when Marks, who was the night manager of the American Telegraph Company's office, used to relieve on No. 4 East at 11 p. m., and proceed to make life interesting for us until "good night." I wonder how many men are living now that were stars of the first magnitude in their day, who can date back to 1848, when Gentry, at the age of twelve years, learned to telegraph in Kentucky, where he was born in 1836. Henry H. Ward and Frederick H. Tubbs are the only ones I know of who are in Gentry's class. If there are others let us hear about them.

Edison's Dreams.

Mr. Thomas A. Edison, in 1884, in predicting the uses of electricity in fifty years, said:

"As to the changes which will be effected by electricity within fifty years in the city of New York, I would say that I believe electricity will propel the cars of the street and elevated railroads, light the city within and without its buildings, furnish power for all purposes, work telephones and burglar alarms, deliver the opera, convey parcels, detect and signal fires, operate fire engines, and possibly displace animal locomotion for vehicles."

In commenting on this prediction the editor of the Shreveport (La.) Times at that time said that these predictions "established Edison's right to membership in the Dreamer's Club."

"We of to-day," the *Times* continues, "can hardly realize that there were no electric street cars in 1884, no electric lighting systems, no great telephone systems, no pneumatic tubes, no electric fire alarm systems, no automobiles. Mr. Edison was called a dreamer because he forsaw all these things. What would have been thought of him if he had predicted that in thirty years men would by flying around in the air in great bird-like machines, that their voices would be reproduced by the phonograph long after they were dead, that their actions would be thrown upon a screen in so lifelike a manner as to be veritable "living pictures," and that wireless messages would be sent through the air for hundreds of miles?

"Every one of Edison's dreams has come true and many more things even more remarkable and more wonderful. Isn't it interesting to speculate, in the light of what has happened in the brief space of thirty years, as to what the next thirty years will hold for mankind?"

Annual Report of Western Union Telegraph Company for 1913.

The annual report of the Western Union Telegraph Company for the fiscal year 1913 was submitted by President Theo. N. Vail at the annual meeting of the stockholders, held in New York on April 8.

The income account for the year shows the following results:

Gross Telegraph and Cable Earnings	$44,847,775.10
Miscellaneous Earnings	935,737.48
Total Earnings	$45,783,512.58
DEDUCT:	
Operating Expenses, including rent of Leased Lines, Reconstruction, Repairs, Taxes, etc.	42,327,121.27
Balance	$ 3,456,391.31
ADD:	
Income from Loans and Investments, including Rentals from Real Estate.....	1,115,755.18
	$ 4,572,146.49
DEDUCT:	
Interest on Bonds of the Western Union Telegraph Company	1,337,229.12
Balance transferred to Surplus Account	$ 3,234,917.37

There have been added to the land line plant 623 miles of poles and 18,458 miles of wire, consisting of an increase of 25,797 miles of copper wire and a decrease of 7,339 miles of iron wire. The company now has 25,060 independent and joint offices. Considerable work has been performed during the past year in improving and rehabilitating offices, moving them to more desirable locations, and closing others which were not remunerative.

Of the total additions to real estate, $1,293,855 was expended on the New York office building construction referred to in previous reports. The balance expended for real estate, amounting to $281,871, has been spent in needed improvements for the cable service.

The total of other securities owned has decreased $2,521,316, which is principally accounted for by the payment, during the year, of three notes, aggregating $2,500,000. The other changes in the value of securities owned are represented by some minor purchases of the shares of allied telegraph companies and the writing down, in book value, of the shares owned in the American Telegraph and Cable Company, pursuant to the resolution of January 2, 1913, which was referred to in the last annual report.

Included among the current assets is cash on special deposit, amounting to $3,000,000, which represents a short-term loan at five and one-half per cent. The total of bills and accounts receivable has been reduced during this year by $348,398, as compared with the corresponding amount at December 31, 1912.

The litigation between the American Speaking Telephone Company *et al.* and the American Bell Telephone Company, on the contract of November 10, 1879, was finally concluded in the latter part of 1913, in favor of the former company, and the Western Union Company received, as dividend, the sum of $3,230,545 on the shares of the American Speaking Telephone Company, which it owned and held as lessee of the Gold and Stock Telegraph Company. This dividend represented deferred income, or a profit to your company, cumulating over a period of years, and was credited to surplus reserved and not to income for the year. Surplus reserved, amounting to $3,451,921, and stated on the liability side of the balance sheet, is made up as under:

Dividend received December 17, 1913, from American Speaking Telephone Co.....		$3,230,545
Reserve for contingencies, transferred to surplus reserved		228,425
		$3,458,970
Less reduction in book value American Speaking Telephone Co. shares owned by Western Union Co.....		7,049
		$3,451,921

The reserves for maintenance of cables and reconstruction of land lines together show a small decrease of $60,882 at the close of the year, after charging the respective reserves with replacements of plant.

It has been thought advisable to re-classify the income account for the year ended December 31, 1913, so as to treat amounts paid other lines for the transmission of messages and refunds made in connection with services rendered, aggregating $1,110,517, as deductions from total earnings, rather than as expenses, which has been the practice heretofore.

The total earnings for the year, amounting to $45,783,512, have increased $1,720,271, or 3.9 per cent over the total earnings for the year ended December 31, 1912, and the total operating expenses, including rent of leased lines, reconstruction, taxes, etc., have increased $1,738,021, or 4.2 per cent. After allowing for interest on funded debt, the balance of income account transferred to surplus was $3,234,917, from which was deducted dividends paid and declared at the rate of 3 per cent per annum on the capital stock, leaving a net addition to surplus of $242,671. The policy of charging operating expenses with betterments to the lines and improvements made to equipment and offices was generally continued during the past year.

Many inquiries have been made as to the prospects of the company, either under any possible purchase by or competition of the government, or as a going concern operating independently of the American Telephone and Telegraph Company.

The relations between the American Telephone and Telegraph Company and your company have always remained the same as between two entirely independent companies. The organizations of the two companies were entirely distinct and independent and, with the exception of the president and a minority of the directors, had no officers in common. All contracts and operating arrangements were such as two independent companies could enter into under the interpretations of the existing laws, and the commercial interests of each company were carefully guarded, so that the so-called divorce of

the two companies is being accomplished with very little confusion.

As to the government purchase or operation of the telegraphs: The property of the company cannot be taken without just compensation, that is, a full and proper equivalent for the property taken must be returned to the owners. In such a case, the shareholders should receive, as a minimum, far in excess of the present market value of the shares.

The other alternative which has been advanced, to take over the long-distance telephone lines and enter into competition with the existing telegraph lines for the purpose of destroying their business, is not only of so questionable a character as to be repudiated when its full significance is realized, but is so utterly impossible and unworkable from a practical point of view as to make it negligible. The owners of the securities of the Western Union may rest quietly, and not be scared into the sacrifice of their property. Headline prophecies should be read and regarded in the light of the results which have followed the headline prophecies of the past.

The technical department of the company has been at work in connection with that of the Bell System in the development of what might be termed mechanical transmission, and there is now in daily use rapid transmission apparatus which nearly, if not quite, quadruples the most effective yet devised, and is giving great results on the trunk lines where there is a concentrated business between large places. There is nothing as yet and not likely to be anything which will supersede the old key transmission of a scattered business distributed to many points on a local line.

Mr. Vail then gives several extracts from a statement made in January, showing the substantial position of the company, and closes his report with the following reference to the new classes of business instituted:

"The new services, in spite of adverse criticism and charges of unfair competition from some quarters, have been revenue-producing and profitable, and of great benefit to the public, and have not, in any way, affected adversely the regular business at regular rates. These were introduced in spite of the belief on the part of many that they would largely affect the long-time telephone business.

"The results have demonstrated that there is a field for them; that with equally available facilities for both, the telephone and telegraph are not competitive, but each has its own distinctive field. If telephone and telegraph facilities are equally available, the public will use that which is best adapted for the particular purposes for which it is used. In case of unequally available facilities, it will use one or the other as an alternative."

MR. H. R. LOVELUCK, of the telegraph department of the United Railways of Havana, Havana, Cuba, writes: "Enclosed find remittance to cover another year's subscription to your clever publication. I do not wish to be without TELEGRAPH AND TELEPHONE AGE."

Associated Press New Headquarters.

The Associated Press, which since 1874, has had its offices in the Western Union Building at 195 Broadway, New York, on April 6 moved into new and much larger quarters at 51 Chambers street. The wire connections were cut from the old offices to the new without any break in the service. The floor space is more than two times as much as in the old quarters.

The telegraph being the heart of the business, all of the offices have been arranged around it, with a view to quick handling of copy. The new quarters occupy the entire second story of the building and are convenient in every way.

Mexico Adopts International Telegraph Alphabet.

Owing to confusion, errors and general inconvenience resulting from the use of different telegraph alphabets on the land lines, cables and in radio-telegraphy in Mexico, the Director-General of Federal Telegraphs, Fernando Gil, under date of February 28, issued an order that the international telegraph alphabet shall be adopted as the official alphabet at the end of four months from that date—that is June 30. This will give the operators four months in which to familiarize themselves with the changes. It is proposed to adopt the international alphabet on the railroads also.

The official circular contains the new alphabet, numerals, punctuation marks and service abbreviations, and states that while the international characters are in some cases a little longer than those of the Morse code the loss of time in transmission will be fully offset by the saving of time lost in correcting errors.

Electrical Instruments and Testing.

We are frequently asked about the methods employed for testing telegraph lines for crosses, insulation, grounds, etc., and we invariably recommend Schneider and Hargrave's book, entitled, "Electrical Instruments and Testing." As its name implies, this book describes the instruments used in making tests and the tests themselves, and is up to date. It is well illustrated, and has very little mathematics—just enough to exemplify the work.

This is a book every progressive operator should possess, and, no doubt, it has been a stepping stone to advancement in many instances.

It is written in a very clear style by practical men for practical men. Mr. Jesse Hargrave, who wrote the chapters on testing, is a well-known telegraph engineer, and what he says on this subject is worth much to those whose duty it is to test wires, and to those who hope to occupy such positions in the future.

The price of this book is $1.15 per copy, which is a remarkably low price for so much information. Copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Western Union Office at Topeka, Kan.

The accompanying illustration shows an interior view of the new and handsome office of the Western Union Telegraph Company at Topeka, Kan. This office is one of the most modern of its class in the United States, and is complete in its arrangement, finish and equipment. The plant department deserves much credit for the skill displayed in planning and equipping the office, and the result of its work is the source of great pride to manager W. C. Carswell.

The building in which the new office is located is a fireproof structure, and the material and workmanship were approved by the National Board of Fire Underwriters.

The switchboard is of the pinjack porcelain type, with a capacity of 360 wires. The office is provided with three quadruplex sets of the new bridge type and five sets of automatic repeaters. The traffic department has operating positions for twelve operators. The power plant for furnishing current consists of eleven motor-generator sets, and is shown in the picture behind the distributing board. The power controlling apparatus is mounted on a Monson slate board.

The business office is attractive, with its new desks and counter of quartered oak. Two double desks have been provided for the convenience of patrons who desire to sit down while writing their telegrams. The floor of the lobby is of tile, of a design used exclusively by the Western Union Telegraph Company. The office is equipped with a Lampson carrier system for carrying telegrams between the traffic department and business office. The women employes have been provided with a comfortable rest and retiring room on the main floor and the men's smoking, toilet and retiring rooms are in the basement. The messengers have not been neglected. They have been provided with a rest and locker room and a shower bath, with hot and cold water, in the basement. Four telephone trunk lines have been arranged for handling incoming business exclusively. The artificial lighting consists of nine 250-watt semi-indirect fixtures, which give a very pleasing and uniform distribution of light.

The street front of the office is of attractive design, the upper portion of the windows being provided with prism glass, which throws an abundance of light into the interior. At night, the front is well illuminated by artificial light.

NEW OFFICE OF WESTERN UNION TELEGRAPH COMPANY, TOPEKA, KAN.

Mr. W. C. Carswell is manager of the office, and he is assisted by J. F. Simonds, chief operator; R. D. Ambrose, night chief operator; H. E. Cross, all-night operator; E. H. Johnson, day operator; L. G. Johnston, cashier; Miss Margaret Chappell, bookkeeper; Miss Grace Roller, counter and manager's clerk; P. W. Hare, delivery clerk; John Thomas, night delivery clerk, and Miss Harriet McCaslin telephone clerk. Mr. J. A. Matthews is night manager of the District Messenger Company.

J. W. Pons, Postal Telegraph-Cable Company, Cincinnati, Ohio, writes: "Enclosed find money-order to pay for my Age for another year. I am always glad to receive it and thank you for renewing my subscription."

Henry H. Ward.

Mr. Henry H. Ward, a well-known old timer, and who has recently been prominently mentioned in these columns as an operator of unusual ability in the early days of the telegraph, when first-class telegraphers were few, resides in East Orange, N. J., where he is identified with a banking institution.

Mr. Gerrit Smith, in his reminiscences published in these columns, March 1 and March 16, refers to Mr. Ward's telegraphic career in very eulogistic terms, and Mr. R. S. Keith, in his article in the March 16 issue, also takes occasion to pay a tribute to Mr. Ward.

Mr. Ward was closely identified with the telegraph service from the early fifties until 1903, when he was retired from the position of cashier of the main office of the Western Union Telegraph Company, New York. He had been the financial head of the company in New York for the previous quarter of a century, and it was only natural that banking interests should seek his services.

It will be remembered that Mr. Ward was the possessor of the famous guncap battery which operated the Atlantic cable, and which has been described and illustrated in these columns. This diminutive battery is now on exhibition in the Smithsonian Institution, at Washington, D. C.

Mr. Ward began his telegraphic career in Springfield, Mass., in 1848, as a messenger for the Morse New York and Boston telegraph system. This "system" consisted of one copper wire between the two cities, and included way stations at the principal intermediate points. One of his duties at Springfield was winding the register. He was advanced to a position in Worcester, Mass., which required his attention in caring for twenty-five cells of Grove battery. He soon became an operator, and later acted as manager at Norwich, Conn. New York was his goal, and he finally obtained a position in the New York office, which was then at No. 5 Hanover street. He was transferred to the Boston office after three months in New York, and later to Portland, Me., as manager. Portland was then an important point telegraphically, as all "down east" business was repeated there. In those days repeating meant the receiving and the retransmission of messages, as there were no mechanical repeaters at that time.

In 1850, while in Portland, Mr. Ward astonished superintendent L. L. Saddler by receiving messages by sound, instead of reading them from the tape.

In 1851 Mr. Ward became "first operator" in the Boston office. There were then two wires to New York, one for way business and the other for through business, and registers were in common use. Receiving by sound was more or less practiced, but it was officially prohibited.

Mr. Ward came to New York in 1863. the office being then located at 145 Broadway. He continued as assistant manager and manager of the American Telegraph Company until 1865, when he was appointed superintendent of the Metropolitan district. Between 1866 and 1874 he was superintendent of the Atlantic Cable Company, and, finally, became cashier and transfer agent for the Western Union Company, which position he held until he retired from the service.

Mr. Ward has many friends in the telegraph business who admire him for his gentleness of character and steadfast friendship. He is an unassuming gentleman and always faithful to the trusts placed in his care.

Ode to the T. M. B. A.

At the dinner given to the delegates to the annual meeting of the Telegraph and Telephone Life Insurance Association in New York on March 11, Mr. S. S. Garwood, of Philadelphia, read an "Ode to the T. M. B. A.," composed by Mr. Thomas E. Fleming, of New York. The ode is as follows:

Old T. M. B. A. born in 1867—

There were good and sufficient reasons for thy birth—

Thou wert created out of the things all good men hate and have ever striven to allay: Poverty, Home, Neglect, Selfishness—

Thy birth announced self-help and manliness and thy tenets pleaded for a practical demonstration of our professed love for those whose protection was placed within our hands—

OLD T. M. B. A.

Thou hast gone on for forty-seven years, appealing, calling, entreating and while thou hast helped to soften many a blow, ease many a heartache, the pity is that so many have refused to hear thy voice and thus permitted the hateful, cruel, unfriendly thing called death to have more than its share of victory—

OLD T. M. B. A.

Thou hast fulfilled every promise and never broken a vow and every name emblazoned on thy black-bordered pages is stamped a man—

OLD T. M. B. A.

Thou hast been a friend to many—

Thy friendly purse has been ungrudgingly placed in the hands of 1921 beneficiaries, who, with heavy hearts and tearful eyes, have accepted thy help, which came so oft in time of need and sweetened the memory of him whose place you took; even for a little while—

OLD T. M. B. A.!

We love thee for the good thou hast done, for the good thou art doing and we who have been close to thee for scores of years thank thee for the opportunity thou hast given us to do some little good to the bereaved ones of those whom we have been permitted to pass on the milestones of life—

All hail! All hail! T. M. B. A.

POLE TIMBER OFFERED BY GOVERNMENT.—Forty-two thousand poles are offered by the government on the Kaniksu national forest, near Priest Lake, Idaho.

MR. GEORGE M. MYERS, president of the Old Time Telegraphers and Historical Association, Kansas City, Mo.; writes: "It is a great pleasure to renew my subscription to TELEGRAPH AND TELEPHONE AGE."

The Late Francis W. Jones.

Francis Wiley Jones, former electrical engineer of the Postal Telegraph-Cable Company, New York, whose death at West Palm Beach, Fla., on March 28, was briefly announced in our issue dated April 1, was a man of high character and ability in the electrical profession. He was born sixty-eight years ago, in Weymouth, N. S. In 1859 he learned telegraphy in Kentville, N. S., where he was clerk in the post-office, and held these two positions till 1867, when he removed to St. John, N. B., to accept a position as operator.

Mr. Jones' natural scientific tendency was shown in 1868-69, during the severe electrical storms which caused the suspension of many telegraph circuits. He suggested that metallic circuits be made up and the ground connections eliminated therefrom. The result was that signals were immediately exchanged free from atmospheric disturbances. On the occasion of a visit of royalty to St. John, about 1870, Mr. Jones gave an exhibition of an electric arc light, supplied by 200 cells of bichromate of potash battery. The light was shown from the window of the telegraph office and attracted a large crowd.

Mr. Jones left St. John in 1872 for Chicago, where he accepted a position as night operator for the Western Union Telegraph Company. From this position he was rapidly promoted and became assistant electrician and assistant manager of the Chicago office. He was largely instrumental in the formation of the Chicago Electrical Society and the American Electrical Society, and was an active agent for the Telegraphers' Mutual Benefit Association.

In 1874, while in Chicago, he set up the first Edison quadruplex west of New York, and, in 1875, greatly improved the system by changing it from the bridge to the differential form, and by applying condensers to mitigate the "kick." In 1879 he patented a device to obviate the inductive effects of electromagnets in telephone circuits. Mr. Jones was the first to explain the cause of the severe electric storms that at times affect the operation of telegraph wires in the western part of the country.

He showed that the trouble was due to sand and snow-storms passing over the wires, allowing the highly electrified particles of sand or snow to touch the wires and communicate to them charges of electricity, which manifest themselves in varying quantities of high voltage.

In 1880 Mr. Jones was appointed to fill the newly created position of general circuit manager of the Western Union Telegraph Company, with headquarters in New York, and, during his two years' service in this position, he invented a sextuplex. In 1882 he became vice-president and general manager of Union Electric Manufacturing Company, which position he resigned in 1884 to become electrician of the Bankers' and Merchants' Telegraph Company. While occupying this latter position he invented a duplex that did not require the use of condensers on long circuits, and proved in every way as efficient as the Stearns duplex. In 1885 he was appointed general manager to the receiver of the Bankers' and Merchants' Telegraph Company, and later became assistant general manager and electrician of the joint United Lines and Postal Telegraph Company. Mr. Jones later became electrical engineer of the Postal Telegraph-Cable Company, with headquarters at New York, and retired from active service in 1907.

He was always a student of electrical phenomena and had a wide knowledge of electrical facts and the principles underlying them. He was a close and accurate reasoner, and was always able to give some explanation for any electrical phenomenon as it manifested itself.

He really was a leader of thought in electrical matters during his active career. The writer recalls to mind asking Mr. Jones, several years ago, in the early days of electric lighting, for an explanation of a certain phenomenon manifested in the operation of telegraph circuits, which, at that time, was becoming annoying on account of the increasing use of high-potential currents. Most engineers at that time would have shaken their heads in doubt, but Mr. Jones ventured an explanation which revealed his reasoning power, and which proved to be a correct one. Mr. Jones would never give an opinion unless he was reasonably sure of his facts and his reputation as an investigator and student was based upon this characteristic of his nature.

Mr. Jones was the first president of the New York Electrical Society, and was the electrical expert for the Senate Committee on general laws during its investigation into the methods employed in furnishing electricity for lighting and power purposes in New York State, in February, 1890.

Mr. Jones was a fluent writer and an author of international reputation.

For several years past, Mr. and Mrs. Jones have been spending their winters at West Palm Beach, Fla., in order to escape the rigors of the Northern climate.

Mr. Jones had not been in good health for several years, but his death was a surprise to his many friends. The cause of his death was pneumonia. Services were held at West Palm Beach, April 1, and the remains were buried in Woodlawn Cemetery, New York.

Mr. J. Hervey Nichols, a well-known old-time and military telegrapher, now living in retirement at Denver, Col., writes: "I received your notice dated March 6, but the letter was mislaid, and having just found it, I hasten to get my post-office order started on the way to your bank account, which, I hope, will continue to grow with each succeeding month and year, as it should, for you give ten times as much as you receive." It will be remembered by the old timers that Mr. Nichols was one of the military operators at Grant's headquarters when the Confederate General Lee surrendered, and was a witness to the embracing of prominent Northern and Southern generals when peace had been consummated.

Universal Telegraph Alphabet.

BY F. A. BARDWELL, SPRINGFIELD, MASS.

I have been much interested in reading the arguments for and against the adoption of a universal telegraph alphabet which have been published recently in TELEGRAPH AND TELEPHONE AGE, and I hope you will permit me to say a word in behalf of the old beloved Morse. That a universal alphabet would be an excellent thing, no one can gainsay; but I fear it will have to be placed in the class with a universal language and a universal religion, all very much to be desired, but impossible under present conditions.

In the first place, I doubt if the companies would stand for the expense of making the change. It would cost them thousands, probably hundreds of thousands of dollars in the aggregate, on account of the slowing up of traffic and probable errors while operators were getting used to the new combinations. Continental is slow at best, in fact, the figures are too cumbersome to be practical, and it would be months before the best operators would be able to attain anything like their former speed. The older men would never be able to reach their old mark, and I fear many of them would be driven to the pension list, or have to be humanely oslerized.

While it is true that safety comes first, speed is, nevertheless, a paramount issue with the companies on many of their wires, and this is especially the case on the heavy trunk lines and in press and broker work.

In fast work, it becomes necessary for the operator to familiarize himself with the sound of syllables or whole words, paying very little attention to the construction of the separate letters. It is evident, therefore, that he would not only be obliged to learn the new alphabet, but also to accustom himself to the sounds of hundreds of syllables and words, and that sometimes takes years to acquire perfectly. The press man, especially the receiver, would have to learn his Phillips all over.

I think the danger from the spaced letters is exaggerated. There are a few combinations which require a little care on the part of the sender, but in most instances they fit in splendidly. In fact, I believe the rhythm and beautiful swing of good Morse is due more to the spaced letters than any other single feature. As against this, I believe the many successive dashes of the Continental, in the hands of our machine senders, would produce combinations that would strike terror to the heart of the receiver.

In many years' experience with claim cases, the writer does not recall a single instance of an error which was due to the spaced letters alone. When badly transmitted, they usually produce a jumble which does not mean anything to the receiver and merely results in a break. The writer believes that the old Morse is not destined to lose its grip yet awhile.

Testing by Shock.

BY I. N. MILLER, DISTRICT COMMERCIAL SUPERINTENDENT, WESTERN UNION TELEGRAPH COMPANY, CINCINNATI, OHIO.

It has long been the practice of wire chiefs and other experts to make many tests with the fingers, depending upon the shock received for results. If a relay is burned, leaving the circuit open, the fact is instantly discovered by placing the thumb and one finger upon the main line binding-posts of the relay.

The current not being able to pass through the relay magnet on account of a wire being burned in two, will pass through the fingers, making a shock plainly felt. If the circuit is open in the key or switchboard, it is at once determined by placing the fingers on the two binding-posts of the switchboard where the wires enter. Whenever the circuit is open and the usual ground wire tests do not close it, then the finger tests are made.

If the fingers are placed on each side of the "opening," then a shock is received, and the "opening" is between the fingers. If by placing the thumb on the ground wire at the switchboard, and then touching any other wire on the board with a finger, a shock is felt, it proves the wire is not open in both directions, and if no circuit can be obtained with the ground wire, the circuit must be open in the office.

In testing with the fingers one should always stand upon a dry floor or insulated platform, otherwise the current is liable to pass from the fingers, through the arm and body, to the floor, and ground, instead of passing from one finger to the other. The only danger connected with finger testing is from the liability of crosses between telegraph wires and light or power wires. If one stands on a dry floor or carpet, the worst accident that could happen would be the burning of the fingers on the hand used in testing. On the contrary, if one stands on a damp floor or one that is a fair conductor of electricity there is danger of electrocution when crosses occur.

A bird perched upon a power wire does not receive any shock even when the wire is without a covering, but if it could stand with one foot on the wire and the other on the ground, it would be instantly killed. Whenever a current of electricity can be felt with the fingers, but no circuit can be obtained through the relays by using the ground wire, then the wire should be cut out at the board, in order that offices can use the wire which is open in your office.

A wire may be open in one direction, and some office may have a ground wire on in the other direction, thus removing all battery from the wire at your office. In such cases no circuit could be obtained with the ground wire, and no shock experienced by finger tests. Whenever the finger tests show a current on any wire a circuit can be established with the ground wire, unless the circuit is open in your office.

Early Days of the Telegraph.

BY T. B. A. DAVID, PITTSBURGH, PA.

Your request to write something about the early days of the telegraph is like an invitation to leave the luxurious Pullman of the Lightning Express to finish the journey on the top of a stage coach or in the stuffy cabin of a canal boat. Reminiscences of this kind may be entertaining, but are of doubtful profit, save as they may show that great things are only accomplished by prolonged effort and hard work. Pioneering is not an easy road.

My earliest acquaintance with the telegraph began when I saw the first poles being erected along the highway near the city of Pittsburgh, in 1846. The event caused much speculation as to how letters would be carried, and it was even suggested that perhaps near-by neighborhood gossip might be picked up and distributed along the way. Four years later a countryman appeared at the office to see a letter go, saying he had watched the wire in front of his house ever since it had been put up. Another man refused to believe the contents of a message because it was not his son's signature.

The first line was a twisted cable of four strands, like a rope, about the diameter of a number seven wire. The purpose of this was that in case of accident, such as falling trees, not all of the strands would be broken and communication interrupted. This expectation was not realized. The rusted strands soon parted in sections, and it was not long before the wire became a very poor conductor. The insulators were of U shape, with a cap, and were let into the top of the pole. There was a wedge-shaped key at occasional poles to prevent the wire running away when a break occurred, but, generally, these were of little service, and often the wire would sag back for miles, to the delight of little boys.

There were no available books on electricity. The average operator knew little, if anything, about the science, and in practice everything was very crude. For instance, in my first experience with the "Grove" battery, the manager told me (then a boy of thirteen) that when it was necessary to reverse the current, each individual cell should be reversed. The reason for this was that each cell, in position, represented in itself the "north and south poles," therefore, each cell must be turned. I do not mean to give the impression that such dense ignorance of electricity was universal, but cite the instance to illustrate how little was known of the mysterious thing. There was no uniformity in relays. Some manufacturers' instruments were thought to be better than others. There was no suggestion of the difference being due to unequal resistance. There were no galvanometer measurements. The makers simply made the coils as large as the space would permit, and a relay became, by chance, good or bad, in the experience of the operator. It must be said that although our work was of the "thumb and finger" order, in detecting trouble on the wires our fingers and our tongues served a good purpose. In later years I was astonished to find how nearly our results approximated the sensitive galvanometer tests. There was almost a total absence, at the first, of convenient appliances, such as switches and "cut offs." It was the universal custom, when closing at night, to remove the main wires from the relay, and twist them together.

At the birth of the telegraph transportation was by wagon, stage coach, canal and steamboat, and as none of these demanded speedy communication, no ready welcome awaited it. The company for which I worked on one occasion did not have enough money, nor credit, to hire a horse and buggy with which to go out on the pike to repair the line, and it only required one dollar and fifty cents for the whole day. It was no uncommon thing, when the line was broken during the night, for the lineman to find, on reaching the break next day, a number of poles chopped down, supposedly the work of some man who had not been paid for poles furnished, or some service rendered.

Linemen, or repairers, as they were called, were located at the main cities, but the operators at intermediate offices had to do repairing also, and there were, sometimes, long delays. I recall one occasion, in the month of March, when up in the Lake region the wire lay on the ground three days. The ground would freeze at night, and we would be able to exchange messages between the hours of 6:00 p. m. and 10 a. m. next day, but, in the interim, through communication would be suspended. There were times when it was expected that the interruption might be prolonged. On such occasions messages were copied and forwarded part way by steamboat or stage coach. Doubtless, there were times when the sender was on the same conveyance that carried his message.

The first telegraph line to connect Pittsburgh with the outside world came from the East by way of the Philadelphia "turnpike," and with one lone wire. The office was opened December 29, 1846, and five years passed (1851) before business demanded a second wire. By this time there was a line from Baltimore over the "National Road," one to Cincinnati, Ohio, and Louisville, Ky., along the Ohio River, another to the same places via the "National Road." and one to Cleveland, following the canal. These were represented by separate organizations: the Western, the Atlantic and Ohio, the Pittsburgh, Cincinnati and Louisville, the New Orleans and Ohio, and the Lake Erie Telegraph Companies. The Western was transferred to the Baltimore and Ohio Railroad from Wheeling to Baltimore, and the New Orleans and Ohio died of starvation. The remaining companies were absorbed some years later by the Western Union. According to James D. Reid, who was superintendent of the Atlantic and Ohio and the Pittsburgh, Cincinnati and Louisville Telegraph Companies, the key to the whole telegraph system of the United States rested at Pittsburgh had J. K. Moorehead chosen to devote himself to the business. Anson Stager was one of the first three operators in Pittsburgh, and George B. Hicks, the inventor of the first automatic repeater, David Brooks and George T. Williams, division superintendents of the Western Union, were also operators there.

I entered the telegraph service in 1850. My fellow messengers were Andrew Carnegie, David McCargo, Robert Pitcairn and George K. Leet. In addition to delivering messages we had to sweep out the office and take care of the batteries and often act as linemen. Poor McCargo lost an eye at that unpleasant work. The hours were long. I do not remember of any complaints. There were no strikes, and necessity was too close to our heels to invoke the aid of a Child's Labor Society. We were nearly of the same age, and all became operators at the same time (when about fifteen), although Carnegie learned to read by sound sooner than the others. I never knew when I learned; it came to my consciousness by "feel" in a peculiar way. I had gone out with a lineman to assist in repairing a bad break. The day was wet and the ground muddy. When I took hold of the naked wire I felt a message being sent by an operator named Kelly. Long after we could read by sound we were required to use paper to guard against errors. Operators were taught to use Morse characters, and these were formed so carefully by time measurements, that a scale laid upon the recording slip would not have shown the slightest deviation in duplicated letters. I do not know what characters are used now; I only know that the rattling lingo I hear is unintelligible to me.

Recurring to my office mates, they all became successful men. Pitcairn was, for nearly fifty years, the superintendent of the Pittsburgh Division of the Pennsylvania Railroad. McCargo was successively superintendent of the Pennsylvania Railroad Telegraph, superintendent of the La Crosse Railroad, general superintendent of the Pacific and Atlantic Telegraph Company, and, lastly, general superintendent of the Allegheny Valley Railroad. Leet was an adjutant on General Grant's staff in the Civil War. Carnegie was a great reader and of a studious habit. A Mr. Anderson, who had a large private library, gave him the use of it. Later, these books were turned over to trustees for the use of working boys. The trustees, assuming that only boys who were learning trades were meant, added "bound" to the conditions. Carnegie, then but seventeen years old, contested this through the daily press, signing his articles "A working boy, though not bound." He succeeded in having the conditions changed, and the books became available to every boy. I will add that quite recently, in searching the newspaper files for some data. I came across this correspondence, which I copied and sent to Mr. Carnegie, expressing the hope that it might renew his youth. In acknowledging its receipt, he addressed me as "my chum of old," and referring to what he had done for Pittsburgh, he said, "I never expected to do so much for the smoky city." In this he spoke well. The conditions that prevailed in our boyhood days hung no dazzling hopes of great riches before our eyes.

One clear, frosty night, in the winter of 1852, an event occurred which produced a sensation almost as profound as that of the first wireless message. With great, cumbersome effort, involving the use of ten hand-shifting repeaters, distributed all along the line, New York and New Orleans succeeded in holding a half hour's conversation. The impression made upon our group of witnesses was that the limit had been reached—nothing could surpass that.

The directors of the company were located at different cities along the line, and directed. On the occasion of a board meeting, they would assemble in the several offices and the proceedings would be conducted by wire. Of course, some operators were wags, and the comments passed along were funny. Sometimes, when motions were adverse to the interest of operators, the criticisms were pointed. I recall one occasion when it was moved to elect a man to a certain position, the operator added, "I wish we had the vote; he'd be dumped into the Ohio River."

The friendly relations existing between the telegraph and the steamboats, stage coach lines, and, indeed, the earlier railroads, made traveling easy for operators. The display of a disabled relay often served to "pass the bearer." Much mystery hung around the whole system, the operators were thought to be above the average of men. One time, when I accompanied a lineman to a somewhat distant point, darkness came on before we had finished, and we had to put up at the village "tavern." During the evening something was said which led the landlord to ask in surprise, "Can that boy telegraph?" Being told that I could, he disappeared, and soon after the villagers straggled in to get a look at me. It was an embarrassing situation, and I soon slipped off to bed.

Of such were the beginnings. To tell more would be to introduce too much of the personal. Suffice it to say, over part of the long road I traveled in harness, contributing my mite, and for the rest I have watched with interest the passing pageant in whose train all of the wonderful discoveries and development of modern times have had their place.

Chicago Athletic Messengers.

An Athletic Carnival was held in the Coliseum, Chicago, the last week in March, under the auspices of the Sportsmen's Club of America. A one-mile relay foot race was arranged between ten Western Union and ten Postal boys. The Western Union messengers won, the time consumed being three minutes, forty-three and fourth-fifths seconds, which is considered very good, in view of the fact that none of the boys had previously taken part in anything of this sort, and had little time for training.

There was an audience of about 8,000 people. Three hundred Western Union messengers, in uniform, were there to "root" for their comrades. The boys marched from the main Western Union office to the Coliseum, about a mile distant, headed by the *Daily News* band of sixty pieces.

Mr. J. Fitzpatrick, district commercial superintendent for the Western Union Company, had charge of Western Union boys.

A Comparison of the Telegraph With the Telephone as a Means of Communication in Steam Railroad Operation.

BY M. H. CLAPP, SUPERINTENDENT OF TELEGRAPH, NORTHERN PACIFIC RAILROAD, ST. PAUL, MINN.

(*Concluded from page 200, April 1*)

The cost of a booth installed along the right-of-way, with the necessary telephone apparatus, depends on how elaborate an installation is desired; a very substantial and satisfactory installation can be provided for $90, but this can be reduced to possibly $30. A good portable telephone can be purchased for $12.

In addition to the uses already described, there are various miscellaneous ways in which the telephone can be employed on a modern railroad. Telephone sets are placed in the observation cars of limited trains and connected to the railroad company's branch exchange, so that passengers can talk to persons in the city from which the train is leaving up to the time of departure. The telephone is often installed in freight sheds and in freight yards, so as to provide a means of ready communication from one point to another. Special types of telephone sets are installed on the desks of officials, and so wired that conversations can be carried on with other officials in the same building by ringing a bell as a signal, and then simply talking in an ordinary tone of voice into the telephone set, without the use of the ordinary receiver or transmitter. Local telephones are installed in the homes of trainmen for use in calling them for duty, thus saving time and avoiding the expense of employing messengers.

The method employed in handling train orders by telephone contains some points of interest. All figures or names of stations occurring in the order are spelled out, letter by letter, both in the giving of the order and in all repetitions; also, in handling a "31" order, the name of the conductor is spelled out. The dispatcher writes the order in his train-order book at the same time that he telephones it to the operator, or operators, on the line. Each operator who receives the order repeats it back to the dispatcher, the dispatcher underlining each word or number as repeated. In operating a message circuit, the same general practice of spelling out words and figures is followed as in the case of the dispatching circuit. The cost of maintenance of the telephone is always more than the telegraph, for the reasons that the telephone is more complicated and has more equipment. In the author's opinion, specially trained men should always be employed to maintain the telephone station equipment, although, on some railroads, the section linemen are required to maintain it; the last plan, however, produces, in most cases, indifferent results, in the author's opinion. In order to maintain properly four selective telephone circuits, having an average length of 100 miles each, at least one telephone inspector should be provided, at a monthly rate of $85, with expenses, and there should be additional force, if there are many telephones maintained at different "blind sidings" along the line, or special apparatus installed at various terminals, private-branch exchanges, etc. All of this expense is practically in excess of what is necessary to maintain the telegraph to handle the same work, although, as already indicated, the telephone handles a great many transactions that were never attempted by telegraph.

The advantages of the telephone are many; some direct, some indirect and some psychological. The first and most important, in the author's opinion, is that it permits direct dealing between the parties desiring to transact business. The superintendent can talk directly with his subordinate, the chief dispatcher can talk directly with the trainmen out on the line, and any two employes can deal directly with one another, if the proper telephone facilities have been provided. This is what might be termed the universality of the telephone, as compared with the telegraph; every one, from the president to the section foremen, can use the telephone directly. The telephone, compared with the telegraph, is a great time saver, on account of its speed of transmission. Train orders can be handled more rapidly by telephone than by telegraph. This is due to the fact that the orders can actually be transmitted faster over the telephone; also, to the fact that the operators along the line can be made to answer the calls on the telephone bells quicker than their calls on the telegraph. The primary reason for this last condition is the use of four-inch vibrating bells for way-station calling signals, which can be heard from some distance. Again, an operator does not know what is taking place on a telephone line until he comes in on the circuit, while, with the telegraph, the operator, by listening, can read all that is being sent, and, in some cases, can judge as to the relative importance of the calls for his office. A call on the telephone always involves an uncertainty as to what is wanted or who is calling; therefore, in order to be on the safe side, the operator will unconsciously drop any work in which he is engaged and answer the telephone bell when it rings. This peculiarity of the telephone constitutes one of its psychological advantages referred to. Furthermore, the calling bell is wired so in the circuit that the dispatcher hears it ring, thus removing any doubt as to whether the bell actually rang or not. This is a very important point in favor of the telephone, as it removes any chance for an argument between the dispatcher and the operator as to whether the latter was called.

Since the dispatcher remains on the circuit continuously, the operators along the line can communicate with him without calling, by simply coming in on the circuit and stating whatever information they may have to communicate. On this account, it naturally follows that more detailed information is obtained as to train movement, and that the dispatchers can keep in closer touch with their work. In using the telegraph, a train dispatcher is not able to transmit his thoughts by one-tenth the speed he could express himself by word of mouth. While a dispatcher cannot send a train order ten times as fast by telephone as by telegraph, he can carry on conversations with operators and trainmen

along the line at this rate, which is a great advantage to all concerned. Also, with the telephone, the necessity is removed of operating trains through the medium of a large number of men of varying ability. Then, there is the human side of the telephone system; the men along the line get very much better acquainted over the telephone than over the telegraph, and co-operate to greater advantage. This condition was largely unknown when using the telegraph, and is not the least of the advantages in the use of the telephone.

By the use of the telephone, the field from which dispatchers and operators can be recruited is naturally broadened. It is no longer necessary on a railroad where the telephone has been installed with a sufficient number of circuits to keep the service intact, to depend on telegraph operators; in other words, specialists. There is, for example, one division on the Pennsylvania Railroad where out of about 400 operators' positions along the line, it is necessary to fill only eight of them with telegraph operators. This is a very important point for consideration in these days, when, as already stated, the supply of telegraph operators is not equal to the demand. Also, it is possible to use as a dispatcher an employe other than one who has obtained his experience in the telegraph or telephone service, as, for example, a freight or passenger conductor.

While a telephone circuit is, in most cases, more susceptible to outside influences than the telegraph, experience shows that in heavy weather, heavy fog, mist, rain or snow, less trouble is experienced with the telephone than with the telegraph; and the telephone is affected only to a small degree by earth currents or by the aurora borealis.

Finally, we have for consideration the saving in the operation of the railroad by the use of the telephone. Unfortunately, it is hard to show, in all cases, a saving, because many of the best-known economies are more or less intangible. One is generally sure that he is saving time by using the telephone, and it seems at least a fair assumption that there is a corresponding money saving. The psychological effects can be capitalized to some extent, but it is generally difficult to do it. In the way of direct saving, the ability of the dispatcher to get his trains over the division quickly, thereby economizing in operating expenses, is the most evident and easiest to understand. This is especially noticeable in the amount of overtime that can be saved in the pay-rolls of the trainmen and the enginemen. As it is conservatively estimated that the trains can be handled over a division from ten per cent to twenty per cent more rapidly by telephone than by telegraph, an approximate estimate of the overtime saved can be prepared by considering a certain operating division before and after the telegraph is replaced by the telephone. For example, on a certain division where the Northern Pacific is now installing the telephone, both for handling trains and for handling the messages along the line, it has been estimated that a saving of about $200 per month will be made in overtime paid to trainmen and enginemen, to say nothing of the other indirect savings of which mention has already been made. In some cases, a direct saving can be made by using a smaller number of dispatchers when handling a given section of railroad by telephone, as compared with the telegraph. For example, there is a division on the Northern Pacific which is made up of four consecutive districts, having an average length of a little over 100 miles each. Part of the year, the four districts can be handled by using two telephone dispatching circuits; but when there is considerable business on the railroad, four dispatching circuits are used. It would be necessary, with the telegraph, to handle the four districts by using four circuits at all seasons of the year. As it requires three dispatchers to handle one dispatcher's circuit during the entire twenty-four hours, and as the salary of a trick dispatcher is $155 per month, the abandonment of any of these positions, even for a part of the year, is a very desirable thing from the standpoint of saving in expenses.

Savings are also made possible by the installation of telephones in booths or boxes at or near small and unimportant stations along the line where operators have been employed, thus resulting in the closing of these stations for a portion of the day, at least, and reducing the number of operators. In some cases, less expensive operators are employed when the telephone is installed; this practice is quite common on some of the railroads, and is done both at the stations along the line and in the offices at terminals and headquarters. In the latter case female employes are often used to advantage, as all that is necessary is a reasonable familiarity with the business to be handled and the ability to operate a typewriter.

The principal disadvantages of the telephone, as compared with the telegraph, is its cost of installation and maintenance. However, these increased costs are overcome by the savings that are made possible. Another disadvantage is that the telephone, in the present state of the art, is not adapted, on account of excessive cost, for use on the railroad for any considerable distance. While there is a circuit about 1,000 miles in length in operation on one railroad in this country, at least, this circuit is used entirely as a talking-circuit, and is not used for message work. It requires a good margin of transmission to handle messages over a telephone circuit, and, according to the author's experience, a circuit equating to more than twenty-six miles of standard cable should not be used in railroad service; at least, not in connection with handling trains or messages.

While it is possible to construct a telephone circuit 2,000 miles long, or even longer, that would have the proper transmission efficiency, it will apparently be some time before a railroad can justify such a circuit, from the standpoint of first cost and maintenance expense, and benefits derived. The telegraph will probably continue to handle the messages for the long distances, such as 500, 1,000, or 1,500 miles, for a considerable time to come.

The telephone is not as flexible as the telegraph when making patches in cases of trouble on the regular wires. For example, suppose that the entire pole-line is down at some point between two terminals, it is very easy to re-establish a telegraph

circuit over some second route, even though it be very circuitous. If the circuit is too long for direct working, repeaters can be cut into the circuit at intermediate points. For example, it is entirely possible for the Northern Pacific to obtain a circuit from the Western Union Telegraph Company via Omaha, Denver, Cheyenne, Ogden and Portland, and work directly between its St. Paul and Tacoma offices. But it is impossible to establish an emergency telephone circuit for the distance involved in this example, or for considerably shorter distances.

The telephone requires a much higher efficiency of maintenance than the telegraph. This is not, strictly speaking, a disadvantage. In fact, the telegraph wires and apparatus should be maintained as well as the telephone system, but in practice this is not done, except in very few cases. Also, there are more delicate parts in the telephone apparatus to get out of order than in the telegraph. The required efficiency of maintenance is not as easy to establish on a railroad as might be thought. The telegraph and telephone plant is, necessarily, spread out over the entire system, without very much of it in any one place; this makes it difficult to secure adequate supervision, and it is not easy to impress upon the different employes who have to do with the maintenance of the plant, the importance of keeping the lines and apparatus in proper condition.

As yet very few railroads are using the telephone as much as they could or should. Because many of the economies with the telephone are more or less intangible, railroad managers are rather cautious in authorizing its wholesale installation. They are usually ready to authorize telephone dispatching circuits, as the savings from them are more easily understood than in other applications. In the author's opinion, the up-to-date railroad of the future will handle its operating divisions entirely by telephone, the telegraph being used only for message work for long distances between the terminals and the general headquarters. On the divisions the typical way office will have no telegraph instruments and will depend entirely upon the telephone for handling all messages. At all terminal points and important offices along the line, private-branch exchanges will be installed, which will be connected with each other by means of talking circuits, so that any two employes on the same division, or adjacent divisions, can communicate with one another easily and quickly. Telephones will be installed in booths or boxes along the right-of-way at frequent intervals, such as every half-mile, and the necessary lines and apparatus provided, so that trainmen, sectionmen, or anyone out on the line, can obtain ready communication with persons with whom they may have business to transact. Where portable sets can be used to advantage, they will be furnished to such employes as trainmen, sectionmen, linemen, signal maintainers, etc., so that connections can be made directly to the telephone line-wires at any point along the line. Ample telephone service will be provided at all points, especially where private-branch exchanges are installed, so that all employes having any legitimate need to talk to one another can do so without delay, whether in the same city or town, or at points on the same division, or other divisions, within a possible limit of 1,000 miles. Also, the railroads will not forget to provide ample service, so that the public can reach certain authorized employes by telephone promptly, when necessary.

The above outline of the applications of the telephone to the needs of a railroad is not entirely prophecy, since there are railroads in this country already using the telephone, on portions of their systems at least, almost as extensively as contemplated in the foregoing description.

There are four general methods of communication, namely: by personal interview, by letter, by telegraph or telephone messages, and by telephone conversation. There are certain business transactions that can best be handled by only one of these methods; there are others that can be handled by two or more; and, in some cases, by any one of the four. Without doubt there is always one of these methods, as a rule, that is best adapted to any particular transaction. While a great deal of traveling is done by railroad men, there is still, in the author's judgment, a lack of personal contact in a great many of the departments between the man in charge and the men in the field; in other words, there is a lack of supervision. There is probably no lack in the number of letters written; and there is no doubt at all that too many telegraph messages are sent. The telephone as a means of communication is not, however, used as it should be on the railroads in this country. As already pointed out, the local use of the telephone has been well developed in a great many places, and the same is true of its use in dispatching trains; but its universal application as a means of communication, and its substitution for and its use as an auxiliary to the telegraph, have only, in a very few instances, been carried to a logical conclusion.

In the discussion of Mr. Clapp's paper, Mr. Wm. Maver, jr., said that given the option of using the telegraph or the telephone over distances of from 200 miles to 1,000 miles, his own experience had favored the accuracy, speed and reliability of telegraphic communication between expert operators, in comparison with which the uncertainty of some words in telephone conversation frequently called for repetition. The telephone is most useful, he declared, when the conversation concerns topics or words with which both speakers are familiar.

Mr. W. E. Harkness stated that operators using the telephone are under less nervous strain than those using the telegraph, and can, consequently, handle nearly twice as much work, thus correspondingly reducing the pay-roll. The average Morse operator sends twenty-five to thirty words per minute, but by telephone the same man can transmit fifty to seventy-five words per minute. Installation of each telephone circuit incidentally makes available an additional telegraph line. Introduction of the telephone, said the speaker, has involved few telegraph operators losing their positions, for they are, necessarily, first of all railroad men rather than telegraphers, and, hence, can always make themselves useful elsewhere on the system.

THE RAILROAD.

J. B. Norcross, Superintendent of Telegraph, Maine Central Railroad.

Mr. James B. Norcross, whose appointment as joint superintendent of telegraph of the Maine Central Railroad and Western Union Telegraph Company, with headquarters at Portland, Me., was announced in our April 1 issue, was born at Carlyle, Ill., May 1, 1870.

He was educated in the public schools at Carlyle, Monmouth Academy, Monmouth, Me., and Kents Hill Seminary, at Kents Hill, Me. He studied telegraphy at Carlyle, and held his first position as telegrapher on the Ohio and Mississippi Railway in 1888. He went to St. Louis as operator for the Missouri Pacific in 1889, and, in the same year, was transferred to the St. Louis Western Union office as operator. In 1890 he accepted a position with the St. Louis, Iron Mountain and Southern Railroad as operator at Mulberry, Ark., but returned to St. Louis the same year, and entered

J. B. NORCROSS.

the service of the Postal Telegraph-Cable Company as operator. In 1891 Mr. Norcross was appointed station agent for the Lake Erie and St. Louis Railroad at Germantown, Ill., and, during the same year, was transferred from there to Oakland City, Ind., on the same road, as agent. He resigned this position and returned to the Ohio and Mississippi Railway, as operator at Olney, Ill., in 1892. In 1893 he accepted a position as station agent with the Boston and Maine Railroad at Oakdale, Mass. He was transferred to Worcester in the spring of 1895, as operator and towerman, and, in 1897, accepted a position as chief clerk to the superintendent of the Maine Central Railroad at Portland, Me., holding this position until appointed superintendent of telegraph, March 9, this year.

RAILROAD TELEGRAPH SUPERINTENDENTS IN NEW YORK.—Among recent New York business visitors were Mr. M. H. Clapp, superintendent telegraph, Northern Pacific Railroad, St. Paul, Minn., and Mr. C. P. Dugan, superintendent telegraph, of the Norfolk and Southern Railroad, Norfolk, Va.

New Orleans Convention Headquarters.

The headquarters of the convention of the Association of Railway Telegraph Superintendents, which will be held in New Orleans, La., May 19-22, will be at the Hotel Guenwald. Ample space will be provided for those who wish to make exhibits of apparatus, etc., and a largely attended and interesting meeting is looked for. The papers to be read will be of the most practical kind, and will be very helpful to the members in the line of development in their work.

Liberal entertainment will be provided by the local committee, which is headed by Mr. W. A. Porteous, manager of the Western Union Telegraph Company at New Orleans. Mr. P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railroad, Chicago, Ill., is secretary of the Association.

THE NEW ORLEANS CONVENTION.—Quite a delegation from New York to the annual meeting of the Association of Railway Telegraph Superintendents, which will take place at New Orleans, La., on May 19, will make the trip to that city by boat, leaving New York on Wednesday, May 13. Mr. Barney A. Kaiser, of the American Telephone and Telegraph Company, 15 Dey street, New York, is chairman of the committee of arrangements.

"Passing of the Ticker."

Mr. F. T. Wilbur, superintendent of telegraph of the Illinois Central Railroad, Chicago, sends us a copy of a poem from the *Illinois Central Magazine*, describing the "Passing of the Ticker."

The author, Mr. A. G. Hill, tells of his wanderings all over the country as an operator and the difficulties he encountered as a train dispatcher. He then decided to return to the key, but found that the good old Morse telegraph had been displaced by the telephone in the dispatching of trains. He laments the passing of the telegraph and the clicking of the sounders, which was music to his ears.

MR. F. A. ROONEY, who has been located at Huntington, Ind., for some time past, installing telephone train-dispatching circuits for the Erie Railroad Company, is now located at Salamanca, N. Y., where he is engaged in the same class of work.

Full Use of Wires.

(*Continued from page 192, April 1.*)

That the railroads are obtaining extraordinary facilities in the use of their wires is evident from the replies already printed from many railroad telegraph superintendents throughout the country (see our issues dated March 1, March 16 and April 1), showing the extent to which this work is carried out. Replies from other superintendents follow:

Mr. J. L. Henritzy, Colorado & Southern, Denver, Col.: "We have no telephones outside of a few Western Electric composites on the train wire. They are fine for emergencies."

Mr. E. A. Klippel, Oregon-Washington Railroad & Navigation Company, Portland, Ore.: "We have

one telephone message circuit from Portland, Ore., to Seattle, Wash. (180 miles), upon which we work single Morse simplex with first-class results. We have another telephone dispatcher's circuit from Portland to The Dalles (eighty-four miles), which we have simplexed. We use the simplex for emergency use on this circuit in case adjoining telegraph wires are down. We have worked single Morse, duplex and quadruplex telegraph circuits through our Portland-The Dalles simplex without difficulty. In addition to these we have two straight quadruplex circuits from Portland to Umatilla (180 miles) and one duplex circuit from Umatilla to Salt Lake (about 600 miles). We are completing additional telephone circuit from Spokane to Ayer Junction (103 miles) and have authority for an additional telephone circuit from The Dalles to Umatilla (100 miles). Up to the present time we have not taken advantage of any phantom circuits. However, when conditions justify it, we expect to do something in this line."

Mr. L. S. Wells, Long Island Railroad, New York: "During recent years the telephone and telegraph circuits added to our lines are designed for maximum use when additional circuits are needed. At present the traffic conditions are such that composite and phantom circuits are not required. However, the foundation has been prepared, and we can, at minimum expense, equip them when they are needed. We have a printing telegraph system in successful use on one of our telegraph circuits."

Mr. J. M. Walker, Denver and Rio Grande, Denver, Col.: "We have a quadruplex circuit, Denver to Salida, 217 miles, and one from Denver to Pueblo, Col., 120 miles; a telephone train dispatching circuit, Grand Junction to Ogden, 330 miles; duplex-simplex circuit on the dispatching circuit, Grand Junction, Col., to Salt Lake, Utah, 295 miles, and a telegraphone circuit on telegraph dispatching wires, 500 miles, all of which are working perfectly. We have no printer circuits as yet. The prospects for increasing telephone dispatching circuits are very favorable."

Mr. M. H. Clapp, Northern Pacific, St. Paul, Minn.: "At present, we have duplex, quadruplex and simplex circuits. We have equipment ordered, and are arranging to install composite sets which will allow us to obtain two duplex and one telephone circuit from two physical wires. We also have apparatus ordered and have completed a considerable amount of work on certain sections of our railroad, where we will obtain from the telephone dispatching and the telephone message circuit (four wires) two physical telephone circuits, one phantom telephone circuit, two telegraph circuits and be able to ring on both physical telephone circuits selectively. I believe that this is about as far as we will go for some time. However, we have in mind the possibility of obtaining from four wires three telephone circuits and four duplex telegraph circuits."

(To be Continued.)

Entertainment of Atlanta Telephone and Telegraph Society.

The regular monthly meeting of the Telephone and Telegraph Society of Atlanta, Ga., was held in the ballroom of the Hotel Ansley, Tuesday evening, April 7. It was "Western Union night," the entire program being arranged and staged by employes of that company.

Mr. F. R. Veale, division cable manager, read a paper on "What We Do." Mr. Veale dealt at some length with the history of the telegraph from the time of the invention by Professor Morse, down to the present time, and described in detail the various classes of service.

The reading of this paper was followed by one prepared by Division Traffic Superintendent J. P. Edwards on "How We Do It." Mr. Edwards was unable to read his paper on account of hoarseness and it was read by Mr. J. W. Ware, his chief clerk. The paper described the various methods of handling traffic and proved a revelation to the uninitiated.

Following the reading of papers, General Manager H. C. Worthen was invited to address the meeting. He expressed his appreciation of the advice and beneficial help which he had received from President W. T. Gentry and Vice-President and General Manager J. Epps Brown and the Southern Bell Telephone Company.

Mr. Worthen paid a glowing tribute to Mr. Theo. N. Vail and the American Telephone and Telegraph Company, expressing his deep personal regret at the separation of the two companies and the retirement of Mr. Vail as the president of the Western Union. He concluded his remarks by invoking the entire audience in a few minutes of silent prayer for Mr. Vail to have a long and happy life.

After Mr. Worthen's address the fun of the evening began. "Way Down Upon the Suwanee River" was suddenly wafted to the large audience from a near-by room, and as the last strains of the famous old song died away, the door swung open and in marched the Western Union Minstrels, headed by Mr. Vincent Hurley, of the auditor's office. Their appearance was the signal for an outburst of applause and from that moment until the close of the entertainment, there was a riot of fun.

The minstrels were dressed as Western Union negro messengers, and the entertainment provided by them would do credit to any professional troupe. The audience was kept in an uproar of laughter from the beginning until the close of the entertainment.

A LARGE ELECTROMAGNET.—An electromagnet, designed for the French National Physical Laboratory by Professor P. Weiss, of Zurich, Switzerland, contains some novel features in its construction. It is about five feet high, weighs a ton and a half and is capable of producing the most intense magnet field known.

Books Recommended by Us.

We are frequently asked to recommend good books for telegraphers, telephonists and beginners, as well as radio men. The best books on the telegraph are Maver's American Telegraphy and Encyclopedia of the Telegraph, price $5.00; McNicol's American Telegraph Practice, price $4.00; Thom and Jones Telegraphic Connections, price $1.50; Pope's Modern Practice of the Electric Telegraph, price $1.50; Schneider's Electrical Instruments and Testing, price $1.15. These books will form the basis of an excellent telegraph library.

Books on the telephone are Cummings' Electricity and Magnetism in Telephone Maintenance, price $1.50; McMeen and Miller's Telephony, price $4.00; Van Deventer's Telephonology, price $4.00.

Books for beginners: Meyer's Twentieth Century Manual of Railway and Commercial Telegraphy, price $1.00; Meyer's Railway Station Service, price $1.25; Dodge's Telegraph Instructor, price $1.00; Abernethy's Modern Service of Commercial and Railway Telegraphy, in Theory and Practice, price $2.00.

Excellent books on wireless: Bishop's Wireless Operators' Pocketbook of Information and Diagrams, price $1.00; Collins' Manual of Wireless Telegraphy, price $1.50; Lieutenant-Commander S. S. Robison's Manual of Wireless Telegraphy for the Use of Naval Electricians, price $1.75; Hawkhead's Handbook of Technical Instruction for Wireless Telegraphists, price $1.50. Any of these books will be promptly shipped on receipt of price.

Make remittances to TELEGRAPH AND TELEPHONE AGE, John B. Taltavall, Publisher, 253 Broadway, New York.

MR. S. A. DUNCAN, of Atlanta, Ga., in remitting for another year's subscription, writes: "You display your business sagacity in renewing my subscription and forwarding me a bill for same."

MUNICIPAL ELECTRICIANS.

HONORING MR. SWENIE.—Mr. Frank W. Swenie, chief operator of the Chicago Fire Department telegraph system, was the guest of honor at a banquet given in that city on March 28 to mark the completion of his thirty-fourth year in the service. Mr. Swenie was presented with a chief's diamond badge.

MR. LEONARD DAY, who recently resigned as electrical engineer of the bureau of fire alarm and telegraphs of the Fire Department of New York, was presented with a diamond watch fob by the members of the bureau as a token of their appreciation and in commemoration of many pleasant years spent with them.

MR. ADAM BOSCH, superintendent of the fire alarm telegraph, Newark, N. J., has held that position for thirty-eight years, and is one of the best-informed men in the country on fire alarm systems.

ATLANTA'S FIRE ALARM SYSTEM.—The city of Atlanta, Ga., has accepted the new fire alarm system over which there has been much contention. It is stated that it will save the city $32,600.

FIRE INFORMATION BY TELEPHONE DISCONTINUED.—On account of the many telephone requests for information of fires every time there is an alarm at Flint, Mich., and the consequent nuisance to both the fire department and telephone exchange, no information will be furnished on such calls hereafter.

INDUSTRIAL.

MR. WILLIAM MAVER, JR., the author of "American Telegraphy and Encyclopedia of the Telegraph," 50 Church street, N. Y., announces in an advertisement on page v an offer to furnish his book for a limited time at $2.50 per copy, postage prepaid. This is a splendid opportunity to receive a book covering all telegraph apparatus at a minimum cost. The regular price of this book is $5.00 per copy.

Canadian Agency for Sending Machines.

Mr. J. E. Albright, sole selling agent for the Martin Vibroplex and Mecograph Company, New York, has opened a Canadian branch of his business at Winnipeg, Man., the agent being the Rebuilt Typewriter Company.

As the demand for these sending machines is rapidly increasing in the Canadian provinces, the new agency will be a great convenience to the Canadian patrons. It is estimated that over 50,000 operators are now using the Martin Vibroplex, which fact speaks well for the practical value of the machine.

Remco Selectors.

Since the first use of the selector in telephone train dispatching and when the initial requirement was to selectively ring a bell at some desired point, the development has been rapid and, owing to the various other functions demanded of such devices, many obstacles have arisen which, at the present time, have been generally overcome.

One of the most important requirements was to have a selector that would operate in multiple with low resistance simplex coils to offer as little resistance as possible to superimposed circuits. Such low resistance impedance coils can be bridged across the metallic circuit on which these selectors are installed, so that practically any number of selector circuits can be connected in tandem for phantom or simplex, with greater efficiency than is possible with any other system.

The Remco selector will also operate on a line with such high capacity that a direct-current selector would be inoperative. In the item of maintenance this selector is the most economical instrument that can be devised, as it requires but three milliamperes to operate it, with two cells of local battery to ring the bell and give the dispatcher the answer-back signal. On an ordinary line of 100 miles with fifteen selectors it requires but fifty volts. This selector is built on the principle of an ordinary telephone ringer and is no more complicated. It has but one contact, no springs, and no adjustments are necessary. All selectors are interchangeable, that is, any one can be set on any desired number. This instrument is contained in a dust- and damp-proof glass case.

It is well known that neutral relays require adjustment and operate on a slight variation of current, while polar relays require no adjustment and operate on a wide variation of current. The Remco selector is of the polar type, and is patented in the United States and all foreign countries. The calling key is in one unit and will call on a line with any

number of stations; one movement of the lever is all that is required to call any station selectively and a call consumes on an average of six seconds.

The Railway Electric Manufacturing Company, Chicago, furnishes any standard make of telephone equipment desired and has the facilities to promptly make up anything of a special nature. Its selector is in practical operation on railroads and giving the highest degree of efficiency. The personnel of this company, Messrs. H. O. Rugh and E. C. Hennis, have been in the selector business since its first inception in connection with the use of selectors in telephone train dispatching and this is the only concern that is engaged exclusively in the manufacture of this class of apparatus.

T. AND T. L. I. A. ASSESSMENTS.—Assessment 565 has been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of P. Fahey, at Boston, Mass.; G. W. Irwin, at Mansfield, Ohio; W. D. Stager, at Cedar Hollow, Pa.; Alice S. Prouty, at Three Rivers, Mich.; W. D. Peck, at Albany, N. Y.; J. E. Griffith, at Hathorne, Mass.; P. J. Huder, at Houston, Tex.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. Oscar C. Hatton, of this office, a well-known old-time operator, formerly on the telegraph staff of the *New York Herald,* and a Civil War veteran, was retired on a pension March 31, having reached the age limit of service. He was identified with the Associated Press and the United Press in Washington and New York for several years.

PROVIDENCE, R. I., POSTAL.

Mr. Joseph T. Doran, cashier of this office, has been promoted to the management of the Newport, R. I., office. Upon his departure Mr. Doran was presented with a handsome desk set and fountain pen by his associates.

Mr. Allen J. West, who has covered the Providence end of the New York bonus wire, one of the fastest wires out of New York, succeeds Mr. Doran.

Mr. Arthur W. Anderson, of Springfield, Mass., and Mr. Jos. Phillips, of the Associated Press, are recent additions to the operating force.

PHILADELPHIA POSTAL.

Among recent visitors at this office were Messrs. Edward Reynolds, vice-president and general manager; C. P. Bruch, vice-president; H. W. Hetzel, traveling auditor; Donald McNicol, A. J. Eaves and D. H. Gage, jr., of the engineering department, New York; C. E. Diehl, manager at Harrisburg, Pa.; A. S. Vogt, manager at Baltimore, Md.; G. M. Foote, manager, and C. F. Thompson, chief operator, Washington, D. C.

Mr. P. G. Murphy was detailed as test operator at Chester, N. J., and Mr. I. J. Landie at New Hope, Pa., during the repairing of lines after the storm of March 1 and March 2.

Telegraph and Telephone Age

No. 9. NEW YORK, MAY 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

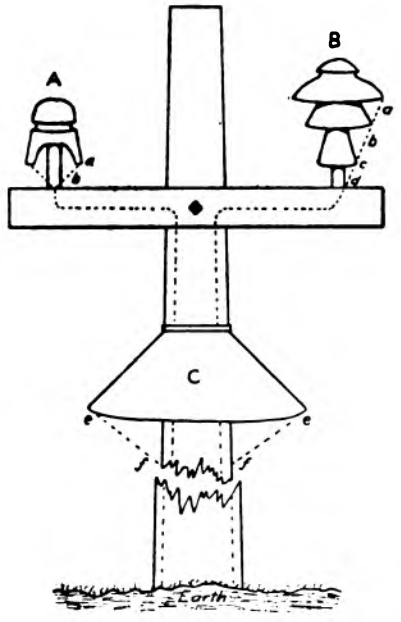
BY WILLIS H. JONES.

Pole Line Leakage and Insulators.

Every wire chief and multiplex attendant will agree that pole line leakage during rain storms is one of the most troublesome factors they have to contend with, necessitating, as it does, a change in adjustment of nearly all line apparatus, with every marked alteration in its value; yet less progress seems to have been made towards remedying this evil than has been accomplished in many other lines.

This defect, common to all telegraph and telephone systems, offers a wide field and fine opportunity for electrical students, as well as engineers themselves to attain distinction, fame, and, perhaps, money, by evolving some practical method of insulating the pole itself from the earth.

Up to the present time, nearly all efforts have been directed towards insulating the wires from the pole, but, so far as the writer knows, no marked improvement has been made in the method of insulating the surface or wet weather leakage of the insulators from the grounded wet pole itself. We know, of course, that a dry glass or porcelain insulator will effectively prevent any appreciable amount of current from leaving the conductor to which it is attached, as no current can flow through the mass of such material. But water is a fair conductor of electricity, hence when an insulator becomes coated with a film of moisture, the surface resistance of the insulator is only equal to that of the resistance of water. Current will, therefore, tend to flow from the wire over all parts of glass so coated. If a means of protecting some part of the insulator from moisture were not provided, the current would find a continuous path to earth via the wet supporting pin, cross-arm and pole. In practice, this continuity is broken by constructing insulators with one or more petticoats, as shown at A and B in the accompanying illustration. By this method the outer wet edge of the glass is removed an inch, or more, from the wooden pin, and, as the inner side of the glass is dry, the direct route of current to the pole is thus broken by the high resistance thus inserted. If there were



POLE LINE LEAKAGE AND INSULATORS.

no other factor to contend with this dry portion of the insulator alone would prevent an excessive escape of current. Unfortunately, however, wet or moist air is a comparatively fair conductor of electricity; consequently, the current still finds a chance to reach the pole by following the air-gap *a-b* (shown in dotted lines), between the insulator and the pin, as a conductor with which to bridge the break in continuity. This air-gap (*a-b*) therefore, although protective in a measure, really constitutes a comparatively easy outlet for the current, owing to the short distance between the petticoat and the pin. The true remedy for escapes is, obviously, to increase the length of this air-gap, and thereby increase its resistance. This is sometimes accomplished by providing insulators having two petticoats, as shown in insulator B. This type provides two breaks in the surface continuity, one between *a-b* and the other between *c* and *d*, thus placing both air-gaps in series and greatly increasing the resistance. However, as each air-gap is but one or two inches long, the total length of

both is not great enough to be satisfactorily effectual.

The novel suggestion has been made that in addition to the usual glass insulators a large petticoat of wood, or other material, C, be placed around the pole itself, just below the lower cross-arm, as shown. This petticoat would not only leave dry a considerable portion of the pole underneath the cross-arm, but would also provide a long air-gap between *e* and *f*, which would be in series with the *a* and *b* air-gap of every insulator on the cross-arms. The high resistance of this long air-gap would certainly reduce leakage from forty to seventy-five per cent. The pole petticoat need not be so large that linemen could not climb over it. Of course, the larger it is the more effective it will be. One large enough to interfere could easily be provided with a lid or slide, which would afford temporary climbing facilities. However, as the cost of equipping each pole in this manner would have to be considered, unnecessarily large petticoats need not be provided.

As the only remedy for preventing excessive escape lies in lengthening the air-gap, this method, or one embracing the same principle, might be worth trying. Its efficacy could be satisfactorily determined by equipping the poles of one trunk line for a distance of, say, 100 miles through some particularly rainy section of the country, and comparing the amount of escape with that in adjacent parallel wires between the same points strung on unequipped poles on the other side of the right-of-way.

If results show that the second side of quadruplex circuits remained operative for conductors on one side of the road, while inoperative in circuits on the other side, the cost of equipment could be ignored.

Telegraph and Telephone Patents.

ISSUED APRIL 7.

1,092,453. Device for Amplifying Variations in Electrical Currents. To P. M. Rainey, West Hoboken, N. J.

1,092,732. Signal Device. To J. H. McCarthy, Stafford Springs, Conn.

ISSUED APRIL 14.

1,093,034. Party-line Telephone System. To A. G. Cerda, Morelia, Mexico.

1,093,041. Party-line Telephone System. To C. J. Erickson, Chicago, Ill.

1,093,240. Wireless Telegraph Receiver. To J. G. Balsillie, Melbourne, Victoria, Australia.

1,093,525. Automatic Telephone Exchange System. To W. R. Binkley, New Bedford, Mass.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, April 28:

American Telephone and Telegraph Co.	120¾
Mackay Companies	76½
Mackay Companies, preferred	69
Marconi Wireless Tel. Co. of Am.	5⅛
Western Union Telegraph Co.	60½

PERSONAL.

MR. THOMAS A. EDISON, with his family, has returned from his winter home in Florida, where he spent six weeks.

MR. PATRICK B. DELANY, the well-known electrical engineer of New York, has taken up his residence at Nantucket, Mass., for the remainder of the year, as is his custom.

MR. EDWIN POPE, formerly superintendent of the Great North Western Telegraph Company, at Quebec, but now retired, celebrated his golden wedding in that city on March 31.

THE RIGHT HON. CHARLES HOBHOUSE, M. P., has succeeded Hon. Herbert Samuel as postmaster-general of Great Britain, Mr. Samuel having been promoted to the presidency of the London local government.

MISS GLADYS MARY LE VIN, daughter of Mr. Jacob Le Vin, formerly general superintendent of the Western Union Telegraph Company at Atlanta, Ga., now retired, was married to Mr. R. H. Butters, in that city, on April 20.

MR. A. P. MARTIN, formerly manager of the Nashville, Tenn., office of the Postal Telegraph-Cable Company, who resigned a few weeks ago to enter the insurance business, has scored a great success in his new field of commercial activities.

MR. FREDERICK PEARCE, the well-known electrical manufacturer of New York, Mr. Sol. Davis, together with Mr. A. A. Pope and his son, will sail for Glasgow on the steamer "Columbia," on May 16. These electricians will make a two months' tour through Scotland and England.

DR. M. I. PUPIN, of Columbia University, New York, will, on May 6, deliver the second lecture on the "Relation of the Electromagnetic Theory to the Science of Electrical Engineering of the Present Day," at the Engineering Societies Building, 33 West Thirty-ninth street. The first lecture, also by Dr. Pupin, was given at the same place on the evening of April 29.

MR. EMMETT HOWARD, formerly manager of the Western Union Telegraph office at Memphis, Tenn., now in the insurance business, has offered his services to the Government for the Mexican campaign. He was an operator in the Confederate service during the rebellion. He cut the wire between the armies of General Grant, at Cairo, Ill., and General Pillow, at Columbus, Ky., and, concealed under a fallen tree, reported their movements for several weeks. Later he was in charge of the telegraph when General Richard Taylor surrendered at Meridian, Miss.

EXTRA WORD CASE IN FAVOR OF POSTAL.—The Court of Appeals at Albany, N. Y., on April 28, affirmed the decision of the lower courts and the order of the State Public Service Commission, forbidding the Western Union Telegraph Company from charging the Postal Telegraph-Cable Company for the words comprising the date and place of origin of telegrams transmitted by the Postal partly over the Western Union lines, to points where the Postal does not maintain offices.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. CLARENCE H. MACKAY, president of this company, has been appointed honorary member of the mess of the Queen's Own Rifles, Toronto, Ont., and the Buffs, now at Fermoy, Ireland.

MR. C. C. ADAMS, vice-president, has been appointed president of the village of Lawrence, L. I., N. Y., to succeed Mr. H. Hobart Porter, resigned. Mr. Adams will serve the remainder of Mr. Porter's term, which will expire June 9.

MR. W. I. CAPEN, vice-president, is on a short trip through the West and South.

MR. J. F. SKIRROW, associate electrical engineer, New York, is in Chicago on company business.

MR. O. M. CHESNEY, manager at Springfield, Mo., has been transferred to Kansas City, Mo., and Mr. Frank Lee, an operator at Springfield, has been promoted to be manager, succeeding Mr. Chesney.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: Miss C. E. Hubertz, La Salle, Ill.; W. L. Lamar, Ocala, Fla.; M. J. Rief, Orrville, Ohio; R. C. Burkett, Troy, Ohio, vice E. D. Preston, resigned; H. N. Tullis, Waynesboro, Ga.; C. H. Hunt, Warrenton, N. C.; H. B. Hebblethwaite, Menasha, Wis.; W. R. Jackson, Wilmington, Del.; H. C. Baumgardiner, Ann Arbor, Mich. Miss E. J. Lanoue, Laramie, Wyo.; A. M. Donahue, Fowler, Col.; Miss Ella Broome, Victor, Col.; Miss Viola Klopke, Rochester, Minn.; P. Dyer, Northampton, Mass.

H. A. GUYON, aged fifty-five years, manager of the Yonkers, N. Y., office, died of pneumonia on April 23.

NEW QUARTERS.—The offices of this company at Plattsburgh and Schenectady, N. Y., will be moved on May 1 into more modern quarters.

NEW INDIANAPOLIS OFFICE.—The new office of this company at Indianapolis, Ind., was opened on April 1. One of the features of the arrangement of the operating room is the grouping of operators near each other, with switching facilities which permit of very prompt and convenient traffic handling. This makes a very compact telegraph office. The switchboard frames are of metal, as are also the repeater racks, which are of the type now used by this company. Mr. M. M. Davis, electrical engineer of the company, inspected the new office recently.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MEETING OF DIRECTORS.—At a special meeting of the Board of Directors, held April 29, Mr. A. H. Wiggins was elected a director, member of the executive committee, and chairman of the executive committee.

MR. W. W. RYDER, general manager, Chicago, was a recent executive office visitor.

MR. LEWIS MCKISICK, assistant general superintendent of traffic, has been appointed assistant to the president.

MR. M. C. RORTY, manager joint telephone arrangements, has been appointed assistant to the vice-president.

MR. W. L. JACOBY, vice-president, and Mr. J. McRobie, general manager of the American District Telegraph Company, New York, are in the Middle Western States on business, in the interests of their service.

MR. S. B. HAIG, division traffic superintendent, New York, is in Washington on company business, in connection with the Government telegraph traffic, due to the Mexican campaign.

EXECUTIVE STAFF CHANGES.—The following is the assignment of duties of the members of Vice-president B. Brook's staff organization, reporting to Mr. M. C. Rorty, assistant to the vice-president:

Mr. E. M. Mulford will be in charge of costs and methods.

Mr. J. C. Nelson will be in charge of inspections.

Mr. Gardner Irving, general superintendent Commercial News Division, will be in charge of that division.

Mr. Henry G. Bates, manager special services, will be in charge of money transfers, time service and leased wires.

Mr. F. W. Lienau will continue as assistant secretary, and will also report to Mr. Rorty as chief of tariffs. Mr. William Holmes will continue in an advisory relation on tariff matters.

Mr. A. C. Kaufman, manager Commercial News Division, will report to Mr. Gardner Irving.

Mr. Edward Everett will report to Mr. H. G. Bates.

Mr. T. E. Fleming will report to Mr. Nelson.

This makes no change in the line organization of Vice-president Brook's office under Mr. L. D. Beall, chief clerk.

MR. I. N. MILLER, district commercial superintendent, Cincinnati, Ohio, announces the following appointments in his district: L. R. Scholl, manager, Columbus, Ohio, transferred as manager at Cincinnati, Ohio, vice R. C. Bliss, deceased; W. W. Browne, manager, Dayton, Ohio, transferred to Columbus, Ohio; E. D. Keyes, manager, Hamilton, Ohio, transferred to Dayton Ohio.

MR. D. C. DAWSON, district traffic superintendent at St. John, N. B., was in New York for a few days recently en route home after a month's vacation spent in Florida and Cuba.

MR. L. A. OTT, former manager of the Postal Telegraph-Cable Company of Texas, at Dallas, Tex., has been appointed city commercial agent of this company, with headquarters at the same point.

MR. T. C. HARLAN, manager of this company's office at Evanston, Ill., has been transferred to a position in the automatic division of the plant department, Chicago, Ill.

MR. J. D. MCLELLAND, manager of the Postal Telegraph-Cable Company of Texas, Houston, Tex., has been appointed manager of the Western Union Telegraph Company's office at the same point, vice J. D. Felsenheld, resigned.

MR. J. C. MCGREW, manager of the Western Union Telegraph Company, Jamestown, N. Y., has resigned to enter the shoe manufacturing business with the Graham-Bumgarner Company, at Parkersburg, W. Va.

MR. W. A. STERNER, manager of the Erie, Pa., office, has been appointed manager of the Jamestown, N. Y., office of this company, vice J. C. McGrew, resigned.

MR. J. W. MCMAHON, telegraph supervisor at Newark, N. J., has been appointed manager at Bridgeport, Conn., vice G. C. Wardell, assigned to special duties.

W. J. GLENN, aged fifty-nine years, member of the Western Union operating force at Lynchburg, Va., died on March 14. He had been in the service at Lynchburg for thirty-three years and was upright in all his relations and highly respected.

MR. LEVI S. WILD, of the Western Union Telegraph Company, Butte, Mont., is the subject of an interesting sketch in a Butte newspaper. Mr. Wild is sixty-eight years of age, and has been in Butte twenty-eight years, twenty of which he was manager of the office. He is now in the company's commercial service. An excellent picture of Mr. Wild accompanies the sketch.

HARRY V. SHELLEY, aged sixty-eight years, who has been in the Western Union Telegraph service for over fifty years, and who was retired two years ago on a pension, died in Brooklyn, N. Y., April 18. He was identified with the Albany, N. Y., office for twenty-seven years. He was afterwards manager of the Bridgeport, Conn., office, and the last position held by him was the managership of the Produce Exchange office in New York. He had a national reputation as an expert telegrapher.

WESTERN UNION ENJOINED BY A QUICK-LUNCH RESTAURANT.—Supreme Court Justice Blanchard has enjoined this company from interfering with the possession by George Glendenning of the small quick-lunch restaurant at 8 Dey street, until the lease expires in 1918. The restaurant is located on the ground floor of the annex to 195 Broadway, which was to have been torn down to make way for the new building which the company proposes to erect. The company's defense was that Glendenning had assigned the lease and business to another without its knowledge, and for this reason the lease had become invalid.

MONEYGRAM.—It has been observed that the Western Union Telegraph Company is now referring to a money transfer as a "moneygram."

The Retirement of Mr. Theo. N. Vail as President of the Western Union.

In the retirement of Mr. Theo. N. Vail from the presidency of the Western Union Telegraph Company, on April 15, the telegraph fraternity loses a true friend. Ever since his assumption of the office he has had the welfare of the operating staff at heart, and has done much to improve their condition, both financially and physically.

During his incumbency of the office Mr. Vail made a remarkable record as an upbuilder of telegraphy in the United States, and this fact was recognized and attested by the board of directors, on his retirement, in a set of resolutions, which bear appreciative testimony of his work in behalf of the company.

Among the most important benefits derived by the company through his administration are the acquisition of the Anglo-American and Direct transatlantic cable lines, the inauguration of the deferred cable service, the day and night letter service on the land lines, the extension of service by improved connections and facilities to many localities not hitherto enjoying such service, the inauguration of the pension plan for the benefit of the employes, and the reconstruction and improvement of the physical condition of the company's lines. The benefits received by the operating force directly, are, besides an increase of salaries, the supply and maintenance of typewriters and the pension scheme. While looking primarily after the interests of the company, Mr. Vail was always mindful of those who did the work, realizing that, in order to conduct a large organization efficiently, harmony, in all its parts, must be promoted and maintained. He was once an operator himself, so he was in a position, through experience, to think and feel just as operators do, and, therefore, look at all situations concerning the employes from their standpoint.

Mr. Vail rearranged and reorganized the company on a basis which has resulted in improved discipline and service and increased facilities to the public. His record, therefore, is one that justified the official expression of appreciation at the annual meeting of the stockholders, and the board of directors, in wishing that "he may long be spared to render to the companies with which he remains connected the benefits of his unusual administrative abilities, his ripe experience and sound judgment," voiced the sentiments of all the employes as well. Mr. Vail retires with their well wishes.

Mr. Vail is a native of Ohio, where he was born July 16, 1845. He is a nephew of the late Alfred Vail, who was the friend, partner and loyal supporter of Professor Morse in the early development of the telegraph. Mr. Theo. N. Vail gave up the study of medicine to take up telegraphy, and soon became an operator, working in the Morristown, N. J., office, and afterwards became manager of a Western Union branch office in New York City. He followed telegraphy until 1869, when he entered the railway mail service. In 1878 he became associated with Professor Alexander Graham Bell in the development of the telephone, and has, with the exception of a few years, been connected with the telephone interests ever since. The wonderful development of the telephone in this country is due largely to his foresight and skill as manager of these vast interests. Mr. Vail was elected president of the Western Union Telegraph Company November 23, 1910, and resigned April 15, this year. This position he held concurrently with that of president of the American Telephone and Telegraph Company, and, in that time, brought about the co-operative arrangement between the two companies, which, by order of the Federal authorities at Washington, has been, since the first of the year, undergoing dissolution. The retirement of Mr. Vail completes the work of separating the two interests.

Postal Telegraph-Cable Company of Texas.

Mr. A. A. Davis, formerly of Galveston, Tex., has been appointed manager of the Postal Telegraph-Cable Company of Texas, at Houston, Tex., to succeed J. D. McLelland, resigned.

THE CABLE.

German Cable Earnings.

The German Cable Company earned net profits of $870,000 in 1913, as compared with $632,000 in 1912, and declared a divided of seven and a half per cent. In referring to wireless, the report says:

"That wireless is not designed to supplant the cables is plainly indicated by the fact that the governments of practically all cable-owning nations built new cables last year, and that the cable companies which own private systems recently laid new lines in various directions.

"The world's network of cables was extended during 1913 by 6,875 miles. The government cables increased twenty-three per cent, and private cables eleven per cent."

Telegraph and Cable Connections with Mexico.

In the present Mexican crisis the question of cable communication with that country becomes an important one, as the telegraph service is entirely dependent upon the cable connections.

The possibility of cutting the cables by the Mexicans has been mentioned, but such a contingency is considered impossible.

The Mexican Telegraph Company, of which Mr. J. A. Scrymser, of New York, is president, owns the submarine cables which run from Galveston, Tex., to Vera Cruz, and Coatzacoalcos, Mexico—two to the former city and one to the latter. Mexico can also be reached by cable from New York, by way of Colon, thence across the Isthmus of Panama, thence to Salina Cruz, on the Pacific Coast of Mexico, by cable.

What was formerly known as the Mexican national land lines, are now divided between the federal and the rebel forces, but the lines controlled by the latter are in very poor condition and unreliable. It would be a matter of weeks, it is said, before they could be put in shape to use for border connection.

None of the officials of the cable or telegraph companies in New York expect that Mexico will be cut off, however. There is no likelihood of Huerta's forces cutting the cable, and the worst they can do is to destroy some of the land-line connections.

The Mexican Telegraph Company has suggested to the United States and Mexican governments that the lines between the two countries be neutralized, the same as was done during the war between China and Japan and the Spanish-American war.

THE TELEPHONE.

Mr. Bernard E. Sunny, a former telegrapher, and now president of the Chicago Telephone Company and other telephone companies, has been elected president of the Commercial Club of Chicago.

William T. Westbrook, aged seventy-six years, a former telegrapher, and afterwards connected with the Delaware and Atlantic Telegraph and Telephone Company, died in Philadelphia, Pa., on April 22. Mr. Westbrook was born in London, Eng. He started his telegraphic career in Wilmington in 1850 as a messenger, and worked as an operator in New York and Wilmington. He entered the telephone service in 1878, and was a member of the Telephone Pioneers of America.

Semi-Automatic Telephone Exchanges are being established at Liegnitz and Leipsic, Germany.

Telephone Service Between Germany and Italy.—Telephone service between Berlin, Germany, and Milan and Rome, Italy, has been opened.

Pay Telephones on Railway Station Platforms.—It has been suggested that pay station telephones be established on railway station platforms for the convenience of passengers who may wish to communicate by telephone on business or personal matters during train stops. It is pointed out that this class of service has not been adopted and probably would be very profitable.

Boston Plant Chapter.—The twenty-fifth regular meeting of the Boston Plant Chapter Telephone and Telegraph Society of New England will be held in the evening of April 28, at the American House, Boston. Mr. Arthur K. Peck, of Brookline, Mass., will deliver an illustrated address, entitled, "Berlin, the Rhine and Glimpses of Germany." Mr. Gordon S. Wallace, Boston, Mass., is secretary of the chapter.

Issue of Telephone Company Notes.—Six subsidiary organizations of the American Telephone and Telegraph Company have arranged to sell to New York bankers $30,000,000, two-year, five per cent notes, all having the indorsement of the parent concern. The notes were apportioned in this way: The Iowa Telephone Company, $2,500,000; the Cumberland Telephone and Telegraph Company, $6,000,000; the Nebraska Telephone Company, $4,000,000; the Missouri and Kansas Telephone Company, $7,500,000; the Northwestern Telephone Exchange Company, $7,500,000, and the Cleveland Telephone Company, $2,500,000.

Telephone Earnings.—Gross earnings of the American Telephone and Telegraph Company in the three months ended with March 31 were $11,564,003, a gain of $347,762 over the first quarter of last year. Net income amounted to $10,233,431, an advance of $235,692. A balance of $1,292,211 was left after fixed charges and dividends were paid. In January and February gross income of the Bell Telephone system aggregated $36,476,470, an increase of $2,051,113 over the same months of 1913. Net revenue of $9,807,133 was greater than the combined net of January and February in 1913 by $5,071. After deducting fixed charges and dividends, the surplus earnings were $1,756,989.

Independent Telephone Companies Reject A. T. & T. Contract.

The directors of the Independent Telephone Association of America, at a meeting in Chicago on April 11, adopted resolutions recommending that members

of the association refuse to accept the contract offered by the American Telephone and Telegraph Company, for connection with its lines.

A committee was appointed to draw up a form of contract which will cover all points the association considers essential for an agreement for connection with the American Telephone and Telegraph Company.

Not a single member approved of the qualified connecting contract submitted by the American Telephone and Telegraph Company, but several hundred condemned it as being unfair both to the public and independent operating companies.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, will sail for home from England on the steamer "Imperator," on May 3.

MR. E. B. PILLSBURY, assistant traffic manager of the Marconi Wireless Telegraph Company, New York, has returned from Glace Bay, where he went in connection with the high-power service.

MR. LEE LEMON, commercial representative Marconi Wireless Telegraph Company of America, has gone to Chicago, where he has established his offices in the Webster Building. Mr. Lemon will represent the Marconi interests in Chicago and adjacent territory.

MISS T. N. BROWN, secretary to Mr. E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, has returned to her office after a vacation spent in Florida.

MR. WILLIAM B. VANSIZE, of New York, the well-known patent attorney, has become identified with the Marconi Wireless Telegraph Company of America, with offices in the Woolworth Building, New York.

WIRELESS FOG GUNS.—The Clyde (Scotland) Navigation Trust is testing the possibility of wireless fog guns for the guidance of navigators in foggy weather. The gun is charged with gas and is fired by means of distant wireless apparatus.

NEW WIRELESS STATION IN SCOTLAND.—A Marconi wireless telegraph station is to be erected at Stonehaven, near Aberdeen, Scotland, as a substitute for the ordinary telegraph in the event of the main overhead lines to the North being interrupted, and for other purposes. There are now 10 wireless coastal stations around Great Britain.

FREE MARCONI SERVICE FOR WARSHIPS IN MEXICO.—The Marconi Wireless Telegraph Company of America has voluntarily offered to furnish free service for the transmission of messages to and from American warships on both coasts of Mexico and Marconi stations ashore or afloat, for the purpose of relaying messages to and from the fleet. The company also has voluntarily agreed to give these Government messages preference over all other dispatches.

WIRELESS AND INFLAMMABLE CARGOES.—The published reports of sparking in the rigging of ships carrying wireless, and the fact that the United States Bureau of Navigation has been calling the attention of the shipping world to the possible danger to vessels carrying inflammable cargoes, led the Marconi Company to make a searching investigation of the subject. The company states that there is not the slightest fire-danger from wireless when properly installed and operated. "If there are sparks within the ship," said an official of the English Marconi Company, "and if there is any danger from such sparks, why were not all the navies of the world blown up long ago, carrying, as they do, large stocks of explosives and utilizing a much higher power in their wireless equipment than merchantmen?"

Annual Meeting of the Marconi Wireless Telegraph Company of America.

The annual meeting of the Marconi Wireless Telegraph Company of America was held in New York April 20. President John W. Griggs, in his report, stated that owing to the plans for the expansion of the company's system the payment of dividends would be deferred for a time. It was expected, he said, that transatlantic wireless service would be opened in six weeks.

The increase in ship-to-shore receipts during 1913 were satisfactory. The ship-to-shore stations of the company sent and received 379,110 messages, containing 6,728,379 words. The gross revenue derived from this business amounted to $125,417.20.

The business organization of the company, Governor Griggs said, has been systematized and strengthened in preparation for the large business expected to be done by the long-distance stations.

The Western Union Telegraph Company has conceded the same land-line rates for wireless letters and week-end letters which it gives to its own cable company.

Stations are planned for Ketchikan and Juneau, Alaska, and the company will erect stations at Valdez and other points along the Alaskan coast.

Governor Griggs referred to the success of the wireless installation on the Lackawanna Railroad. Three trains have been equipped with apparatus, and negotiations with the Marconi Company are now being conducted by the railroad for the installation of several more sets.

Mr. John Bottomley, secretary of the company, referred, in his report, to the decision of Judge Veeder on March 19, upholding the Marconi patents which were contested by the National Electric Signaling Company. This decision, he said, puts the control of wireless telegraphy in America practically in the company's hands. He stated, in behalf of the directors, that matters are actively in hand to bring all infringers to terms which will be satisfactory to the best interests of the stockholders of the company.

Messrs. William Marconi and James W. Pyke were the elected directors for five years, and Mr. J. Van Vechten Olcott was elected for the same period to fill a vacancy.

New Method of Controlling Power for Duplex, Quadruplex and Automatic Circuits.

BY CHARLES E. DAVIES, SUPERVISOR OF EQUIPMENT, GREAT NORTH WESTERN TELEGRAPH COMPANY, OTTAWA, ONT.

In telegraph operation since the change from the use of so-called gravity cells to generator currents, it has been necessary, in order to prevent "blow-outs" and the too rapid rise of current, as well as to prevent currents being formed which would cause injury to the instruments, to provide resistances approximating two ohms per volt of power used, so placed in each circuit that under any condition a no greater current than one-half ampere could be placed on a circuit from the telegraph generators.

In multiplex and automatic operation where currents of two polarities are required it has been the practice to place a resistance equal to two ohms for every volt potential used, between the generator and each side contact of the pole changing apparatus. Thus in case of a short circuit from any cause there is always sufficient resistance in circuit to prevent the current rising above one-half ampere even should the short circuit occur in the pole changing instrument itself. This resistance acts as a safety factor and otherwise is not necessary; on the contrary is a detriment.

Ohm's law states that the voltage is equal to the current multiplied by the resistance. Therefore if a certain current is required for the proper operation of given apparatus, it becomes necessary to provide a voltage high enough to supply the current needed for the circuit and must in addition be of sufficient strength to furnish this value through the added resistance mentioned. The flow of current through the added resistance causes a loss of power equal to the current multiplied by this resistance.

It is evident that, in multiple or automatic operation under high speed, the added resistance not only calls for a higher voltage than would be necessary if it were not in circuit, but that the resistance added at each end of the line produces a circuit in which the rapid discharges of the static, is accomplished with difficulty, and that owing to the higher voltage necessary, the tendency for the current to seek by-paths to the ground, or what is known as "escape," is greatly increased; also the greater the fluctuations the greater is the inductive disturbance set up in near-by parallel wires.

The idea used in the new method is to provide an arrangement which, when the apparatus is in regular operation the resistance added shall be reduced to a minimum, but which, in the event of a short circuit or other untoward incident, which would otherwise tend to increase the current to a dangerous point, the resistance is automatically and quickly raised to such a value as to overcome the possibility of damage, and to give practically the same result obtained under the present arrangement.

A so-called tungsten metal filament lamp possesses the quality of rapidly changing its ohmic resistance, that is, it offers several times the resistance to an electrical current when red hot than when cold. This feature is taken advantage of in the multiplex and automatic arrangement proposed, it being found that a 100-watt tungsten lamp resistance, cold, is approximately forty-three ohms, and hot approximately four times as great, and that the filament will stand a current of .8 ampere for the length of time necessary to remedy a short circuit. It is, therefore, possible by placing two of these lamps in series (total resistance of eighty-six ohms, cold) between a generator of 250 volts and the pole changer contacts to accomplish the same result as is done at present by the high resistance lamps. The voltage drop through this resistance being so much smaller that the effective voltage at the pole changer contacts with 250 volts has been found to be practically equal to the current provided with 350 volts under the old arrangement, a test using 250 volts on a new-style set showing an effective voltage of 230 volts at the contacts, while the old-type set using the same power machines showed but 150.

The advantages of the new system are that not only does it permit of the use of a much lower voltage, to accomplish the same result, therefore using much less power, but the discharge of the static from the line is accelerated, overcoming, to a great extent the difficulties at present experienced under high-speed operation. In addition to this the tendency to "escape" is greatly reduced, as is also the inductive effects in parallel wires.

The new arrangement is especially efficient on quadruplex circuits, smaller voltages giving excellent results, due, principally, to the elimination of the "kick" on the neutral relay.

Course of Instruction in the Elements of Technical Telegraphy.

The course of instruction in the elements of technical telegraphy, which has been printed in installments in these columns without a break since October 16, 1911, was concluded in the issue dated April 1.

These articles have met with a wide reception and have been greatly appreciated especially by the student element of the fraternity, and in order to supply the constantly increasing demand for them we have decided to issue the entire course in book form.

Not only have students expressed their appreciation of the articles, but practical telegraph engineers as well, as they are constantly referred to by the latter to refresh the memory as to the underlying principles of the art. A careful study of this book will give one a safe groundwork in telegraph engineering that will place the student in a position to readily grasp practical details.

The price of the book has been fixed at $2.00 per copy. Send orders to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Associated Press New Headquarters.

As announced in our issue of April 16, the Associated Press, which for many years occupied quarters in the Western Union Building at 195 Broadway, New York, on April 6 moved into more commodious offices at 51 Chambers street, where everything for the prompt and easy handling of the news service has been provided on a liberal scale. The new location is excellent, both from proximity to a majority of the city papers, and ease of access to the working force.

The building in which the offices are located faces City Hall Park, and the Associated Press offices occupy the entire second floor.

General efficiency was given first consideration in planning the new quarters. To this end the location of the operating room was made central. Contiguous to it are the cable and the local rooms, an arrangement making for the quick handling of the copy these departments originate. On the west side of the operating room is the news-distributing room, where all matter received on stencils is printed. This proximity ensures quick work in moving copy to the wires. The corps of delivery boys, day and night, who move copy by hand to the city papers, is located in the basement of the building and supplied from the cyclograph room through pneumatic tubes.

Within a few feet of the operating room are the quarters of the news department, the division superintendent, and the traffic department, an arrangement further carrying out the main idea of efficiency and compact relationship between the production and the moving of the report, and its supervision.

In the operating room there are tables with thirty-five positions and forty-eight loops connect the office with the Western Union and Postal Telegraph companies and the telephone company.

The entire telegraph equipment is new and of the latest design. The switchboard is made up of the present standard porcelain panels of the Western Union Telegraph Company. On these are mounted the jacks through which the circuits are wired. The panels are mounted in a specially constructed cabinet of sheet and angle iron construction, the whole forming a modification of the recently developed test-panel unit for installation in railroad and other offices where an essentially fireproof construction is desired.

It was necessary, in this installation, to concentrate the rather extensive facilities in a very limited space. For this reason the face of the switchboard is hinged in order to do away with any necessity for space behind the board, access being had to the wiring and jacks, in case of necessity by dropping the face of the board to a horizontal position.

Flexibility of circuit arrangements is secured by wiring the jacks and telegraph instruments to a special type of distributing frame enclosed in panel work and located immediately beneath the switchboard.

The circuits of the Western Union, Postal and telephone companies are carried through this distributing frame, which renders it possible to permanently assign any set in the office to any loop of either of these companies. This same result may be obtained in the case of a temporary change in assignment by making patches on the face of the board by means of patching cords and plugs. With all assignments normal, however, the face of the board itself will be free from cords, as the permanent changes are made at the distributing frame.

There is now under construction a monitor board to be installed in the office of Mr. Kent Cooper, chief of the traffic department, which will permit of ready supervision of all circuits in use. This board is similar in construction to the main switchboard, but on a smaller scale.

The wiring of the office is in floor conduits, and each table is connected with the distributing frame by a ten-pair cable. There is a simplex circuit between the market room of the Associated Press and the Commercial News Department in the Western Union main office which may be employed for the simultaneous transmission of telephone and telegraph messages between the two offices.

In all respects the Associated Press installation conforms to the latest improved and accepted practice of the telegraph company and no effort has been spared to produce an efficient and neat-appearing installation. The office is connected with the Western Union office through twenty-four loops, with the Postal Telegraph-Cable office through thirteen loops, and with the American Telephone and Telegraph office through six loops.

The entire equipment was installed by the local Western Union forces under the immediate supervision of City Equipment Foreman Mr. A. A. Bergen.

Sixteen wires are regularly operated from the new office, namely, two to Chicago, two to Boston, one New York State, two night city wires, one day city wire, four marine wires (to Fire Island, Quarantine, City Island and Sandy Hook), one to the Western Union cable office, one to the Commercial Cable office, one to the French Cable Company's office and one to the Anglo-American Cable office.

The operating staff consists of Mr. F. H. Trickle, division traffic chief; J. A. Bates, day chief operator; H. J. Pearce, night chief operator, and the following operators: A. Turner, E. F. Wilson, J. S. Morgan, G. L. Snodgrass, J. L. Carnall, W. L. Waugh, G. K. Heath, G. W. Pennington, O. H. Winn, E. H. Simmons, W. A. Yoell, H. Simon, G. F. Moss, A. J. Coates and J. M. Finnerty.

All incoming special dispatches are handled by three Western Union operators.

MISSISSIPPI MANAGERS AND OPERATORS SUMMONED TO TESTIFY IN ANTI-TRUST SUIT.—Four hundred and fifty-three managers, agents and operators in the employ of the Western Union and Postal Telegraph-Cable companies in Mississippi were summoned to appear in Jackson, Miss., on April 27, to give testimony in the state's anti-trust suit against the American Cotton Oil Company and concerns alleged to be allied with it.

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, MAY 1, 1914.

STATEMENT.

Statement of the ownership, management, circulation, etc., of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th of each month at New York, N. Y., required by the Act of August 24, 1912.

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JOHN B. TALTAVALL, Publisher.

Sworn to and subscribed before me this 26th day of March, 1914.

HENRY A. VAN DER PAAUWERT,
Notary Public, Kings County, No. 29.
Certificate filed in N. Y. Co., No. 4
(My commission expires March 30, 1915.)

The Universal Telegraph Alphabet.

That the adoption of the Universal telegraph alphabet in the United States is a matter of only a short time we have excellent reason to believe. There are signs on every hand that the proposition is receiving serious consideration, although little has, as yet, been expressed publicly in words, and there will be no sentiment involved when the change is made—it will be a clean-cut business proposition.

As we have iterated and reiterated, we honor Professor Morse for the great benefits he bestowed upon mankind when he invented the telegraph. That fact, in itself, is an everlasting monument to his name and fame, but for us of the present day, to cling to an antiquated code of telegraphic signals just because Professor Morse designed it, and ignore the scientific and practical necessities of modern times, is no more defensible than it would have been for our predecessors to have failed to make use of the improved locomotive or the swifter steamer, because the originals of these types were good enough. The objection to the sacrifice of a few of the Morse characters in favor of more safe and scientific symbols denotes stagnation of the mind, and savors too much of the idea that if a thing has served well in the past it must necessarily answer every requirement of the present and of the future.

As we have stated before, sentiment is all right in its place, and is a necessary and potent force in the world, but there are other things to consider in dealing with every-day facts.

Many telegraphers have the idea that the adoption of the so-called Continental or Universal alphabet is equivalent to the total annihilation of the Morse code, but this is not true. The Continental code is just as much Morse as is the so-called Morse alphabet itself. What Morse did was to adopt the use of dots and dashes and spaces in making up his alphabet. The Continental code is simply a slight variation of the combination of the dots and dashes, and the omission of the spaces, as compared with the American or Morse code. As time went on the weak points of the latter were discerned, and in order to strengthen them, the Continental code was devised. That it was an improvement on the original is evident from the fact that it is now used in every country in the world except the United States and Canada, and so long as the latter two countries fail to fall in line they will be excluded from fuller participation in the work of formulating rules and regulations for the guidance of the telegraphic administrations throughout the world. The rules and regulations of the International Telegraph Union are based upon the Continental or Universal alphabet, and are binding upon the United States, although the latter have no vote in their preparation.

It is interesting to note, in this connection, that when the official telegraph vocabulary, with its million and a half words, was furnished by the governments to the business world, America protested against the use of so many words which began with the letters "o," "e," "r," "c," "e," "r," "r," "e," "c," etc. The Berne headquarters of the International Telegraph Union replied, "Change your alphabet, and these objections will fall."

Up to the year 1898 the so-called American code was used in the Australian colonies. In that year, the Australian Government decided to adopt the Universal alphabet, in order that the government might become an active member of the International Telegraph Conference. Orders were issued to make the necessary preparations to carry out the change, but many of the operators strenuously and bitterly opposed it, for no other apparent reason than that they did not want to disturb the existing conditions. It was a case of sentiment, on the one hand, and practical business necessity on

the other. The operators went so far as to endeavor to create public sentiment against the proposed change by informing commercial bodies and business men generally that their telegraph business would suffer severely if the change were permitted to be carried into effect. This action on the part of the sentimentalists created a great sensation, but the government was firm in its decision, and the day appointed for the change arrived. On the first day there was naturally, under the circumstances, some confusion; on the second day there was less, and at the end of the first week the work was running so smoothly under the new conditions that no one would ever have believed that the Australian Government had not always used the Universal code. The confusion resulted because some of the men wanted it; not because there was any real reason for it.

A few years ago, when the campaign against the spaced letters of the Morse alphabet was carried on through the telegraphic press in the United States, a great many operators, through choice, used the Continental code as freely and easily as they did the Morse, and no trouble whatever resulted. The transition from one to the other was easy; it was simply a case of making up the mind to do it; and there is no cause whatever to apprehend any confusion if ample time is given the operators to break themselves in in their own way. Hundreds of operators are now familiar with the Universal as well as the American code, and not one of them favors the spaced letter as against the Universal alphabet without spaced letters.

When the change is made it should be complete, that is to say, the Universal code should be adopted in its entirety at a given time. It has been suggested that the changes might be made gradually, that is, by introducing one or more of the substituted characters at stated intervals of time. Such a procedure, we think, would more likely lead to confusion and would, on general principles, be inadvisable. We believe that the good sense and ability of the American operator to adapt himself to new conditions can safely be depended upon to accomplish the entire change at one time, provided he is allowed sufficient time to prepare himself for it, and that, of course, the companies will grant.

The Mexican Government has, as recorded in our issue of April 16, decided to adopt the Continental or Universal code, and has given its operators four months in which to prepare for the change. It is safe to say that the change will be carried into effect with practically no ill-results.

The two great American telegraph companies, as well as the railroad companies and press associations, are progressive, and will, no doubt, fall in step with the rest of the world when the time is propitious. This result, it seems to us, is inevitable.

High-Speed Telegraph Records.

In conversation with an English operator regarding the records made by Postal operators, as recorded in our issue dated April 16, he stated that while the records were very good, they are not only equalled but surpassed by the telegraph operators in England and on the Continent. This is interesting, in view of the fact that some American operators believe that the alphabet used in England is slower than the one used in the United States.

Utility of Wires.

The extent to which railroad telegraph superintendents are utilizing all possible facilities obtainable from their telegraph and telephone wires has been the subject of general surprise, as judged by the numerous letters received at our office referring to the matter. The question is frequently asked, "If the railroad superintendents can get so much work out of their wires, why do not the commercial telegraph companies obtain the same results with their plant?"

The railroad telegraph departments, of course, obtain large benefits through the availability of the telephone in their service, and by the combination of this system with the simple Morse and multiplex telegraph, but, in commercial telegraphy, the telephone and the telegraph cannot be operated simultaneously on account of the fact that the telegraph wires were not originally erected with this purpose in view. The railroads, in late years, have installed plants for this purpose, and, in this respect, they have the advantage of the commercial companies. By means of these improved methods they have facilities that will serve their purpose for many years to come, without the necessity of calling for the erection of additional wires to carry a larger volume of service traffic. The replies of the superintendents of railway telegraphs on this phase of their work, which are now running in these columns, furnish interesting reading. Their success, of course, is due largely to the combination of the telegraph and the telephone, and the possibilities resulting therefrom.

Mr. Vail's Parting Regrets.

Mr. Theo. N. Vail, who has just retired from the presidency of the Western Union Telegraph Company, has always had a warm spot in his heart for old telegraphers. Knowing this, the publisher of TELEGRAPH AND TELEPHONE AGE asked him if he cared to express a few farewell words to his recent associates on his retirement from the telegraph field. This is his reply:

"The most gratifying feature of my connection with the Western Union Telegraph Company was the spirit and alacrity with which all connected with the company responded and made it possible and easy to do whatever was done. Whatever was done, by far a greater part of the doing and all the possibility of doing, was by and through the old Western Union men. This experience naturally confirms my opinion formed by experience and observation that the only way you can get efficiency, development and progress is by placing responsibility and require accountability. Very naturally, I regret closing such a pleasant association."

The Part Played by the Submarine Cable in the World's Material Development.*

BY GEORGE GRAY WARD, VICE-PRESIDENT AND GENERAL MANAGER, COMMERCIAL CABLE COMPANY, NEW YORK.

Submarine cable telegraphy has probably contrib- more toward the world's commercial development and advancement in civilization than any other class of industry. Steamships and railroads have opened up new territory for the immigrant and pioneer; but without submarine cables and land telegraphs these enterprises would have made only a languid progress. Railroads could never have been so successfully operated as at present, nor so enormously developed without the aid of the telegraph. The great expansion in steamship transportation and the consequent increase in the imports and exports between the nations of the world would never have reached the present proportions without the aid of the submarine cable.

Every year brings some new territory into closer touch with the commercial centers of the world by means of submarine cable connections, or increased cable facilities are provided to meet the demands of expanding commerce and national requirements. There are now upwards of 237,575 miles of submarine cables owned by private companies, representing an investment of more than $295.000,000, and there are few, if any, colonies of sovereign nations throughout the world which are not linked up in the chain of the world's submarine cables.

Of the millions of words which pass through this network of channels of communication, probably ninety-five per cent represent matters of national or business importance, significant of peace and protection on the one hand and business prosperity on the other. The growth of the world's international commerce in the last half-century has been fabulous, and submarine cable enterprise has been the most important factor in making possible this result. It has kept pace with demands made upon it to serve this growth.

Less than fifty years ago, merchants in the United States and Europe heralded the laying of the first commercially operative transatlantic cable (laid in 1866) as a wonderful product of man's genius and enterprise. To-day, after nearly fifty years of steady progress, serving vastly greater demands, its significance in the world's commercial development seems overshadowed by the efficiency of its service. Writers have invariably overlooked the fact that the telegraph is the root of the world's development—it has never been given the credit it is entitled to. When the first cable was laid, dispatches, costing $5 per word, passing through to their destination in Europe in anything less than two or three hours, were regarded as wonderful achievements. To-day, there are cable dispatches which must pass through to their destinations in less than two or three minutes or they fail to serve their purpose. Many messages are daily transmitted through the Commercial Cable Company's cables in less than one minute. In fact, on one occasion, this company received a complaint from one of its customers that his message had been sent too quickly, which had caused him a loss!

The mechanical construction of submarine cables, with the exception of the sheathing wires, is practically the same as it was when cables were first laid. The cost of manufacturing cables has, however, considerably increased on account of the increased cost of materials and labor. Notwithstanding this and the high state of efficiency with which submarine cables are now operated, and the constantly increasing cost of such operation, the charge for the transmission of cable dispatches across the Atlantic has decreased ninety-eight per cent, and the use of skilfully devised codes has brought this reduction still lower.

Although improvements in the methods of operating long submarine cables have probably not been so numerous as in the method of operating land lines, nevertheless, there have been very great improvements in the mode of transmission through submarine cables. Most of these improvements have been directed toward obtaining improved quality of signals at higher speeds, rather than in multiplying the output of the cables, as in case of land lines. One of the most successful inventions for multiplying the output of cables was introduced by Herbert Taylor and Dr. Alexander Muirhead in 1873, by which means long cables were duplexed, so that messages can be sent in opposite directions at the same time through a single wire.

Since that time improvements have been made in multiplex land telegraphy, so that it is possible, with the use of these new inventions, now to octuplex wires under certain conditions; that is to say, to send eight messages at the same time, four in each direction. On account of the long unbroken length of submarine cables, electrical difficulties exist, which have, thus far, thwarted the efforts of scientists and cable engineers further to multiply their ouptput.

Among the most notable inventions for improving the efficiency of operation of long submarine cables were the inventions of Messrs. Charles Cuttriss and T. J. Wilmot, now dead, both electrical engineers of the Commercial Cable Company, inventors of automatic cable transmitters, which send signals into the cables mechanically, thus producing a uniform type of signal at the receiving end, much more perfect in shape than the signals sent by manual operation.

The next important improvement in transatlantic cable transmission, which the Commercial Cable Company was the first to adopt, was the invention of Messrs. Sidney Brown and Arthur L. Dearlove's automatic relay. This very ingenious instrument enabled cables to be electrically coupled with each other, and messages automatically translated from one into the other. Prior to the invention of this automatic relay, messages had to be passed from one cable to another for further transmission by human relay. That is to say, an operator read the incoming signals from one cable and simultaneously sent them through the other cable. The

*From the New York *Evening Post*.

Brown and Dearlove automatic relay has replaced the human relay and eliminated all the common defects or errors of the human element at the intermediate station.

The next important invention for the improvement in the quality of service and output was the invention of Mr. E. S. Heurtley of an instrument much more sensitive than any instrument previously used in the practical operation of cables. This instrument Mr. Heurtley calls a "magnifier." By its means the most feeble electric impulses passing through the cable, which would hardly be noticeable on the instruments formerly used for the reception of long cable signals, are magnified to such an extent that they form clear and well-defined signals.

The most notable invention, however, since Atlantic cable telegraphy was first introduced is the invention of the late Mr. John Gott, who was chief electrician of the Commercial Cable Company since its organization until the date of his death, March 8, 1914. By means of this invention, Morse sound telegraphy can be used on long cables just as it is now used on land lines. This invention surpasses in importance anything that has been added to submarine cable science since Sir William Thomson (Lord Kelvin) and Cromwell Varley first made the practical operation of long submarine cables possible. By means of Mr. Gott's device, the company has been able to connect San Francisco and London by direct signals. Messages have also been sent direct between Vancouver and the city of London, and each day the company is using this system of operation for transmitting messages between Canada and London and Liverpool.

This is an achievement which inventors and the foremost electrical scientists of the world in cable working have striven to attain ever since the first Atlantic cable was laid. The first transatlantic cable was practically destroyed by forcing a powerful electric current through to work the Morse system of telegraphy. Some years ago Mr. Thomas Edison took an automatic Morse arrangement to England, and, in the course of his experiments, he tried to pass signals through a cable about 1,000 miles long, coiled in a tank. After the trial he laughingly acknowledged that he had not been very successful, as a dot sent into the cable was twenty-eight feet long when it came out at the other end. "In fact," he added, "I thought that dot was never going to end."

The far-reaching effect of this invention on all kinds of telegraph transmission, both by land and sea, cannot yet be definitely stated, but I feel convinced that by its means it will be possible to transmit, through automatic repeaters, telegraph signals around the world.

With regard to the possibility of wireless telegraphy ever replacing the submarine cable in the transmission of international communication, while I have and wish to express the highest regard for wireless telegraphy as an invention for communication with and between ships at sea, I have not the slightest faith that it will seriously introduce effective competition with the submarine cable. The submarine cable brought to its present state of operating efficiency after nearly fifty years of experimental work of scientific and practical minds is not at all times a perfect conductor of the electric impulses which are sent into it, but it is as nearly perfect as present-day skill and science has made it possible to be.

To believe it possible to discharge an electric impulse into ether and expect it to be as reliably communicated through the maze of nature's atmospheric and electrical phenomena to its destination, as a current can be passed through an unbroken electrical conductor connecting two points, requires a faith in man's conquest over nature which is, at least, beyond my capacity to comprehend.

Institute of Radio Engineers.

On the evening of April 1, a regular meeting of the Institute of Radio Engineers was held at Columbia University, New York. Mr. R. H. Marriott, radio inspector of the United States Department of Commerce for the port of New York, presented an interesting paper on "Specifications for Steamship Radio Equipment." The paper gave conclusions which Mr. Marriott has drawn from his long experience in radio work, and was directed especially toward improvements which should be adopted in the design and installation of emergency transmitters in particular. It was advocated that spare parts of such items as are subject to derangement should be furnished, and that a storage battery of sufficient capacity to run the main transmitting set for six hours should be supplied.

The paper was discussed by Messrs. J. S. Stone, A. N. Goldsmith, G. Hill, E. J. Simon, A. F. Parkhurst, A. A. Hebert and John L. Hogan, jr. In the discussion the difficulty was referred to of creating sufficient interest among the steamship companies to warrant the large investment necessary for the installation of transmitters, as suggested by Mr. Marriott, in spite of fact that the United Fruit Company, and one or two other corporations, have been willing to go to such great expense in the matter of ship insurance by radio.

Mr. Hogan described a new ship installation of the National Electric Signaling Company, in which two motor-generators (one of two kilowatts and one of a half a kilowatt) are used. The suitability of various materials for apparatus construction was also taken up.

Secretary Emil J. Simon announced that Mr. John Hays Hammond, jr., had generously assigned a room of his suite at 71 Broadway, New York, for the office of the Institute. An assistant secretary will be in constant attendance.

A New Telegraph System.

BY GEORGE E. HINES, NEW YORK.

I was much interested in Mr. S. Thomson's criticism (published in TELEGRAPH AND TELEPHONE AGE January 1) of my article in your issue, dated December 1, 1913, but have been too busily occupied in proving the claims made for the work to reply earlier. I was interested in the article, because it voiced the sentiment and opinions of telegraph engineers who, naturally, are against a new idea so revolutionary in character.

I have purposely reserved a stronger argument against present scientific telegraph practice until I should have confirmed all the statements and claims

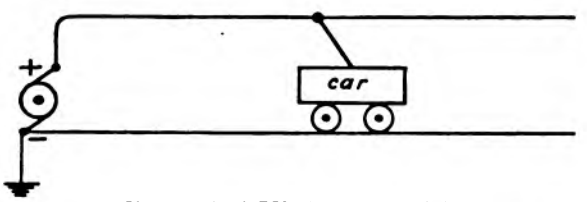


FIG. 1—NEW TELEGRAPH SYSTEM.

made in the previous article, and I am now in a position to declare them true in every particular.

Referring again to the pamphlet which was printed for me, and which has aroused some interest among our best-known scientific men, it will be noticed that claim is made that the present telegraph systems have developed upon a reverse scientific principle. Mr. Thomson says: "No new principles have been evolved" in my work. The new principles claimed and confirmed by the inventor are just as represented—the plenary turnover of the fundamental principles of present telegraph practice—and can be stated in a few words. The new method embraces "grounded lines and insulated batteries," as against "grounded batteries and insulated lines" universally adopted in the old method.

A telegraph circuit is practically a power circuit

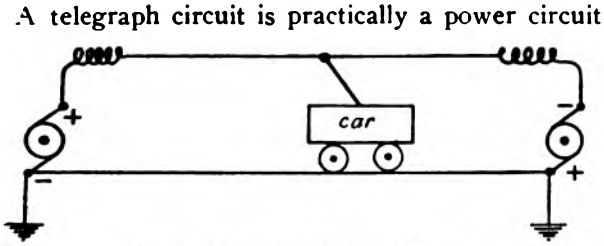


FIG. 2—NEW TELEGRAPH SYSTEM.

in its elemental form. The relays represent our trolley-cars; the lines, our trolley-wires; the ground or earth, our rails or return medium. The source of power, or the e.m.f., remains the same for both purposes, and we have only to deal with conditions made different by complicating circuit applications and uses, and with changing atmospheric conditions beyond our control. Under circuit conditions, as shown in Fig. 1, the work is practical and will do what it is designed to do. Changing weather conditions do not affect our trolley cars.

Now there are two questions I desire to ask: First, would it not be an unwise thing to do to insert a high resistance between the generator and the trolley wire? That is what is being done with the present telegraph systems. Second, would it not, theoretically and practically, put your trolley car out of commission to put in another generator plant at the distant end of the circuit, connecting the reverse polarity of this second plant to the trolley wire, as in Fig. 2? That is what is being done in the old method of operating the telegraph. Upon these two mistaken ideas scientific development has given place to so many circuit and mechanical changes, one upon the other, that the telegraph has become so intricate and impracticable that our most expert and talented attendants cannot keep the circuits in operation when atmospheric conditions are varying.

A few tests of the new method have been recently made and the work shows an efficiency of 260 per cent over the old in the three experimental applications, with the weather tests yet to be made. It is for simplicity and practical efficiency that we are making, and it is to be hoped that the new method will prove as practical and efficient in service as the laboratory experiments have so far indicated.

Telegraphic Connections.

A book that ought to be better known and more widely used by telegraphers is "Telegraphic Connections," by Thom and Jones. It gives mechanical information on a wide range of telegraph apparatus, and every telegraph engineer, wire chief and operator will find it a great help in his daily work. It gives very clear diagrams and practical information on the following subjects:

Polar relay, pole-changer, polar duplex, quadruplex, local connections, proportional currents, division of generator current, Gerrit Smith attachment, the working quadruplex, how to balance, quadruplex trouble and faults, margin, new quadruplex apparatus, new standard quadruplex, duplex loop, lamps in the circuit, combination loop, defective loop repeater, double-loop, duplex, Toye repeater, Milliken repeater, half Milliken, half Milliken (chemical) repeater, call-bell, the loop-switch, Postal-Telegraph loop, current distribution, Wheatstone automatic duplex.

In the diagrams the local and main circuits are distinguished by colored lines, or otherwise differentiated, so that they can be separately and readily traced with the least strain upon the eye. The descriptive matter is brief and to the point, and judging from the list of subjects covered, it is a very practical and useful book to have on the desk for ready reference and for study.

The price of this book is $1.50, and copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MR. F. S. LEWIS, district cable manager of the Western Union Telegraph Company, New York, writes: "Enclosed find $2.00 to renew my subscription. Thank you for not letting it expire. Each issue of your paper is read with interest, and I get much valuable information from it."

Telephone Achievements.

Some interesting facts regarding the development of the Bell Telephone System have been made public by President Theo. N. Vail.

From its foundation, he says, the company has continuously developed the art. New improvements in telephones, switchboards, lines, cables have followed one another with remarkable rapidity.

While each successive type of apparatus to the superficial observer suggested similarity, each step in the evolution marked a decided improvement. These changes, this evolution, have not only been continuous, but are continuing. Substantially, all of the plant now in use, including telephones, switchboards, cables and wires, has been constructed, renewed or reconstructed in the past ten years.

Particularly in switchboards have the changes been so radical that installations costing, in the aggregate, millions, have frequently been discarded after only a few years' of use.

Since 1877 there have been introduced fifty-three types and styles of receivers and seventy-three types and styles of transmitters. Of the 12,000,000 telephone receivers and transmitters owned by the Bell Company January 1, 1914, none were in use prior to 1902, while the average age is less than five years.

Within ten years the company has expended for construction and reconstruction an amount more than equal to the present book value of our entire plant.

Long distance and underground transmission was, Mr. Vail says, the most formidable scientific problem confronting the telephone experts.

The retarding effect of the earth on the telephone current often impaired conversation through one mile underground as much as through 100 miles overhead. Overhead conversation had its distinct limitations. No possible improvement in the telephone transmitter could, of itself, solve these difficulties. The solution was only found in the cumulative effect of improvements, great and small, in telephone, transmitter, line, cable, switchboard, and every other piece of apparatus or plant required in the transmission of speech.

While the limit of commercial overhead talking had increased from strictly local to over 1,000 miles as early as 1893, it was not until 1905 that conversation could be had over long-distance circuits of which as much as twenty miles was in underground cables. By 1906 underground talking distance had increased to ninety miles. By 1912 it was possible to talk underground from New York to Washington.

It was then that the construction of underground conduits from Boston to Washington was determined upon—not that it was expected to get a through underground talk between those places, but in case of storm or blizzard, to utilize intermediate sections in connection with the overhead.

"We have," he said, "perfected cables, apparatus and methods that have overcome obstacles heretofore regarded as insuperable both to long-distance overhead and underground conversation.

"Underground conversation is now possible between Boston and Washington, four times the length of the longest European underground line. This enabled the Bell System, in the recent great storm, so destructive on land and sea, to maintain communication for the public between all the principal points on the Atlantic seaboard.

"Telephone communication is established between New York and Denver, is potentially possible between all points in the United States, and by 1915 will be an accomplished fact between New York and San Francisco."

Sam Williams.

BY JOSEPH MARSHALL, SAVANNAH, GA.

Sam Williams, of the Gould-Dewey telephone message episode, was inordinately fond of calling himself an "Afro-Amerikin," and claimed that his father fell on "de bres' works in Ferginnia," and that he, himself, had "fit and bled" for his country.

"What have you done for your country?" I asked.

"Why, sah," replied Sam, "I 'longed to de artillery in the Spinnish-Amerikin wah, an' I driv de fines' pa'r o' mules in Cuby."

In addition to all this he said he 'longed to de Independen' Ordah o' de Risin' Sons o' Ham, and to de Bloomin' Lily Club.

Sam called himself an expert on gravity battery, but we had one bank of 350 cells, known as the fifth New York-Jacksonville, which gave him much trouble. It was in a damp place, and we finally had to insulate the stand with blotters saturated in paraffine oil.

One morning I walked in on Sam while he was working on this battery and heard him say in a very plaintive tone:

"Poor niggah, poor niggah! Go to baid las' an' git up fus'. A streak o' lean an' a streak o' fat, and de white folks grumble ef yo' eat too much o' dat."

"Sam, what has all that to do with this battery," I asked. "Don't you know those folks up in New York are raising sand about this battery?"

"Yas, sah, yas, sah," replied Sam, and stretching his six feet two to the limit, pointing to the battery and looking at me, said: "Mistah Zeigler done tole me dat Mistah John Hurd up to New York say 'tis Sam Williams' fault. Now, Cap'n, listen to me; 'tain't a thing in de world de matter wid dat battery; 'tis strong as aggyforty (aqua fortis), and, what's mo', please tell Cap'n Hurd an' all de other white folks up thar in New York I willin' to make an affidavy dat it 'tain't nary two niggahs in de State o' Georgia what kin connek up de las' two cells of dat battery, 'scusin' dey stands on a dry bode or on some hay, bekase—g-r-e-a-t C-a-e-s-a-r, white man, I done 'sperience dat thing—don't laugh at me, boss, don't laugh at me; it's jes' like I tell yo'. I koched hole o' de neked ends o' dem wires yistiddy mawnin' and I ain't know nothin' for five minutes; it flung me agin' de wall. No, sah, nothin' de matter wid dat battery."

There was a patch of wool missing from the back of Sam's head. I found the trouble in the old clock-faced pole-changer.

Construction of the Washington-Baltimore Telegraph Line, 1843-1844.

BY G. C. MAYNARD, CURATOR, DIVISION OF TECHNOLOGY, NATIONAL MUSEUM, WASHINGTON, D. C.

The attempt to lay the underground wire, which was commenced in Baltimore and carried a distance of about nine miles to the Relay House, was begun in the summer of 1843. After it became certain that this plan would be a failure, because of the lack of sufficient insulation of the lead-covered wire, operations were suspended to wait for milder weather.

Alfred Vail's diary shows that during January, February and the early part of March, 1844, he was employed in the work of securing line and battery material, which was delivered at Washington, and in taking the wire out of the lead tubing and getting it ready to be strung on poles. Much of this work was done in a room in the basement of the United States Patent Office, which was assigned to Morse for that purpose. Vail's diary then proceeds:

1844.

Tuesday, March 12.—Busy at the Patent Office all day.

Wednesday, March 13.—Cloudy and rainy. Put together two of the large magnets, and this afternoon took the four o'clock car for Baltimore; put up at the U. S. Hotel. In the evening went to the Museum.

Thursday, March 14.—Clear and pleasant. Settled with Mr. Winans for the U. S. Went to our telegraph office and put up two boxes of magnets and brought them on. The rest of the day until four o'clock I spent in collecting at the little stream near the depot yard. Took the Frederick cars to Relay House and the Washington from there home. Called at Mr. Griffiths's this evening.

Friday, March 15.—Cold, rainy and disagreeable weather. Went to the depot twice this morning. Paid freight and cartage on boxes.

Saturday, March 16.—Cold and stormy. Was at the Patent Office all day.

Sunday, March 17.—Clear and pleasant, though cool. Went to church at Apollo Hall and heard a stranger.

Monday, March 18.—From this date to Saturday, 23 I spent at the Patent Office in superintending the soldering of the wires for the poles.

Sunday, March 24.—Clear and cool. Attended services at the Capitol and heard Mr. Kincade.

Monday, March 25, to Saturday, 30.—Was engaged in preparing the wires, etc., for putting it upon poles. Paid Dr. Page and Mrs. Kenneday Friday, yesterday.

Sunday, March 31.—Went to Georgetown this morning and heard Mr. Butler. Very cold.

Monday, April 1.—Commenced putting the wires upon the poles. Cold.

Tuesday, April 2.—Got beyond the two-mile post. Clear and pleasant, and until Wednesday evening, 10, tried the telegraph at different distances on the road from four miles to seven with success.

Thursday, April 11.—Moved to the Capitol and put up the instruments. The correspondent in one room and the battery in another.

Friday, April 12.—This morning tried the wires for ten miles out. I went out by the four o'clock train a distance of ten miles. Corresponded with Prof. Morse at the Capitol and returned with the evening train.

Saturday, April 13.—At the Patent Office sending the lead pipe, etc., to the cars. In the afternoon visited a locality of petrified wood near the residence of Mr. France on the W. Harrison Smith farm, also called the Silk farm. In a deep ravine near the house found a considerable quantity, some of which are beautiful specimens. This morning I called upon Mr. Bester, who has a good collection of minerals and fossils of Virginia and Maryland.

Sunday, April 14.—Hot and dry. Went to hear Mr. Stringfellow this morning and this afternoon walked out to the Columbian College.

Monday, April 15.—Spent most of the day in loading the cars with pipe, etc., for Baltimore.

Tuesday, April 16.—At half past five started for Bladensburg, walking the distances, and collected on the road some pieces of petrified wood and geodes. On returning I left the depot at Bladensburg for Mr. McGregor's, from there to Mr. Birch, then to the next, then crossed the N. W. Branch for Mr. Scott's orchard, in doing which, after walking half a mile, crossed a marsh, and struck upon some gullies, in which I found an abundance of petrified wood. Got what I wanted and went east to the borders of the woods, then to Mr. Scott's house, where I left the specimens to be sent to me, and went across lots to the railroad, coming out at the brick reservoir. Examining the banks of the railroad along. I returned home at six o'clock. After tea went to the post-office, Mr. Ellsworth's and home. Cloudy and warm.

Wednesday, April 17.—Cloudy. Took the freight train for Beltsville this morning, went three miles beyond and collected a large basket of specimens of iron ore. Took the passenger train to Beltsville, and then the freight train to Calvert's, where I put up the wires to connect the instrument in the house. From there I went to Mr. Scott's farm and collected some large pieces of petrified stone and walked home. This evening I visited Mr. Bester and Prof. Morse. It looks much like rain.

Thursday, April 18.—Went to Mr. Calvert's in the morning, stopping on the way to collect minerals; went back by the morning train after getting things in readiness; returned to Calvert's in the afternoon, but did not get the instrument to write well, returned. Cloudy and cool.

Friday, April 19.—Remained at the Capitol all day preparing the instruments. Visited Bester and took him some geodes. Cool and cloudy.

Saturday, April 20.—Cool and cloudy. Spent the morning at the Capitol. After dinner took the cars for White Oak Bottom and telegraphed sixteen miles and returned in three-quarters of an hour. Paid Stevenson $6.37—one-half.

Sunday, April 21.—Went with Mr. Drayton to

the Capitol to hear Harriet Livermore, but soon left and went to Mr. Sprole's. Wrote to T. P. Cummings this afternoon.

Monday, April 22.—Remained at the Capitol all day adjusting instruments.

Tuesday, April 23.—At six o'clock took the cars for Bladensburg. Got out at the last cut and gathered minerals; walked to the Summer House; prepared the ground circuit, and found it answered. Corresponded with Prof. Morse all the morning. Went down to the East Branch and found some beautiful stones; returned and put the register in circuit and wrote until near six o'clock, giving and receiving intelligence. Very foggy this morning. This evening visited Mr. Bester.

Wednesday, April 24.—Went to the Patent Office and prepared the large magnet, then purchased several articles for the use of the telegraph at the junction, went to the Capitol, and, after dinner, went to the Silk farm, got some specimens and returned. Warm to-day.

Thursday, April 25.—Went out to Mr. Beshire's farm and got some specimens of petrified wood, Bladensburg, then to the Summer House, returned by the eleven o'clock train, went to the Capitol, then to my room, packed up minerals until three; after dinner went to the Capitol and prepared the wires for a ground circuit.

Friday, April 26.—Went to Bladensburg, to Mr. Beshire's farm, got some specimens of petrified wood, then to Calvert's, telegraphed until half past eleven, went down the East Branch to B., collected some minerals returned to Calvert's, telegraphed until six, and returned to Washington. The day warm.

Saturday, April 27.—Went to Bladensburg, went up the East Branch to Calvert's, telegraphed until twelve, then took down the branch wires, and packed up the instruments and returned to Washington at six o'clock. The day cold and rainy.

Sunday, April 28.—Heard Mr. Stringfellow this morning; in the afternoon walked with Mr. Drayton to the long bridge; returned, wrote letters; in the evening walked up to Judge Tappan and back. Rained this morning, but is now quite clear.

Monday, April 29.—Spent the morning at the Capitol getting ready to telegraph, and at four o'clock took the cars for the Junction. Stopped at Mr. Sumwalt's and prepared for action the next day.

Tuesday, April 30.—Telegraphed all day, wrote all sorts of things. The two wires worked well the twenty-two miles.

Wednesday, May 1.—Telegraphed all day. In the afternoon announced the nomination of Mr. Frelinghuysen as Whig candidate for vice-president.

Thursday, May 2.—Telegraphed. It thundered and lightened very sharply last night and considerable noise was heard in the telegraph room by three or four persons in the house at the time of a flash.

Friday, May 3.—Telegraphed all day, using one wire on the poles and the ground; worked well.

Saturday, May 4.—The same as yesterday; returned to Washington this evening; called on Mr. Bester and Prof. Morse.

Sunday, May 5.—Clear and a beautiful day. Went to the Capitol and heard Mr. Dwight and then communed at Mr. Stringfellow's. Went to Mr. Bester's in the afternoon.

Monday, May 6.—Spent the day at the Capitol arranging the wires so that one battery will answer for two circuits, and each act independently of the other. Prof. Morse is again low spirited. He says that Smith will permit nothing to be done by Congress in reference to a further appropriation. Prof. Morse's plan is to desist from further progressing with it, let the patent expire and then if Government use it and remunerate him. He will not see Prof. Gale and myself want. But will not give Smith a cent. This he told me in the Capitol this morning.

Tuesday, May 7.—This morning took the freight train for the Junction; remained there all day; nothing done; wire broke; returned to Washington this evening. Very windy all day.

Wednesday, May 8.—This morning went to the Capitol and arranged the wires anew; went to Patent Office, then to my room. Took the cars for the Junction and telegraphed with Prof. Morse.

Thursday, May 9.—Telegraphed all day.

Friday, May 10.—Telegraphed all day.

Saturday, May 11.—Telegraphed until three o'clock; returned to Washington by the cars. Settled with Prof. Morse for the month, and returned to my rooms.

Sunday, May 12.—Heard Mr. Tinsley at the Capitol.

Monday, May 13.—Went to the Junction and returned in the evening train to Washington; packed up for R. H.

Tuesday, May 14.—Took the train for the Relay House, and at the Junction took all on board the cars, put them up at the Relay House, while a party of forty or fifty were dancing; and telegraphed; all worked well.

Wednesday, May 15.—Telegraphed all day and went to Washington.

Thursday, May 16.—Returned to the Relay House and telegraphed all day. Collected some minerals.

Friday, May 17.—Telegraphed until half past two. Saw an electric spark at the register. Collected some specimens of iron ore from the Elkridge furnace of Mr. Poo; returned to Washington.

Saturday, May 18.—Walked to the Patent Office and home. After walked up to the Capitol.

Sunday, May 19.—Went to the Capitol but found no church, and went to Mr. Stringfellow's, and in the afternoon to hear Mr. French. Remained at home during the evening.

Monday, May 20.—Went up to the Capitol, then to the Patent Office, repairing the small lever.

Tuesday, May 21.—At Capitol putting in order the instruments. Then went to the Senate and House of Representatives. Returned home.

Wednesday, May 22.—Took the cars for the Relay House; took down the wires and sent the instruments to Baltimore upper depot. Collected

specimens of iron ore at the Elkridge furnace and the ore banks.

Thursday, May 23.—Went to the upper depot and put up the instruments and found the battery in action at Washington. Prof. Morse called in the afternoon on his way to Washington.

Friday, May 24.—Telegraphed all the morning. Miss Ellsworth sent as the first message: "What hath God wrought?" In the afternoon took the instruments to the lower depot and put them up.

Saturday, May 25.—Commenced telegraphing at nine o'clock and continued until after two o'clock with Prof. Morse at Washington. Returned to Washington by the evening train.

Sunday, May 26.—Went to the Capitol this morning and heard Mr. Tinsley.

Monday, May 27.—Took the cars for Baltimore and got there at eight o'clock. Took board at Merchants' Hotel and commenced telegraphing for the convention and others with Prof. Morse.

Tuesday, May 28.—The same.

Wednesday, May 29.—The same.

Thursday, May 30.—The same.

Friday, May 31.—Stopped at two o'clock for the purpose of getting room and things in order.

Saturday, June 1.—Preparing room.

Sunday, June 2.—This morning went to Christ Church. Returned and walked as far as Christ Church in the evening and returned.

Monday, June 3.—Preparing room.

Tuesday, June 4.—Prof. Morse came from Washington this morning and I returned with him this evening.

Wednesday, June 5.—Called at Mr. Ellsworth's this morning, then on F. O. J. Smith, went to the Capitol; there Prof. Morse, Smith and myself met and I think matters are in train for adjustment; returned home and after dinner called upon Mr. Bester, then on Prof. Morse.

Thursday, June 6.—Returned to Baltimore and got the telegraph in working condition again and telegraphed till two. Saw Mr. Latrobe, who is drawing up the proprietors' agreement, and at five o'clock telegraphed till seven o'clock.

Friday, June 7.—Pleasant. Telegraphed from nine till two, and from five till near seven o'clock.

Saturday, June 8.—Telegraphed from nine till two, and from three to half past four o'clock, then took the five o'clock train and went to Washington; took tea and spent the evening with Prof. Morse. Messrs. Ellsworth and Wood were there, also Mr. Cornell part of the time. Prof. Morse is not satisfied with the agreement. Mr. Ellsworth recommended him to sell it to the Government for $50 per mile. To this, I presume, Smith will not consent. I gave an unwilling assent upon condition that the pamphlet which Prof. Morse and myself intend to get out, three-quarters of it shall be mine and one-quarter his, and also that if the Government make that bargain, I shall receive $2,000 per year salary.

Sunday, June 9.—This morning I went to Captain Wilkes's, then to the Capitol to church, heard Mr. Tinsley's last sermon. Returned with Mr. Drayton to Captain Wilkes's, saw him, went home, wrote letters. Heard Mr. Sprole in the afternoon. Took tea with Mr. and Mrs. Child, went home; Mr. Cornell called. Went to see Prof. Morse, then to Mr. Monroe's. Returned home.

(To be Continued.)

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 16) Study Fig. 2, showing graphical representations of the various kinds of current.

(Page 17) Answer the five questions at the foot of the page.

(Page 18) Does an electrical generator generate electricity?

What is an electrical generator and what does it accomplish?

What is the cause of an electrical current, and what takes place when two points at different electrical potentials are connected by a conducting wire?

(Page 19) If a difference of potential between two points is created, but no means of maintaining that difference is provided, will a continuous current result when the two points are connected by a wire?

How much more energy will it require to maintain a current of ten amperes than for a current of five amperes?

If a plate of copper and one of zinc are immersed in dilute sulphuric acid, for which of the metals will the acid show the greater affinity?

What is the relative potential effect upon the copper and zinc of the action of the acid?

How much greater is the potential of the copper than that of the zinc, and how can the difference be indicated?

If the two plates are connected through a galvanometer, or an ammeter, in which direction does the resulting current flow?

What is indicated by the rising of air bubbles from the surface of a copper plate?

(Page 20) Why do these bubbles cease when there is no current to relieve the pressure?

If a wire is moved rapidly through a magnetic field, what is the effect upon the wire?

In what manner can this action serve to illustrate the principle of a so-called dynamo or electrical generator?

What is the one point of difference in the action of the generator and that of the battery?

Why does the difference of potential cease when the armature of the generator stops its motion, while that at the terminals of a battery is maintained when the circuit is opened?

(To be Continued.)

How Cables Are Made, Laid, Operated and Repaired.

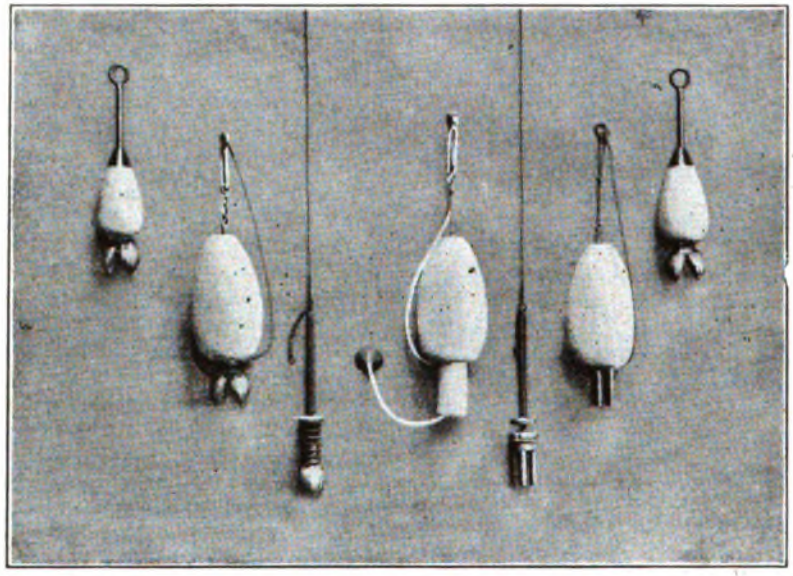
(*Continued from page 224, April 16.*)

The time occupied in the manufacture of cable depends upon the number of machines employed by the manufacturer, but a single set of machinery is capable of turning out about five or six miles of deep-sea cable per day.

The works of the cable manufacturers are always located on the banks of a river, or close to docks, where the cable can easily be transported into a cableship. When the cable is nearing completion the cableship is brought alongside of the wharf to receive the cable. The largest cableship in the world at the present time is the "Colonia," which is owned by the Telegraph Construction and Maintenance Company, London, England, and was used in laying the trans-pacific cable of the Commercial Pacific Cable Company. The cableship "Colonia" is 500 feet long, fifty-six feet wide, and has a displacement of 7,976 tons, and a carrying capacity of 4,000 nautical miles of cable. She is equipped with four cable tanks. The cable is coiled into these tanks with almost as much exactness and precision as thread is coiled around a spool. Before the cable is placed into the tanks of the ship all the various types to be used are joined together, and the cable is stored into the tanks with regard to the manner in which it is to be laid out; that is to say, the shore end will appear on the top of the tank, as that is to be laid first. Then come the various intermediate types, down to the deep-sea type; and, again, as the ship is approaching the shore of destination, the cable becomes heavier, as the water becomes shoaler, until the end is landed.

The laying of long submarine cables is not an easy matter, nor is it an inexpensive operation. To safeguard the millions of dollars required to manufacture and lay a submarine cable, every possible precaution must be taken to prolong its life, and, at the same time, to assure the company of being able to recover the cable for repair purposes. It is well known that the contour of the bottom of the ocean varies similarly to that of dry land; that is, it has hills and valleys and plateaus. It is, therefore, of the utmost importance before a cable is laid to know the contour of the bed of the ocean, so as to avoid suspending the cable between two hills, where it would hang in a festoon, and soon become chafed through by its own weight.

The question has often been asked, "Does a submarine cable sink to the bottom of the ocean?" The answer is that unless it rested on the bottom all the way across its span, it would only be a matter of a very short time before it would be chafed through and communication interrupted. In order to find a resting-place for the cable, which will enable it to lie without strain throughout its entire length, a survey of the bottom of the ocean is first made. This survey consists of a series of deep-sea soundings, which not only furnish the depth of water, but also produce specimens of the bottom of the ocean, and the temperature of the water, both of which are important factors in the laying of submarine cables, because, if by chemical analysis, it should transpire that there is any mineral deposit on the bottom of the ocean which would injuriously affect the cable, or if the temperature should show that there is volcanic action at certain places, these places must be avoided.



SPECIMENS OF DEEP SEA SOUNDERS.

(*To be Continued.*)

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at New Orleans, La., May 19, 1914. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

Utility of Wires on the Pennsylvania Railroad.

The Pennsylvania Railroad Company, through the office of Mr. J. C. Johnson, superintendent of telegraph, Philadelphia, Pa., has issued a useful booklet entitled, "Utility of Wires," for the information and instruction of its telegraph and telephone employes. It gives some interesting and valuable explanatory matter of an electrical character, then describes the various methods employed on that road of utilizing the wires. Through the courtesy of Mr. Johnson we are enabled to reprint the text, together with the illustrations.

INTRODUCTION.

Electricity is used in telegraphy and telephony either as direct currents or alternating currents, often abbreviated as D. C. and A. C.

Direct currents are those that flow always in the same direction. Of these we may have several varieties:

First.—If the strength of the current remains constant, the current is called steady.

Second.—If the current's strength varies, becoming now weaker and now stronger, but at no time completely stopping, we have a variable direct current.

Third.—If the current stops and starts again continually, we have a pulsating current. This is sometimes called intermittent current, in telegraph use.

An alternating current is one which flows alternately in opposite directions. One forward and one backward rush of current, taken together, are called a cycle, and the number of such cycles in one second is called the frequency of the alternating current.

RESISTANCE AND IMPEDANCE.

If a long, straight wire has sent through it, first, a steady current and then an alternating current, both currents will encounter the same resistance; but if the wire be coiled into a helix of many turns and iron core be placed inside the helix, this is no longer true. While the steady current encounters the same resistance, the alternating cur-

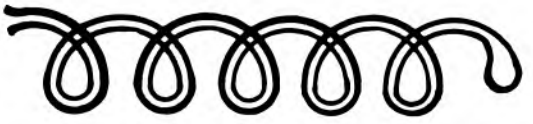


FIG. 1—NON-INDUCTIVE WINDING.

rent is much more impeded. The reason for this is found in the fact that the alternating current must continually make and destroy the magnetism of the iron core at the expense of its own energy, a burden from which the steady current is free. Such a coil is said to offer resistance to steady currents and impedance to alternating currents. Both quantities are measured in ohms. The impedance includes the resistance as a part of itself. The rest is due to what is called the inductance of the coil, a quantity which depends, in a complicated manner, on the frequency of the alternating current, the number of turns in the helix, and the amount of iron it contains. A coil wound thus is said to possess inductive resistance, or to be wound inductively.

It is possible to wind a coil so as to offer the same resistance to all kinds of currents. Fig. 1 illustrates this.

A long wire is doubled at the center and the coil wound with the doubled wire. A current in such

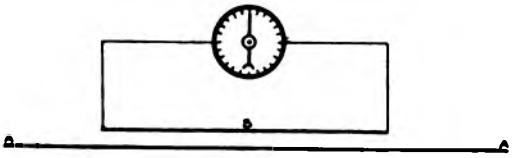


FIG. 2—PRODUCTION OF A CURRENT BY INDUCTION.

a coil has no magnetizing power. A coil so wound is said to be wound non-inductively, or to possess no inductance.

INDUCTION COIL.

Let two long, straight wires be stretched side by side, as in Fig. 2, and the ends of wire B be connected to a suitable current detector.

If now either a pulsating, variable or alternating current be sent through A, an alternating current will flow through B and show itself in the detector. This is the simplest example of the production of a current by induction.

The circuit A is called the primary, and the cir-

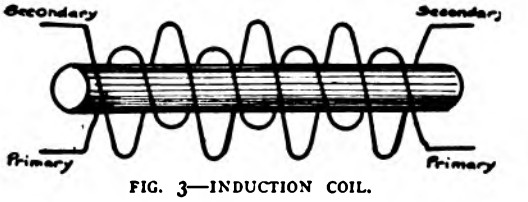


FIG. 3—INDUCTION COIL.

cuit B the secondary. A steady current in the primary will produce no current whatever in the secondary. The inductive effect of A upon B may be much increased by coiling both wires into spirals, placing one within the other and inserting an iron core in the center, as in Fig. 3.

Such an arrangement is called an induction coil. Several varieties of induction coils may be mentioned: The transformer, which has, usually, a con-

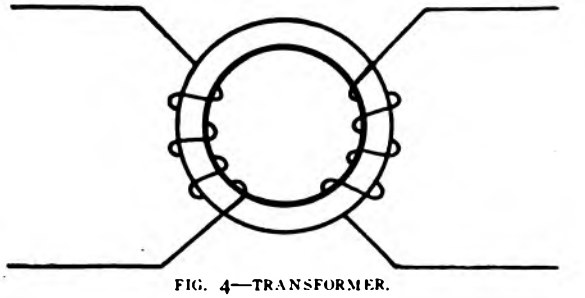


FIG. 4—TRANSFORMER.

tinuous ring-shaped iron core, upon which primary and secondary coils are wound, sometimes on opposite sides of the ring. The transformer is used for changing the voltage of an alternating current. An alternating current supplied to the primary coil will induce an alternating current in the secondary coil, with a voltage greater or less than that of the inducing current, according as the number of turns of wire in the secondary coil is greater or

less than that in the primary coil. When the voltage is increased by the transformer, it is called a step-up transformer, and, in the reverse case, a step-down transformer. The repeating coil used in telephone work is merely a small transformer.

Induction coils, with closed or ring-shaped cores, have a greater inductive effect than those with open cores or straight cores, but introduce also more impedance into the circuit.

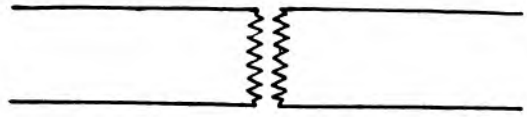


FIG. 5—THEORETICAL DIAGRAM OF INDUCTION COIL OR TRANSFORMER.

An induction coil, or transformer, is usually represented in diagrams as in Fig. 5.

RETARDATION COIL.

To form a retardation coil, a wire is doubled and wound non-inductively upon an iron core, allowing the doubled end to extend some distance from the winding. The doubled end is then cut. We then have the arrangement shown in Fig. 6, where A_1 and A_2 are the ends of the same wire.

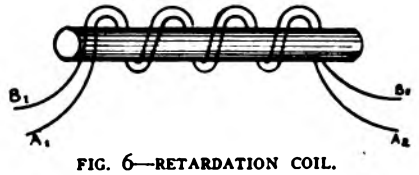


FIG. 6—RETARDATION COIL.

A_2 is then joined to B_1 at C, and another wire, D, fastened to the joint, giving the arrangement of Fig. 7.

A study of Fig. 7 will reveal the following facts: A current entering by C will divide itself equally and flow in opposite directions, and, therefore, non-inductively, around the core, leaving, in equal strength by A_1 and B_2. Such a current will encounter only the resistance of the coil.

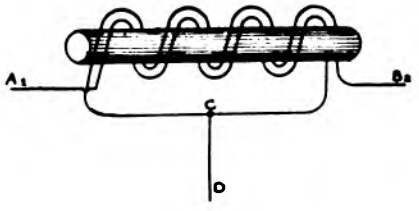


FIG. 7—RETARDATION COIL WITH ENDS OF WIRE JOINED.

A current entering by A_1 will traverse the helix and reach the point C. Here it would normally divide; but if the resistance of the line D is very great, compared with the resistance of the coil, but little current will flow along D, the greater part re-entering the helix and traversing it in the same direction as before, and leaving by B_2. Such a current would have a magnetizing effect on the coil, and, if it be alternating, will encounter the impedance of the coil.

RESISTANCE OF DIVIDED CIRCUITS.

If a portion of a telegraph wire be cut out and replaced by wire of greater thickness, it is obvious that the total resistance of the line will be decreased. The same effect may be obtained by using, instead of one thick wire, two thinner wires whose cross-sectional areas together make up that of the thick wire. If, now, one of these wires be removed, leaving the other, the current, because it encounters a thinner path, meets a greater resistance. This is equivalent to the statement that the joint resistance of a divided portion of a circuit is less than that of either of the wires composing it. This is analogous to the fact that the exit of an audience from a theater is made easier by opening several doors instead of one.

We may have a divided circuit of two, three, or any number of branches. When all of the branches are of equal resistance the joint resistance may be

FIG. 8—RESISTANCE OF DIVIDED CIRCUIT.

found by dividing the resistance of one branch by the number of branches. For instance: In Fig. 8, if we were to replace the two wires of 100 ohms each that join A and B by one wire of fifty ohms, the current in the main line would be unaltered.

Divided circuits, of as many as four equal branches, occur, in what are called phantom-simplex lines, and, by the above rule, the joint resistance of the four-fold line will be one-fourth that of the single wire.

Divided circuits, in consequence of their low resistance, require less voltage to maintain and give

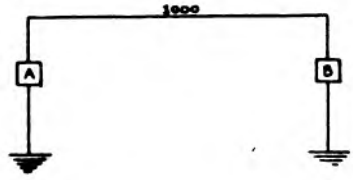


FIG. 9—RESISTANCE OF ONE-WIRE CIRCUIT.

current in them than is required for a single wire.

A few examples will make this clear. In Fig. 9 let A and B be two telegraph offices separated by a grounded line of 1,000 ohms resistance. Suppose that a current of 0.07 of an ampere is required to work the instruments. The necessary voltage may be found by multiplying the current by the resistance, or in symbols

$$E = I \times R$$

In this case $E = 0.07 \times 1{,}000 = 70$ volts.

(To be Continued.)

PEOPLE LIVING IN GLASS HOUSES SHOULD NOT THROW STONES.—The publisher of a leading newspaper, who is ever-ready to find fault with the telegraph service if a mistake is made, recently sent a clipping to one of the telegraph superintendents, complaining that the name in a press dispatch covering an obituary notice was spelled incorrectly. The superintendent noticed that through a typographical error the item stated that the victim left a "window and three children." The opportunity was too good to escape the superintendent. He asked the publisher if he did not think the telegraph company should be held responsible for the typographical error, as well as the telegraph error.

Spring Meeting of the Magnetic Club.

The regular spring meeting of the Magnetic Club was held at the Broadway Central Hotel, New York, on the evening of April 15, and, despite the disagreeable weather, there was a large and enthusiastic attendance. An excellent dinner was served and instrumental and vocal music aided to enliven the occasion.

When the dinner was finished, Mr. C. F. Leonard, president of the club, delivered his maiden address as president, and made an excellent impression upon his hearers.

The subject of his address was "Unselfishness." He referred to the long and useful life of the club, due, in his way of thinking, to the fact that its officers, from the beginning down to the present time, had given unselfishly of their time and talents to its interests. He referred to the fact that history gave a larger meed of praise to the unselfish man who had failed to accomplish the things he set out to do, than to the selfish man who had accomplished great results. He appealed to the younger men who were admitted to membership at the meeting to show the same spirit of unselfishness that had characterized the members of the club from the beginning.

Mr. Leonard then introduced Mr. Edward Reynolds, vice-president and general manager of the Postal Telegraph-Cable Company, who was received with long and hearty applause.

Mr. Reynolds stated that he felt complimented at having the privilege of addressing the gathering. It was naturally pleasing to him, as it was to anyone, to receive the commendation of his fellow-workers, particularly of those whom he had known for many years.

"It is a good thing for men in all walks of life to get together," he said, "but I think it is better still for men engaged in the service of the same company to meet together on occasions like this, where it is possible to meet on the same social plane; it gives them a splendid opportunity to become better acquainted. The thought that we can meet here upon the same plane socially prompts me to say that in the service of the Postal Company I can assure you that all enjoy the equality of opportunity also. Any employe of the company, no matter how humble his present place may be, can rise to the highest position in the service; it is for him to be prepared and ready when the call comes to advance. It will require patience and some self-sacrifice, and hard work, but it is possible to go ahead, and I say to you in all earnestness that nothing is required except the ability and readiness to render the character of service that commands recognition. President Mackay," he continued, "has told me time and again of his interest in the welfare of the employes throughout the Postal service. He wishes them to be well treated and surrounded with proper living conditions, and, above all, that there be no favoritism, and that an equal opportunity to advance shall be given to those who render efficient and loyal service.

"It is my personal conviction that the officer who exercises unbusiness-like favoritism in making appointments is likely to suffer for his weakness by reason of the inefficiency in his organization that is bound to result. One of the most common causes for what looks like unfairness in making promotions is the inability of the appointing officer to make himself well acquainted with all the men eligible for a given position. That is one reason why I believe in these Magnetic Club meetings—they afford an opportunity for us to become better acquainted. My one regret is, that they can only reach a limited number of the good men, but I am going to make it my business to visit all the offices throughout the country for the special purpose of becoming acquainted with those who cannot come to us here, and to know them."

In closing his address Mr. Reynolds referred to the vigor of the Magnetic Club after its twenty-five years of existence, and its splendid future, and paid a high compliment to the club's new president, Mr. Leonard.

Mr. J. J. Whalen, manager of the New York operating department of the Postal Telegraph-Cable Company, was the next and last speaker, and was received with a rousing welcome.

He made a plea for increasing the membership of the club and for spreading the good feeling enjoyed at its dinners. "This is the day of the get-together movement," he said, "the time when all large business concerns throughout their systems require and demand the leaders who possess the get-together spirit; leaders who can lead; who can, by the exercise of their good qualities, attract to their support and carry along with them large bodies of workers; leaders who will have the unqualified support of every honest and fair-minded employe under them.

"The leaders selected to secure desired results," he continued, "must first possess a high and strong personal character, those whose word is their bond, who are thoroughly sincere and honest in all their dealings with every person, who stand for and demand for all just and considerate treatment, who take a deep and kindly personal interest in the welfare of every employe, who leave no stone unturned, and will go to extremes, to prevent and to correct a wrong, who treat every one on a merit basis, who reward on a merit basis, and, at the same time, give full and careful consideration to all good work and to all modifying circumstances."

Mr. Whalen closed with a complimentary reference to Mr. Edward Reynolds, whom, he said, possessed all of the characteristics mentioned, and assured that gentleman the hearty co-operation and loyalty of the members.

The evening's festivities were concluded with an excellent vaudeville entertainment.

Forty-one new members were elected at the meeting. Since the first of the year, ninety new members have been admitted.

Each one present received as a souvenir a one-pound box of Huyler's candies.

Those present were:

BALTIMORE, MD.—J. A. Vogt.
BOSTON, MASS.—C. A. Richardson.
BRIDGEPORT, CONN.—S. H. Flint.
BUFFALO, N. Y.—L. J. Reynolds, H. D. Reynolds.
ELMIRA, N. Y.—J. S. McIntire.

HARRISBURG, PA.—C. E. Diehl.
JERSEY CITY, N. J.—A. C. Ackerman, Fred Ackerman, R. J. Post.
NEW BRITAIN, CONN.—C. H. Burr.
NEW LONDON, CONN.—F. Orchard.
NEW YORK—C. C. Adams, J. J. Alcock, J. J. Astegher, A. Auslander, J. M. Barry, F. J. Block, T. F. Boles, W. P. Bowman, T. A. Brennan, E. D. Brewster, C. P. Bruch, W. I. Capen, M. J. Carey, A. H. Clarke, J. F. Cleverdon, C. R. Closson, J. J. Cochrane, M. R. Cockey, S. Cohen, W. Commerce, J. Costello, F. A. Crippi, J. J. Cardona, A. H. Davies, M. M. Davis, J. A. Davison, B. J. Dixler, J. J. Donoghue, T. J. Donovan, T. J. Dunn, W. B. Dunn, A. J. Eaves, J. H. Evans, H. G. Fink, Wm. Finley, A. V. Finn, V. F. Fiore, J. Flood, R. J. Ford, J. J. Fredericks, I. C. Kinkelstein, J. F. Gaynor, J. C. Geigle, M. F. Geigle, R. Gould, E. Hagerty, R. J. Hall, W. S. Hallett, E. Hammond, P. A. Hickey, T. J. Horan, L. R. Hallock, R. Jacobs, W. L. James, A. Kavanagh, W. J. Kavanagh, W. L. Kearney, L. P. Kearsley, F. G. Kernan, F. J. Kernan, E. Kimmey, M. Klepper, A. A. Kramer, J. H. Keesey, J. J. Leahy, A. M. Levenson, C. P. Linder, A. Lockwood, J. E. McCartey, C. J. McCarthy, J. J. McDermott, J. F. McNeill, D. McNicol, J. A. McNulty, D. J. McQuade, H. G. Madden, A. McNeill, H. J. McNamee, P. McInerney, F. E. McKiernan, G. W. McLaughlin, D. A. Mahoney, D. F. Mallen, C. T. Mallette, N. A. Malpas, J. A. Manning, C. W. Many, H. T. Marks, J. P. Mead, W. H. Michener, R. H. Miller, W. J. Mitchell, G. F. Murray, F. F. Norton, C. B. Obst, G. J. O'Brien, J. P. O'Donohue, M. J. O'Leary, L. P. O'Toole, B. Padgug, F. G. Payne, M. Pertka, H. Peters, J. Pinto, F. W. Potts, W. O. Powers, F. Pearce, C. Prettyman, E. Rahtes, D. F. Regan, E. Reynolds, C. R. Robinson, L. O. Rogers, C. Ruffer, J. Russo, E. J. Rankin, M. D. St. John, J. Santalli, W. Scarborough, H. Scharf, E. A. Schoonmaker, W. B. Schreiber, M. Schwartz, C. Shirley, M. L. Schwinger, C. Shakely, J. Shandley, P. R. Shingler, D. Shortall, J. F. Skirrow, W. V. Stahl, H. Stern, W. F. Stirling, D. Sullivan, F. Sullivan, J. M. Sullivan, L. Segol, T. R. Taltavall, R. M. Telshaw, R. Thompson, F. Tiernan, P. J. Tierney, H. H. Trotsky, E. P. Tully, J. H. Twyford, J. T. Tynan, W. VanWyck, J. J. Wallace, A. Walsh, C. Wanamaker, A. J. Ward, C. P. West, J. J. Whalen, H. Wiese, H. E. Wilson, J. P. Williams, W. Wolff, D. M. Whetsel, C. Yacht, F. C. Yanger, H. Zweifel.
NORFOLK, VA.—H. A. Lanier.
PHILADELPHIA, PA.—C. E. Bagley, E. W. Miller, C. F. Myers, J. H. Wilson.
PITTSBURGH, PA.—H. Scrivens.
ROCHESTER, N. Y.—R. J. Little.
SYRACUSE, N. Y.—J. W. Weed.
UTICA, N. Y.—G. F. Lawler
WASHINGTON, D. C.—G. M. Foote.

The Universal Telegraph Alphabet.

BY FREDERICK T. IDDINGS, BALTIMORE, MD.

As an old "Morse" operator who has learned to use and abuse the Continental code the proposal to give up the alphabet of my boyhood and retrograde to slow Continental at once generated in me a counter-electromotive force. Knowing how easily one may jump at conclusions and charge with slowness a code which deserves better treatment, the following method of comparison occurred to me:

The Department of Commerce, Radio Service, International Morse Code and Conventional Signals says:

1. A dash is equal to two dots.
2. The space between parts of the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to five dots.

Figuring upon this basis, the alphabet and three most commonly used punctuation marks, the period, the comma and question mark (omitting the numerals, which are admittedly too long in Continental)—total, Continental, 261 dots; American, 222 dots. This means that an operator sending at the rate of forty-five five-letter words per minute would send the sentence, "The Telegraph and Telephone Age two dollars per year," in twelve seconds. In American Morse this sentence equals 391 dots; in Continental Morse, 431 dots, so the operator would have to crowd forty more units into the twelve seconds, or, if he had reached his limit at 391, it would take him 40/391 of twelve seconds longer. In the latter case, instead of forty-five words per minute he would send but 40.82 per minute.

This would mean that if he had earned for the company $450 dollars per month when using American Morse he would earn but $408.20 when he had become equally expert in the use of Continental Morse.

It has been my understanding that the difficulty experienced by the Old-World operators in translating the spaced letters was caused by their adherence to the old Morse register until the art of sound reading had been developed by the operators of America. If wrong in this I should like to be corrected.

Testing by Shock.

BY J. P. CHURCH, SUPERINTENDENT OF TELEGRAPH, WABASH RAILROAD, DECATUR, ILL.

I was much interested in reading the article by Mr. I. N. Miller in your issue of April 16 on the subject of "Testing by Shock." In the early days, when electrical instruments were scarcer than they are now, we did most of our testing in this manner, and some of the wire chiefs became quite expert in locating different kinds of trouble by the sense of feeling.

While assistant to the chief operator and wire chief in the Toledo, Ohio, office, I had considerable experience in locating faults by feeling, and could generally tell at once the nature of battery trouble in this manner.

I remember one instance after "Vic" Kissinger left the board in Chicago, when we had difficulty in getting Chicago on the quadruplex for several days in succession, I finally cut off our battery and set and felt for the trouble on the Chicago end. I notified the wire chief that there was a loose connection in his tap wire, which he removed, and we had no further trouble at that time. The new man in Chicago wanted to know how I did it, and I told him I was a "ham" meter, and he said, "Oh, but you need a voltmeter for that kind of work."

THE RAILROAD.

MR. L. B. FOLEY'S NEW TITLE.—The title of Mr. L. B. Foley, superintendent of telegraph, Delaware, Lackawanna and Western Railroad, New York, has been changed to "Superintendent of Telegraph, Telephone and Wireless."

MR. JOSEPH J. GRAF, has been appointed telegraph, telephone and wireless engineer of the Delaware, Lackawanna and Western Railroad, with headquarters at Scranton, Pa.

TELEPHONE AND SELECTOR INSTALLATIONS ON THE ERIE.—Telephone supervisor Jos. P. Kreiter and engineers M. F. Baker, F. A. Rooney and H. A. Daake have completed installing Western Electric train-dispatching telephone and selector equipment on the Lima Division of the Erie Railroad, and are now installing Western Electric telephone and Gill selector equipments on the Alleghany and Bradford Divisions, also on the Genesee River Railroad, which they expect to have completed by next fall. When these divisions are completed, practically all the main line divisions of the Erie, except the New York Division, will be so equipped.

Lackawanna's Wireless Telephone Experiments Interrupt Government Messages to Warships.

On April 14, the ships of the Atlantic fleet, on their way to Mexican waters, were unintentionally cut off from all official communication by wireless by the wireless telephone experiments then being conducted from a Lackawanna express train, as it speed across the New Jersey meadows on its way to Buffalo. The official messages to the battleships which were interrupted were being sent from the wireless station at the navy yard in Brooklyn. The wireless waves of the Government's apparatus were confused and blurred by the waves sent out by the wireless telephone apparatus at the Lackawanna Railroad station at Hoboken, which communicated, for the first time, successfully to the Lackawanna Limited, ten miles away.

Superintendent C. J. Phillips, of the Lackawanna Railroad, was called up by telephone by the Brooklyn Navy Yard, and requested to stop sending messages until the wave-length of the Lackawanna wireless system was changed. This Mr. Phillips agreed to do.

In order to avoid interference with the Government wave-length (600 meters), the wireless telephone experiments were transferred from Hoboken to Scranton, Pa., and on April 21 wireless telephone conversation was had between Scranton and Binghamton, a distance of sixty-three miles. The words were very distinct. So far, the telephone experiments have been between fixed stations, and, by making slight changes in the installation, another wave-length will be used and interference thus avoided.

Mr. L. B. Foley, superintendent of telegraph, telephone and wireless of the Lackawanna, who was in charge of the experiments, stated that it would be an easy matter to alter the equipment so as to avoid interference with the Government wave-length. The train antennæ would have to be changed also. He expects to soon be able to converse by wireless over a distance of 100 miles.

The New Orleans Convention of Railway Telegraph Superintendents.

As announced in our issue dated April 16, the headquarters of the thirty-third annual meeting of the Association of Railway Telegraph Superintendents, which will be held in New Orleans, La., May 19 to 22, inclusive, will be at the Grunewald Hotel.

The minimum rates for rooms at this hotel, per day, are as follows: In the annex (new building), single room with bath $3.00 for one person, $4.00 for two, without bath $1.50 for one, $2.50 for two; double rooms with bath $4.00 for one, $5.00 for two, without bath $2.00 for one, $3.00 for two. Rooms, suites of two or more, rates on application. In the main (old) building, single rooms with bath $2.00 for one, $3.00 for two, without bath $1.00 for one, $2.00 for two; double rooms with bath $3.00 for one, $4.00 for two, without bath $1.50 for one, $2.50 for two. Two rooms communicating, bath connected with one party of four, $6.00.

An informal get-together assembly will be held Monday, 8:30 p. m., May 18.

The first business session will be called at 10 a. m., Tuesday, May 19.

Members are requested to bring their advance copies of the papers to the meeting and be prepared to discuss them without formal reading.

Mr. P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railroad, 112 West Adams street, Chicago, is secretary of the Association.

Full Use of Wires.

(*Continued from page 242, April 16.*)

Mr. F. G. Sherman, Central Railroad of New Jersey, Jersey City, N. J.: "We are using one duplex telegraph circuit between New York and Philadelphia, one phonoplex circuit between Jersey City and Mauch Chunk, Pa., and one phantom telephone circuit. We expect to use, as soon as we have our lines finished, a phantom circuit from New York to Easton, and, probably, to Allentown and Mauch Chunk, Pa., in addition."

Mr. W. M. Hayes, Pere Marquette, Detroit, Mich.: "The Pere Marquette Railroad has 669 miles of telephone dispatching circuits in operation, of which 560 miles are copper wire, the remainder being iron. We expect to install telephones on the lines from Saginaw to Bad Axe, sixty-seven miles, and from Saginaw to Port Huron, ninety miles, this summer, using for that purpose the present iron wire circuits between those points. Our copper circuits now extend as follows: Detroit-Grand Rapids, 153 miles. On this circuit we are operating a common Morse simplex. We have a quadruplex set working on No. 8 iron wire from Detroit to Grand Rapids, with half-set repeaters on the polar side working through from Detroit to Petoskey, a distance of 380 miles. From Detroit to Grand Rapids this is used on the common

side. We have a duplex circuit working from Detroit to Grand Rapids, with half-set repeaters at Grand Rapids, through which this circuit works to Chicago, also intermediate offices between Grand Rapids and Chicago, a distance of 332 miles. A copper circuit from Grand Rapids, Mich., to Porter, Ind., 137 miles. This circuit is not simplexed, as we do not require any additional telegraphing facilities between the points named. A telephone circuit, Waverly to Allegan, twenty-two miles, No. 9 iron wire, grounded circuit, working through a repeater coil at Waverly, with the dispatcher at Grand Rapids. Composite telephone circuit, No. 9 iron wire, Boardman to Rapid City, Mich., twenty-two miles, with four telephones in service. A copper circuit, Saginaw to Toledo, 138 miles, simplex from Saginaw to Detroit, via Plymouth, working from Plymouth to Detroit over simplex on iron telephone circuit, the latter circuit being twenty-four miles long. Copper circuit from Saginaw to Ludington, 137 miles, repeating via Walhalla to Manistee, a further distance of twenty-seven miles, the circuit from Walhalla to Manistee being No. 8 iron. The latter circuit from Walhalla to Manistee is simplexed. The main line circuit from Saginaw to Ludington is not simplexed, as we do not require an additional telegraph circuit between those points. We have a grounded telephone circuit of No. 8 iron wire in operation on the Harrison branch from Clare to Harrison, Mich., seventeen miles, repeating through a coil at Clare to the dispatcher at Saginaw. A telephone circuit on the Mount Pleasant branch from Coleman to Mount Pleasant, fifteen miles, No. 8 iron wire, simplexed to form one side of Western Union loop from Coleman to Mount Pleasant. This circuit works direct with the dispatcher at Saginaw through a coil at Coleman. A composite circuit composed of two local No. 8 telegraph wires from Saginaw to Port Huron, ninety miles, seventeen intermediate telegraph offices. This composite circuit carries three intermediate telephones, in addition to telephones at Saginaw and Port Huron, and the freight trains operating on this line are equipped with wall telephones and extension poles. Our passenger trains operating between Detroit and Grand Rapids and Grand Rapids and Chicago, are all equipped with portable telephone sets, including line poles of the Western Electric standard, and all of the principal passing tracks between Toledo and Ludington, and between Detroit and Porter, Ind., are provided with telephone booths connected with the dispatchers' circuit. We are also placing on the outside of many of our stations, box telephones connected with our telephone dispatching circuits. This is on the main lines, between Detroit and Porter, and between Toledo and Ludington."

(*To be Continued.*)

What Books Say on Various Subjects.

SELF-INDUCTION.

Wherever a current exists there is a magnetic field. This field is the result of the current, and in coming into existence it cuts through the current-conveying conductors to which it owes its origin. Now, wherever a magnetic field cuts a conductor, or vice versa, an e.m.f. is generated. The current does not instantly attain its full value, since its rise is opposed by the e.m.f. generated by the lines of force cutting through the conductors This opposing e.m.f. is termed the "back e.m.f." of self-induction. If, now, the coil and battery are short-circuited a current will flow through the circuit in the same direction as the original battery current. This is caused by the collapse of the lines of force which, in so doing, cut through the conductors in the opposite direction.—*Telegraphy.* By T. E. Herbert. ($3.00).

WAVE-LENGTHS.

Two wave-lengths, one of 600 and the other of 300 meters, are allowed for general public correspondence. Every coast station open to this service must be equipped in such way as to be able to use these two wave-lengths, one of which will be indicated as the normal wave-length of the station. A coast station is sometimes authorized to use a wave-length not exceeding 600 or else exceeding 1600 meters for communication of a special kind.

Stations used exclusively for the dispatch of signals intended to determine the position of ships must not use wave-lengths exceeding 150 meters. Every ship station must be equipped in such a way as to be able to use the 600 and 300 meter wave-lengths, the 600 meter being the normal wave-length, and which may not be exceeded in transmission.—*Wireless Telegraphy.* By W. H. Marchant. ($1.60).

New York Telegraphers' Aid Society.

Following is the statement of the New York Telegraphers' Aid Society for the year ending March 6:

Balance on hand, March 6, 1913.....		$26,881.27
Receipts:		
From Dues $5,524.50		
" Initiation Fees 66.00		
" Interest 1,261.74		$ 6,852.24
Total		$33,733.51
Disbursements:		
Sick Benefits $5,031.92		
Death " 2,000.00		
Expenses 750.05		$ 7,781.97
Balance on hand, March 6, 1914.....		25,951.54
Total		$33,733.51

RELIEF FUND.

Balance on hand, March 6, 1913.....	$ 6,360.02
Receipts	1,210.05
Total	$ 7,570.07
Disbursements	1,082.40
Balance on hand, March 6, 1914.....	6,487.67
Total	$ 7,570.07

Dictaphone in Railroad Operation.*

BY G. O. PERKINS, SUPERINTENDENT TELEGRAPH, CHICAGO GREAT WESTERN RAILROAD.

The Great Western made a bit of history the other day when a new device for automatically conveying information regarding train movements to the dispatcher was given its first test, and, it may be added, a completely successful test.

The experiment was no less than the application to railroad operation of the famous dictaphone, hitherto used chiefly in detective work.

By means of an electrically operated switch, controlled by the station selector, the dispatcher can connect the dictaphone to this telephone circuit at will, and as readily disconnect it.

[This device is advertised in another column by the Railway Electric Manufacturing Company, Chicago.]

So perfectly does the device work that the dispatcher at St. Paul, fifty-seven miles from Nerstrand, can hear a locomotive whistle half a mile from the station, hear the exhaust of the engine, the ringing of the engine bell, the roar of the train as it passes the station, as distinctly as though he were at Nerstrand.

In fact, much fainter sounds are transmitted perfectly the entire length of the 180-mile circuit. The noise of a farm wagon crossing the track nearly a block from Nerstrand station was plainly recognizable, as were the twittering of birds, the ringing of the distant school bell, roosters crowing, etc. Conversations in an ordinary tone of voice held by persons standing on the station platform are conveyed as distinctly as though the speakers were talking into the transmitter of the operator's telephone.

Nerstrand has no night operator. It is situated at the top of a long, steep hill, where freight trains sometimes get stalled and have to double. It is important that the dispatcher know how trains on the hill are doing, and whether or not they are doubling, in order to figure on meeting points for opposing trains.

The dictaphone gives him this information with absolute accuracy.

Jake Stresser, the agent at Nerstrand, found this out the first day the trap was put in. Although Jake was on duty, the dispatcher cut the dictaphone in when No. 46 was due, just to see how it worked. He heard the train pull in and stop at the milk stand; he heard the loading of the cans and the railroad language used by the brakeman in hastening the process. Finally he heard the conductor cry, "All Aboard," and heard the train pull out.

A little later Jake came to the telephone and said, "O. S. Nerstrand No. 46 arrived 7:22, departed 7:23." "Jake, what are you giving me?" responded the dispatcher. "That train pulled in at 7:20 and out at 7:25."

Jake thought a moment. "I guess you're right," said he.

The only ciriticism of the invention that has reached me was made by Superintendent Causey. While he was listening at St. Paul to hear a freight train come up the hill a flock of sparrows were chirping around the station, and I asked him if he could hear them. "Yes," he replied, "but what I want is a dictaphone that will make a noise like a chicken."

*Great Western Employes Magazine.

Automatic Telephone System in Michigan Central's New Detroit Terminal.

The Michigan Central Railroad has installed a complete set of intercommunicating telephones in its new passenger terminal and yards in Detroit, Mich., and the yard across the river in Windsor, Ont. The board is arranged to handle all local calls in the terminal building proper, in yards and terminals in Detroit, extending down to the old terminal station and freight house about two miles, and from six to twelve telephones will be located in the Windsor yards and towers, three or four miles from the main board.

It was found that, due to the length of lines and the number of yard telephones now on party lines, the best board for this particular plant was what is known as a six-party, code-ringing reverting call system.

The number of telephones originally ordered was 225. These were placed on 125 lines. In the yards nearly all lines have three or four telephones on them, and many of the telephones in the offices are equipped with extensions, to allow the chief clerk to answer all calls and handle all business for the officer whom he serves, except that which requires personal attention. The reason for using a party line system is to avoid excessive line construction through the yards.

The board is located in the telegraph office, and the maintenance, therefore, will be directly under the supervision of the wire chief. It is equipped with alarm fuses and an automatic alarm, both visual and audible, for most of the troubles that can occur in the apparatus. There are a number of these boards in operation completely isolated from all supervision, which are inspected only occasionally eighty per cent of the time. It is found that the only thing really needed nine-tenths of the time is to see that the battery is in proper condition, the lines intact and the board kept clean.

The saving effected by this installation is estimated about as follows:

Saving in operators' expense, about	$2,500 per year
Saving in rentals on telephones required for local work (approx.)	1,000 per year

While it is not easy to reduce the saving in time of employes to exact dollars and cents, it is estimated that this will approximate one week per year, per telephone in use, assuming that the saving on each call averages eighteen seconds. A saving of eighteen seconds in railroad operation may mean hundreds or even thousands of dollars saved or earned. If such a saving has to do with the movement of trains, it will always mean not alone the saving of the time of the man using the telephone, but also the saving of cost in operation.—*Railroad Gazette.*

MUNICIPAL ELECTRICIANS.

FIRE-ALARM FOR PANAMA-PACIFIC EXPOSITION.—The Aero Fire-Alarm Company, Seattle, Wash., has been awarded the contract for the installation of automatic fire-alarm systems in the buildings of the Panama-Pacific International Exposition, San Francisco, at a cost of about $100,000.

TELEPHONE FIRE-ALARMS IN ATLANTA.—The telephone number of the fire department of Atlanta, Ga., has been abolished. When the fire department is wanted, "Fire department" is called for instead. Instead of separate telephones in the chief's office, headquarters and each of the fire stations, the fire department now has a branch exchange, and these branch exchanges have numbers, but the fire department exchange has no number whatever. There is an operator on duty on the fire department exchange day and night.

Line Construction.

The severe blizzard of last March, which caused so much damage to telegraph and telephone lines in the Middle Atlantic States, has led line builders to give unusual attention to the problem of constructing more durable lines. All recognize the fact that stronger construction is highly desirable, but it seems that any structure that man can erect is not proof against nature's forces.

The telegraph and telephone lines along the Canadian Pacific Railway are excellent examples of modern construction, and what Mr. W. J. Camp, assistant manager of the Canadian Pacific Railway's telegraph, Montreal, Que., has to say with regard to that company's practice in line building will be read with interest. Mr. Camp says:

"We try to keep up with what we think are the best methods followed by other companies. For twenty-four wires, we consider forty poles per mile ample, provided these poles are put five feet in the ground and of good, strong cedar, well guyed on all curves, both head guyed and side guyed, every half mile on straight line. Where there is boggy ground, or other defects, the construction of the line to be increased accordingly. Up to twenty-four wires we consider that six-pin arms should be used, as we are able to give a greater separation between the individual wires and have a much stronger structure than if eight-pin or ten-pin arms are used. Of course on lines with more than twenty-four wires it becomes necessary to use longer arms, so as to avoid increasing the height of the poles.

"Our standard insulators are white porcelain, although, sometimes, owing to delay in obtaining material, we are compelled to use glass. We find that porcelain insulators are much more durable than glass and also provide a higher insulation. In building new lines, we usually put up two No. 8 gauge iron wires first, then follow with additional wires of 210-pound copper. Our experience with lighter wire than 210-pound copper has been that it is mechanically defective."

Mr. W. Salisbury, district plant superintendent, Western Union Telegraph Company, Omaha, Neb., writes:

"We recently passed through an experience of sleet in Kansas and Nebraska which prostrated the lines of the telegraph and telephone companies to a large extent. I have noticed that the wires which were tied on the south side of the glass insulators suffered much more than those tied on the north side, owing to the fact that the weight of the wire, which was coated with from one-half to three-quarters of an inch of ice, coupled with the severe wind from the north, had a great tendency to either break or pull off the tie wire."

The importance of observation and attention to apparently small matters is strongly emphasized in this statement, and it shows, in addition, the great value of experience. It was only through this experience that it was learned that it makes a great difference whether a wire is tied to the north side or the south side of an insulator, and the reason for it, as suggested by Mr. Salisbury, is a very natural one. The local conditions, of course, have an important bearing in matters of this kind, and have to be considered.

LETTER-TELEGRAMS IN AUSTRALIA.—The Australian Government has introduced letter-telegram service, at the rate of one shilling (about twenty-five cents) for forty words. In America fifty-word letter-telegrams are sent for twenty-five cents. The Australian telegraphs are owned by the government.

A subscription to TELEGRAPH AND TELEPHONE AGE is an excellent investment for every progressive telegrapher.

GOLD AND STOCK LIFE INSURANCE ASSOCIATION.—The printed proceedings of the thirty-sixth annual meeting of the Gold and Stock Life Insurance Association, which took place in New York, on January 19, have been issued. The pamphlet includes the reports of president Gardner Irving, secretary W. J. Dealy, treasurer L. Dresdner and of the auditing committee, and other matters of interest to the members.

T. AND T. L. I. ASSESSMENTS.—Assessments Nos. 566 and 567 have been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of R. A. E. Taylor, at Canso, N. S.; C. E. Wineland, at Kansas City, Mo.; E. A. Hamilton, at Utica, N. Y.; Mrs. Agnes Drohan, at St. Louis, Mo.; C. E. Bliss, at Bangor, Me.; C. G. Andrews, at Cleveland, Ohio; E. W. Crew, at Washington, D. C.; G. W. Naile, at Omaha, Neb.; J. P. McClure, at St. Louis, Mo.; W. F. Jones, at Philadelphia, Pa.; H. Cordes, at Millerton, Pa.; T. J. Lawrence, at Mattapan, Mass.; H. S. Converse, at Easton, Cal.; W. S. Burleigh, at Philadelphia, Pa.; R. B. Dungan, at Indianapolis, Ind.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION

Mr. John Rathbone, identified with the operating department, 195 Broadway, New York, for over thirty years, and who was retired from the position of southern traffic chief a year ago, will act as agent for TELEGRAPH AND TELEPHONE AGE, covering all the offices in New York City and vicinity. Mr. Rathbone at once time acted as agent for this publication, and those who then had dealings with him in the purchase of books and subscribing for the paper, will remember the courteous treatment received at his hands.

Mr. John A. Dreams, a well-known telegrapher of this office, has published a song entitled, "I Kissed Her in My Dreams," set to music by C. A. Egener. The publisher is the John T. Hall Music Publishing Company. Mr. Dreams is an author of ability.

W. B. Wood, aged seventy-four years, a former operator of this office, died at West Nutley, N. J., on April 23. Mr. Wood was retired about a year ago. After the battle of Fredericksburg, Va., he was transferred to the signal and telegraph corps, where he remained until the close of the rebellion.

PHILADELPHIA POSTAL.

The annual ball of the Electrical Aid Society of Philadelphia was held Thursday evening, April 16, at Mercantile Hall, Broad street. As usual, it was a social and financial success.

Mr. S. L. Dickson, chief operator, Baltimore, Md., was a recent visitor at this office.

Night wire chief F. K. Holtzinger has become an auto expert. He drives an Oakland car.

Telegraph and Telephone Age

No. 10. NEW YORK, MAY 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Action of Current on Reinforced Concrete.

A member of one of our electrical classes writes as follows:

To settle an argument between two students will you please state whether the stray currents which sometimes pass through reinforced concrete blocks cause damage to the iron or to the concrete itself. My friend A claims it is the metal that is attacked, while B insists the harm is confined to the concrete.

In reply we will say that both contentions are true under certain conditions, but as current invariably tends to create a change in the condition of one or the other of those two substances when they are in close union, the best way to ascertain the facts is to observe what always happens wherever electrolytic action is concerned.

The damage usually done to reinforced concrete blocks generally manifests itself in one of two principal ways; the concrete either cracks open, or it loses its hold on the metal and thus destroys the bond. One of these effects is caused by a current of electricity flowing from the metal into the concrete and the other by a current through the concrete into the metal.

Our correspondent will readily understand why such is the case by observing what takes place in an ordinary cell of gravity battery.

It will be noticed that in time the copper plate will have increased greatly both in size and weight, due to the metallic copper deposited thereon from the blue solution, while the zinc plate will have been partially eaten away. Furthermore, a soft, spongy deposit of zinc sulphate will have formed around the zinc plate. A thermometer will show that the temperature of the conducting liquid in the jar is increased whenever the current flows.

If we now consider the iron in the concrete block as occupying the position of one electrode in the path of a stray current we will see that both metal and concrete will naturally tend to show similar phenomena, and, therefore, be capable of causing the damage referred to. This fact was recently demonstrated by the United States Bureau of Standards, which made an exhaustive test of the effect of current flowing through reinforced concrete during a period of several months.

It was conclusively shown that when a current passes from the iron into moist concrete the metal tends to oxidize, and being insoluable, surrounds and gradually enlarges the diameter of the embedded metal, thus causing such a pressure against the cement that the latter cracks. However, damage of this kind does not often occur, as it requires a high voltage to accomplish this result. None of the blocks cracked where the voltage was kept down to sixty or less per linear foot through the concrete.

Non-corrodable metals never cause cracking, and even iron itself shows but very little corrosion when the temperature is below 45 degrees centigrade, hence the heating effect of a high voltage current is necessary to drive out the moisture, and by thus hardening the cement, increases the resistance opposing the metal's expansion.

On the contrary, when a stray current flows from the concrete into the iron, sodium and potassium gradually concentrate around the surface of the metal, and in time, form a strong alkali, which attacks the concrete. This action causes the latter to release its hold on the metal, consequently the bond is destroyed.

Unlike the former experiment, however, high voltages are not required to cause softening of the cement. The effect is the same, regardless of pressure, except, of course, in degree. For this reason the latter damage represents the most common defects due to the electrolytic action of stray currents traversing reinforced blocks.

As a matter of fact the danger caused by electrolysis is probably greatly overestimated. In actual practice it is seldom found, except along sea shores and salt water courses. Moist blocks containing a solution of saline matter offer a comparatively low electrical resistance, thereby allowing a greater volume of current to flow; consequently, the danger is greater and quick action follows in such localities.

Stray currents have no harmful effect whatever on non-reinforced concrete.

PERSONAL.

SENATOR W. L. IVES, of New York, is making an extended vacation trip in the interior of the State where he is well known.

MR. J. E. WRIGHT, an old-time telegrapher and inventor of the Wright Printing Telegraph System, Swissvale, Pa., was a New York business visitor this week.

MR. J. N. JOHNSON, of Albuquerque, New Mexico, an old-time telegrapher, but who for several years past has devoted his entire time to his inventions, was in New York for a few hours last week on a business trip.

MR. ANDREW CARNEGIE recently made his debut as an actor for motion pictures, and so successful was he that an Edison player was led to remark that "it was a pity that Mr. Carnegie had given his attention to steel and libraries, as the stage thereby lost a great actor."

COLONEL WILLIAM BENDER WILSON, Holmesburg, Pa., president of the Society of the United States Military Telegraph Corps, and a veteran of the Pennsylvania Railroad service, gives, in the *Railroad Employee*, Pittsburgh, Pa., an interesting account of the operation of the old Public Works railroads of Pennsylvania, which were under the control of the government of the State in the early fifties. Colonel Wilson's description of the way the politicians got after this system of transportation and used it for their personal and selfish purposes reads like a romance, and forms a strong argument against the proposition of government ownership of railroads.

Telegraph and Telephone Patents.

ISSUED APRIL 21.

1,093,702. Relay. To I. Kitsee, Philadelphia, Pa.

1,093,794. Telephone Signal System. To J. Meyerhoff, Chicago, Ill.

1,093,803. Combined Telephone-mouthpiece Guard and Advertising Device. To G. Ross, Chicago, Ill.

1,093,951. Case and Cap for Telephone Receivers. To L. Steinberger, Brooklyn, N. Y.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, May 12:

American Telephone and Telegraph Co.	122⅝
Mackay Companies	79
Mackay Companies, preferred	68½
Marconi Wireless Tel. Co. of Am.	3⅝
Western Union Telegraph Co.	61½

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, on May 11 returned from an inspection trip through the south. Superintendent C. H. Ashburn joined Mr. Reynolds on his way south and they visited all the principal offices in North Carolina, and were joined by Superintendent Ribble at Augusta. Mr. Reynolds, after visiting Atlanta, New Orleans and Birmingham, returned home by way of Louisville, Cincinnati and Pittsburgh. Associate Electrical Engineer J. F. Skirrow joined the general manager at Atlanta and accompanied him on the rest of his trip.

MR. W. I. CAPEN, vice-president, New York, has returned from an inspection trip through the middle west.

MR. THEO. L. CUYLER, JR., formerly assistant treasurer of this company, accompanied by Mrs. Cuyler, returned from a trip to the Mediterranean on the steamer "Caronia," May 11.

MR. J. F. SKIRROW, associate electrical engineer, New York, has returned from a three-weeks' trip through the middle west and south.

MESSRS. J. F. HEARD, division electrical engineer; B. S. Price, superintendent of construction of the southern division, Atlanta, Ga.; C. M. Baker, division general superintendent of plant, Chicago, and M. C. Welch, of Atlanta, district foreman, recently visited Augusta, Ga., in connection with the right-of-way case pending in court between this company and the Georgia Railroad.

MR. A. F. JOYNER, was recently appointed manager at Ocala, Fla., and not W. L. Lamar, as was erroneously reported in our May 1 issue.

NEW GRAND RAPIDS OFFICE.—This company will move into new quarters in Grand Rapids, Mich., about July 1.

A MOTOR GENERATOR has been installed in the Port Arthur, Tex., office of the Mackay Telegraph and Cable Company. Mrs. L. M. Blackwell is the manager.

POSTAL FOREMAN KNEW HIS BUSINESS.—The recent storms in New Jersey, carrying down all telegraph and telephone poles and wires, brought the usual troubles with a few cantankerous property owners who saw an opportunity to attempt to hold up the companies in replacing the poles, says the *Postal Telegraph*. One instance occurred at Burlington, N. J., where a man named John McLaughlin drove the Postal lineman away with a shotgun when they attempted to restore four poles on the highway in front of his property. He demanded $35. Thereupon foreman Gorsuch, of the Postal company, promptly swore out a warrant and had McLaughlin arrested and put under $500 bail to keep the peace. This was enough for McLaughlin, and he allowed the poles to be restored.

RIGHT-OF-WAY CASE SETTLED.—As a result of the trial of the right-of-way case of the Louisville & Nashville Railroad Company et. al., *vs.* the Postal Telegraph-Cable Company, and vice versa, the jury in the superior court at Augusta, Ga., on April 28 rendered a verdict for both, settling the difference by the payment on the part of the Postal Telegraph-Cable Company of the amount of $50 to the Georgia Railroad & Banking Company; and the amount of $10 jointly to the Louisville & Nashville Railroad Company and the Atlantic Coast Line Railroad Company, lessees, together with interest at 7 per cent per annum from August 16, 1911.

Mr. Newcomb Carlton, President Western Union Telegraph Company.

Mr. Newcomb Carlton, president of the Western Union Telegraph Company, whose election to that office on April 15 was announced in our issue dated April 16, comes well fitted by long training and experience to occupy that important position. He is not an operator and did not have any telegraphic experience prior to his entry into the Western Union service in 1910, but his engineering education and broad experience in large business affairs naturally fits him for the position.

Mr. Carlton was born in Elizabeth, N. J., February 19, 1869. His technical education was received

MR. NEWCOMB CARLTON, PRESIDENT WESTERN UNION TELEGRAPH COMPANY

at the Stevens Institute of Technology, Hoboken, N. J., from which institution he was graduated in 1890 with the degree of mechanical engineer. He practiced his profession in Buffalo, N. Y., between 1891 and 1899, and from the latter year until 1902 he was director of works of the Pan American Exposition. In 1902 he became the executive officer of the Bell Telephone Company of Buffalo and filled that office until 1904, when he was appointed vice-president of the Westinghouse Electric Manufacturing Company, and located in New York. In 1906 he was made managing director of the British Westinghouse Electric and Manufacturing Company, with headquarters in London. He remained abroad until the end of 1910. He was elected a vice-president of the Western Union Telegraph Company in December, 1910. On April 15 of this year he was elected president. Besides being president of the Western Union Telegraph Company, Mr. Carlton is president of the American District Telegraph Company of New Jersey, and is a director of the Great North Western Telegraph Company of Canada, and of the Liberty National Bank of New York. He is a member of the Century, New York Yacht Club and the Piping Rock Club.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. J. C. WILLEVER, United States Manager, Cable System, New York accompanied by Mrs. Willever, arrived from Europe on the steamer "Imperator" on May 9.

MR. W. A. SAWYER, district commercial superintendent, New York, in the evening of April 29, gave a lecture before the Butler Business School, New Haven, Conn., his subject being the "Story of the Telegraph." Several managers of Connecticut offices were present. The lecture, which was illustrated, described the progress of the telegraph from the earliest days to the present time.

MR. S. B. HAIG, division traffic superintendent, New York, has returned from Washington, where he spent some time in connection with traffic matters as affected by the Mexican troubles.

EX-JUDGE J. F. DILLON, aged eighty-three years, consulting counsel of this company, and one of the highest legal authorities in the United States, died on May 5. Judge Dillon studied medicine in his early career and received his degree as M. D., but gave up that profession for that of law, in which he became eminently successful.

MR. G. C. WARDELL, manager of the Bridgeport, Conn., office, has been transferred to a position in the office of Superintendent W. A. Sawyer, at New York.

MR. JOHN W. MCMAHON, the new manager of the Bridgeport, Conn., office, was in the United States military service during the Spanish-American war. He was attached to General Funston's staff as a signal corps operator when the General captured Aguinaldo, the leader of the Philippines insurrection. Mr. McMahon is a native of New Orleans, La., where he was born in 1879.

MR. G. V. REEVES has been appointed night manager of this company's office at Houston, Tex. Mr. Reeves is a young man and is thoroughly acquainted with the telegraph business.

MISS BERTHA SMITH, formerly cashier at Fort Wayne, Ind., has been appointed manager of the Mishawaka, Ind., office. Mr. J. E. Riley succeeds Miss Smith as cashier at Fort Wayne. Mr. John H. Adams has been appointed manager at Wabash, Ind., vice Mr. W. E. Chandler, transferred to a similar position at Kokomo, Ind., to succeed M. H. Hutton, deceased.

VAIL RESOLUTIONS ENGROSSED.—The resolutions passed by the Board of Directors of this company on the retirement of Mr. Theo. N. Vail as president have been beautifully engrossed on vellum and bound in morocco for presentation to Mr. Vail. The work is highly artistic in execution and handsomely illuminated. Mr. Vail's monogram, cut out in gold, is affixed to the front cover.

G. W. LOGAN, aged sixty-seven years, for thirty-three years bookkeeper for the tariff and check bureau of this company, died in Brooklyn, N. Y., May 1. He was a member of the Brooklyn Board of Education some years ago and was prominent in Sunday School work. Mr. Logan was at one time identified with the Atlantic and Pacific Telegraph Company. He was a member of all the telegraph beneficial and social organizations.

INDEPENDENT OFFICES OPENED.—This company has opened independent offices at Troy and Saratoga, N. Y., and South Orange and Summit, N. J., in pursuance of the plan of separation of the interests of this company and those of the American Telephone and Telegraph Company. Independent offices are being opened at other places as rapidly as arrangements can be made. An independent office has been established at Indiana Harbor, Ind., with Mr. Virgil Johnson as manager.

Mr. J. D. McLelland, Manager Western Union Telegraph Company, Houston, Tex.

Mr. J. D. McLelland, manager of the Western Union Telegraph Company, at Houston, Tex., is well known throughout the south and southwest. He was born in Georgia which state gave to the Union the illustrious Henry W. Grady, whose silver tongue did so much to bring about peace and harmony between the North and South after the war of 1861.

Mr. McLelland has been a resident of Houston since 1901, coming as night chief operator for the

J. D. MCLELLAND, MANAGER, HOUSTON, TEX.

Postal Telegraph and Cable Company of Texas. Later he was appointed chief operator and has served very successfully as manager of the same company since 1908.

Mr. McLelland has worked in all departments of the telegraph business and has made a thorough study of each so that to-day he is one of the most thorough telegraph men in the service. He is a progressive, public-spirited citizen in every sense of the word, and the business men of Houston hold him in high regard.

Mr. McLelland is a thirty-second degree Mason and a Shriner, and is also identified with other business and social organizations of Houston.

Mr. L. R. Scholl, Manager, Western Union Telegraph Company, Cincinnati, Ohio.

Mr. Lloyd R. Scholl, who was recently appointed manager at Cincinnati, Ohio, was born at Chillicothe, Ohio, December 1, 1874, and entered the telegraph service in his native town as messenger during the year of the Johnstown, Pa., flood. He has filled positions as operator and chief operator for the Western Union Telegraph Company, and at newspaper offices. He became assistant manager at Cincinnati, and was afterwards appointed commercial agent for the seventh district. Mr. Scholl was manager at Columbus, Ohio, at the time of his appointment to the managership at Cincinnati.

Meeting of Western Union Commercial Managers.

On Saturday evening, May 2, the second social gathering of the district commercial managers, and managers of the Western Union Telegraph Company of New York, was held at the Carlos Cafe, Twenty-fourth street and Broadway, and a very pleasant evening was spent. Mr. P. J. Casey was, as usual, a most entertaining and able chairman, but the feature of the evening was a descriptive talk on Mexico and Mexican conditions by Mr. P. J. Tierney, of the Central Cable Office. District commercial managers Veitch, Hull, Pierce, Lister and others made suitable addresses relative to business conditions and connections, and it was pointed out that co-operation was the true watchword to success.

It was decided to arrange a summer outing, to which the lady folk are to be invited, and a committee was appointed to make these arrangements.

Among those present were Messrs. P. J. Casey, P. J. Tierney, A. Lister, John Veitch, A. Simon, P. J. Sullivan, C. B. McCann, J. S. Bradbury, F. Bollman, C. A. Harvey, T. Lebuff, M. E. Pierce, J. J. Riley, F. Nilan, J. N. Weisiger, B. F. Benson, G. W. Fascher, J. H. Fleming, W. A. Schudt, Frank Spree, J. T. Carberry, E. G. Hohenstein, G. L. Reilly, A. D. Shaw, T. F. Hull, M. J. Brooks, P. Kinman, A. Disney, M. M. Green.

A vote of thanks was tendered to Mr. P. J. Casey as chairman and Mr. P. J. Tierney as orator.

Atlanta Western Union "Get-Together" Dinner.

The annual "get-together" dinner of the Western Union employes in Atlanta, Ga., was held in the ball room of the Ansley Hotel on April 18. The hall was beautifully decorated for the occasion with American flags and foliage. All the Western Union employes who could be spared from their duties were present to the number of two hundred.

Mr. B. F. Ragsdale, chief operator, made a genial toastmaster, but his duties were slight, however, for outside of two short talks by general manager H. C. Worthen and Dr. Gentry, the Western

Union attending physician, the meeting was of the speechless variety. A Victrola played popular airs during the course of the dinner.

Mr. Worthen, in his informal talk, complimented the local forces on their part in the splendid showing that Atlanta and the Southern Division was making, and assured them of the company's deep appreciation of the spirit of loyalty and wholehearted zeal that was being manifested by all. Mr. Worthen commented briefly upon the separation of the Western Union and the American Telephone and Telegraph Companies, and paid a tribute to the newly elected president, Mr. Newcomb Carlton. In closing, Mr. Worthen declared "open house" and expressed the hope that every employe would shortly learn the way to his office and would unhesitatingly use it.

After Mr. Worthen's talk, Mr. Ragsdale called upon Dr. Gentry to explain the plan for having a visiting physician. This Dr. Gentry did, stating that the purpose of the visits was "to keep the well well, and make the sick well."

At the conclusion of the addresses, Mr. Ragsdale rapped for order, and the famous Western Union minstrels, who had achieved an enviable success in their previous performance, ushered in the entertainment of the evening, with "Way Down Upon the Suwanee River." The minstrels, dressed in their negro messenger costumes, kept the audience entertained for over an hour with their songs, gags and dances.

The all-star cast, which would do credit to an A1 G. Field's show, was under the able direction of Vincent Hurley, of the auditor's office. Mr. Boochever, of Mr. Edward's office, was interlocutor, and the rest of the show was centered about Hugh Connelly of the auditor's office, and Dave Foster, of the operating room as end men, Ernest Reynolds and Norman Wrigley, as bones. A novel feature of the show was some fancy buck and wing dancing by C. Vandevender, of the operating room, accompanied on the harmonica by "Buster" Trussell, of Mr. Edward's office. Mr. "Al. G." Fletcher, of the operating room, proved the hit of the evening with his tuneful baritone solos.

The committee, through whose efforts the successful evening was attained, was composed of the following: Mr. F. R. Veale, division cable manager, chairman; B. F. Ragsdale, chief operator; W. G. Peebles, manager; W. O. Ballard, of the office of Mr. L. H. Beck, division plant superintendent; C. T. Taylor, chief clerk to the district plant superintendent; V. J. Hurley, of the office of Mr. J. J. Hoefman, division auditor; F. M. Gillespie, division traffic engineer, and J. T. Warner, chief clerk to district commercial superintendent J. E. Scofield.

TELEGRAPH CONFERENCE.—An international conference of telegraph engineers is to be held in Berne, Switzerland, from September 14 to September 20. Among the subjects to be discussed are: "The Prospects of Telephony over Longer Distances," "The Protection of Telegraph and Telephone Wires from other Electrical Conductors" and "How Far Automatic Apparatus in Telephone Exchange Working is Desirable."

Resolutions from Western Union Employes to Mr. Theo. N. Vail.

At a special meeting of the Board of Directors of the Morse Electric Club, held in New York on May 1, resolutions were passed on behalf of the employes of the Western Union Telegraph Company throughout the country, expressing their appreciation of what Mr. Theo. N. Vail had done for them while he was president. The resolutions are as follows:

A MESSAGE
FROM THE EMPLOYES OF THE WESTERN UNION TELEGRAPH COMPANY TO MR. THEO. N. VAIL.

"It is most difficult for thousands of men and women, scattered over the vast territory of a nation-wide organization, and without opportunity to assemble together for the purpose, to give single voice to a sentiment which animates them in common. With this difficulty the employes of The Western Union Telegraph Company throughout the country find themselves confronted at this time, when on the retirement of Mr. Theodore N. Vail from the presidency of the company and from active participation in the guidance of its affairs, it is their impulse and desire to convey to him a direct and comprehensive expression of their grateful acknowledgment of the benefits which his administration has brought to them. Realizing that no number of individual manifestations of a feeling so universally prevalent can afford an adequate conception of its unanimity, they have chosen the Morse Electric Club, which is representative of all branches and gradations of the service, as the common vehicle for the conveyance of their message.

"The employes of the company are keenly alive to the fact that the measure of their welfare is in direct relation to the material progress of the company. They appreciate very vividly that what has been done under Mr. Vail's administration in making the telegraph service more universally and more readily available to the public, in originating the new classes of service with their strong appeal to popular favor, in improving the physical condition of the plant, and in augmenting the effectiveness of the organization, has, by advancing the best interests of the company, been of corresponding advantage to themselves.

"But more particularly do they wish to speak of those benefits which they owe to Mr. Vail's thoughtfulness of their personal welfare, of the progress which has been made in providing better surroundings and better facilities for the performance of their work, of the many manifestations of solicitude for their physical well-being and for their contentment, and, above all, of the most generous provision which has been made to relieve them in illness, to guard them from want when in the fullness of time they must lay down the burden of active work, and, when death comes, to care for those whom they must leave behind.

"To the man to whose large-hearted sympathy they owe these things, the employes of The Western Union Telegraph Company throughout the length and breadth of the land send this message

of their profound and sincere gratitude, uniting in the wish that his years may be many and rich with the blessings which are the portion of him that has deserved well of his fellowman.

"On behalf of the Employes of The Western Union Telegraph Company,

"The Morse Electric Club, by B. Brooks, president; W. C. Merly, Secretary. P. J. Casey, Gardner Irving, J. A. Hill, R. J. Murphy, committee."

In transmitting the resolutions to Mr. Vail, Mr. Belvidere Brooks, president of the Morse Electric Club, sent the following letter:

MAY 2, 1914.

Personal.

THEO. N. VAIL, ESQ.,
15 Dey street,
New York City.

DEAR MR. VAIL:

As soon as it became generally known that you were definitely relinquishing the presidency of the Western Union Telegraph Company, there became apparent a general feeling on the part of our employes and officials in the field that they wanted to find some way of manifesting their appreciation of what had been done for them under your administration. Movements to this end were originated by the operating forces at numerous points throughout the organization. The same desire to convey to you some direct expression from the men themselves was manifested everywhere. The operators in the New York operating room, being no doubt aware that the operators elsewhere felt as they did, suggested that they all might speak through the medium of the Morse Electric Club and, as this offered the common channel of expression which they were trying to find, the suggestion met with the enthusiastic approval of the employes throughout the country.

I am sending you with this letter a copy of their message. The original is being prepared in more fitting form, and I am forwarding the enclosed copy of it to you at this time in order that there may be no delay in advising you of the action taken by the employes of the company. The message speaks for itself. In communicating it to you I am acting at the request of the employes, and it is not for me to add anything to it. I can say with propriety, however, and feel that I should say, that I am privileged to know that it is the wholly spontaneous expression of the genuine, deep and universal feeling of the entire working organization of this company.

Sincerely yours,
(Signed) B. BROOKS.

Postal Telegraph-Cable Company of Texas.

MANAGERS APPOINTED.—Mr. W. L. Jones, general manager Postal Telegraph-Cable Company of Texas, Dallas, Tex., furnishes the following list of new managers appointed: A. H. French, Morgan City, La., vice J. L. Fisher, resigned; Sam McClusky, Monroe, La., vice Miss L. A. Dobrowolski, resigned; J. H. Howell, Lake Charles, La., vice C. M. Wilgus, resigned; P. A. Kaufman, Ardmore, Okla., vice W. T. Salisbury, resigned; Wm. A. Drake, Tulsa, Okla., vice E. E. Louderback, resigned; Roy Frazier, Paris, Tex., vice Howard Jolly, transferred; Howard Jolly, Galveston, Tex., vice A. A. Davis, transferred; A. A. Davis, Houston, Tex., vice J. D. McLelland, resigned.

MR. A. A. DAVIS, whose appointment as manager of the Postal Telegraph-Cable Company of Texas, at Houston, Tex., was announced in our issue dated May 1, was formerly engaged in business in Mexico. He was, for several years, manager of a large mercantile establishment in Monterey, Mexico, but on account of the troubles in that country he returned to the "States."

THE CABLE.

FREDERICK B. TOWNSEND, senior operator at the French cable station at Orleans, Mass., has resigned, owing to failing health, after thirty-four years' service in cable telegraphy. He will receive a pension, and will return to Sydney, N. S., to live. He was born in Sydney in 1858, and entered the service of the French Cable Company in 1880.

WEEK-END CABLE LETTERS TO AUSTRALIA.—The Pacific Cable Board, London, announces that arrangements have been made for the telegraphic transmission throughout of "week-end cable letters" to Australia without addition to the existing charge of eighteen cents per word, and to reduce the minimum number of words from twenty-four to twenty, making the minimum charge $3.60 instead of $4.32. The arrangement will come into force in a few weeks' time.

IRELAND TO TORONTO DIRECT.—Direct telegraphic communication between Fermoy, Ireland, and Toronto, Ont., was held on the evening of April 23, on the occasion of the banquet in Fermoy of the officers of the "Buffs," and the banquet of the officers of the Queen's Own Regiment in Toronto, Ont. Greetings and toasts were exchanged between the two banquet halls, over a circuit including the Commercial cable. The Gott relay was employed. The circuit was arranged through the courtesy of President Clarence H. Mackay, of the Commercial Cable Company, and in appreciation of this he was elected an honorary member of both organizations, as was briefly mentioned in our issue dated May 1.

THE TELEPHONE.

F. P. WHITNEY, aged forty-four years, assistant engineer of the New England Telephone and Telegraph Company, Boston, Mass., died in that city April 28. He was a member of the Telephone Pioneers of America.

BUYING A CLOCK BY TELEPHONE.—A woman in buying a mantel clock by telephone was particular about the chime. The salesman held the clock up to the transmitter and as the chime as transmitted over the telephone was satisfactory the sale was closed.

TELEPHONES IN BERGEN, NORWAY.—The Bergen Telefonselakab, Bergen, Norway, is installing a new semi-automatic telephone system, including underground wires. It will be the most modern and up-to-date system in Scandinavia, and is the product of an American factory.

The Telephone's Future.*

BY FRANK H. BETHELL, VICE-PRESIDENT NEW YORK TELEPHONE COMPANY, NEW YORK.

In New York State alone, in 1914, we expect to spend $23,000,000 in extending and improving our plant and equipment. According to our plans, as already mapped out, from 1915 to 1930 we anticipate spending a yearly average of $25,000,000 for the same purpose. From 1931 to 1940 our budget will average about $28,000,000, and from 1941 to 1960 it will be about $25,000,000 again. We are figuring on an annual development of fifteen per cent, or reducing the figures to a concrete simile, upon fifteen telephones in every 100 of the population in this State.

According to our estimates, the population of New York State in 1960 will be 27,000,000, and this population will require 5,000,000 telephones. There are now 500,000 instruments in New York City, and 900,000 in the whole State. In order to provide for the development of our service and to be able to take care of the growing demands upon us, up to 5,000,000 telephones, we shall have to spend in the forty-five years between 1915 and 1960 a total of $1,155,000,000—this being additional to the budgets for upkeep of plants and equipment already in use and for operating expenses.

Figures I have given apply to New York State alone. They would be enormously augmented if the rest of the country, or even if the States comprised in what we call our Eastern Group, were thrown in. In Pennsylvania alone, in the years intervening before 1950, we look to expend $166,000,000 additional to maintenance expenses, in order to keep abreast of growing demands upon us.

We estimate the population of Pennsylvania in 1950 at 13,000,000, and this population will require 2,250,000 telephones. As a matter of fact, the number of telephones in use in the Eastern Group States will pass the 2,000,000 mark early next month.

It is a fact little known, by the way, that the proportion of telephones to population in communities is markedly affected by the component parts of that population. For instance, sixty-five per cent of the 15,816,000 telephones in use in the world on January 1, 1913, were in the United States. Even in the United States the largest number of telephones in proportion to population is not found in New York. You have to go out West, where the percentage of illiterates, foreign-born and colored population is at a minimum, to get the maximum number of telephones in proportion to population. Lack of education has a perceptible influence upon our patronage. Illiterates and foreign-born whites and native-born colored people do not use the telephone.

I look to see the investment per telephone come down steadily during the years to come, and, of course, that means a consequent reduction in rates. We can determine the likelihood of these two developments by study of the past. Since 1900 telephone rates have decreased forty per cent in this country. Practically the only staple household food that has decreased at all in the same period has been sugar. Some food supplies, like bacon and flour, have increased in cost from 130 to 300 per cent in the same period.

Hereabout we have already voluntarily granted subscribers a rebate of ten per cent, pending completion of the valuation of our property. On behalf of the company, I offered the legislature at Albany $200,000 to defray the cost of this valuation, but the legislature saw fit to decline the offer. We shall sustain a decrease of $2,250,000 a year in our revenue as a result of this ten per cent rebate.

I dare say that, as time goes on, and the investment per telephone decreases, we shall be able to lower our rates still further. That is a logical supposition based upon the developments of the past. Our investment per telephone already is much lower than that of Europe. Over there, in six countries, it averaged $197, while here it averaged $143 in 1912.

The secret of our success is that we plan ahead. We study the probable growth in population and the probable future needs of communities, and build our plants to keep ahead of the time when the facilities will all be needed. We cannot be caught, like the Japanese Government, which is unable to grant the requests for service of 30,000 persons in Tokio alone.

Since work began on the Panama Canal in 1904, the Bell system has pent more money in extending its lines and plant than the United States Government has spent to dig the big ditch and buy the right of way. This suggests one advantage that we have over government-owned lines, which must secure first the consent of the government before they can spend money for extension of plant and equipment. That is a very tedious and uneconomic process.

As to efficiency, it is difficult to say exactly what progress may be looked for in the immediate future. The telephone on my desk is a different instrument from that used two years ago. The receiver has been much improved and the clearness of enunciation bettered. In the big blizzard recently the fact that our underground lines to Washington were untouched was generally commented upon.

We are only beginning to be able to send messages successfully over underground wires. Five years ago it could not have been done, and even yet we have much to learn. Underground service is not as satisfactory as overhead service, although our engineers are constantly experimenting with the design of improving it. Many lines of experimentation similar to this are being followed up.

It will not be long, we hope, before subscribers will be able to talk from New York to San Francisco. We are now far ahead of Europe in this respect, as in practically all others. The first 900-mile service on the Continent was put into use less than two years ago, while it is twenty years since we linked New York and Chicago by the telephone. Two years ago, when Europe was amazed at the possibility of talking 900 miles, we bridged the 2,100-mile gap between New York and Denver. I do not think it is an exaggeration to say, that in

* From the *Evening Post*, New York.

the very near future New York will be able to chat with San Francisco.

Long-distance submarine telephony is not a practical possibility, I am afraid. There are mechanical reasons against it, more or less similar to the difficulties we encounter in subterranean telephony, although infinitely greater. But I believe that we shall be able to improve every branch of our business and service in some way or other in the next few years, exactly as the records show we have improved them in the past. Certainly, we shall endeavor to do the best that we can.

To revert once more to the wireless telephone. That is a very difficult subject to discuss, because it is almost wholly futuristic, and this era of marvelous inventions, when what was undreamed of yesterday is an accomplished fact to-day, a man would be foolish to say that a certain thing could or could not be. Yet when you take into consideration the fact that our thirty-eight central offices in this city alone handle 2,000,000 messages every day, you must find it difficult to conceive in what manner the wireless telephone would equal the demands of so intricate a traffic. And when one considers, too, the speed with which these messages are cleared, the efficiency with which all calls are answered and put through, it seems a rare possibility that the average time of establishing connections could be reduced with wireless telephones. Indeed, one finds it impossible to imagine the confusion that would arise from wireless telephony.

I think that the development in efficiency in the future will be confined to the wire systems, at least where communication on land, especially in great cities, is concerned. But efficiency, proceeding at the normal rate prevailing hitherto, will be increased markedly. Much as we have accomplished, we are willing to admit that time teaches better ways, and we are all eager to learn these better ways and adapt them to our needs.

Course of Instruction in the Elements of Technical Telegraphy.

The course of instruction in the elements of technical telegraphy, which has been printed in installments in these columns without a break since October 16, 1911, was concluded in the issue dated April 1.

These articles have met with a wide reception and have been greatly appreciated especially by the student element of the fraternity, and in order to supply the constantly increasing demand for them we have decided to issue the entire course in book form.

Not only have students expressed their appreciation of the articles, but practical telegraph engineers as well, as they are constantly referred to by the latter to refresh the memory as to the underlying principles of the art. A careful study of this book will give one a safe groundwork in telegraph engineering that will place the student in a position to readily grasp practical details.

The price of the book has been fixed at $2.00 per copy. Send orders to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Efficiency.

BY THOMAS M. RAGEN, NEW YORK.

Efficiency is the watchword of telegraphy to-day. How to maintain the present standard of efficiency, and, if possible, broaden its scope, is a question of great moment.

Human intelligence is the all-important factor to be considered. That this feature is recognized is evident by the great care exercised in the employing of boys and girls, who are to be our future telegraphers, and upon whom will fall the burdens of maintaining that high standard of efficiency and character that was established by what is to-day known as "The Old School," among whose names are numbered some of the country's foremost scientists, scholars and business men.

Efficiency should always be the motto of telegraphers, always remembering the duties that devolves upon all interested in the delicate duty of handling the public business through the medium of the telegraph.

The Morse code, with its many possible combinations, requires quick thinkers. It also requires fine temperament and judgment, for there can never be a time when all telegraphers will be mature stars. As there will always be beginners, the problem of handling this class of telegraphers so as to get the best service possible, as well as the administering of human justice to the ever-excitable junior telegrapher, is a telegraph duty that should never be overlooked.

It is marvelous how a well-balanced senior can calm the excited and sensitive beginner, thereby lessening the possibility of errors, and, at the same time, increasing the amount of business handled. Confidence between telegraphers is also a large factor, which can only be accomplished by strict application to business and ever-ready co-operation.

But there is one feature in telegraph efficiency that stands out above all others in the way of accomplishment for the successful telegrapher, and that is a knowledge of the English language. It is hard to conceive how a telegrapher can ever hope to successfully perform his exacting duties of either transmitting or receiving when there is a lack of knowledge of the subject being handled.

Nature seems to have fitted every human being for some vocation; therefore, if a person is not fitted by nature to be a telegrapher, it seems that to continue in that particular field of endeavor is unfair to the person most interested.

Efficiency is the great problem not only to the senior, but also to the junior telegrapher, and should ever be the first principle.

Each day, telegraphy finds new and broader fields in the business world. It is hard to see how telegraphy can be given any secondary credit in the development of this country. When we also take into consideration that the world's strongest men are guiding the destinies of telegraphy, it is hard to take anything but an optimistic view of the future.

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, MAY 16, 1914.

Responsibility and Accountability.

The key-note of the communication from Mr. Theo. N. Vail, the retiring president of the Western Union Telegraph Company, printed in our issue dated May 1, is that the only way business efficiency and progress can be realized is by placing responsibility and requiring accountability. Everyone who has had large modern business experience will, no doubt, agree to this proposition. If a man is placed in a position of responsibility and given to understand what results are expected of him he must be left to his own resources and, in a general way, allowed to develop his own plans in order that he may attain the results in view. It follows that a man who cannot fulfill the requirements will soon reveal his inability to measure up to the standard.

A person occupying a position of responsibility should not be interfered with as regards his duties. He must do his work in his own way or he cannot render the most efficient service that is in him. The moment some one else interferes his sense of responsibility is weakened.

The foregoing does not mean, of course, that a person should not seek advice. Every intelligent man seeks it at times, but the initiative must come from him. Advice sought and advice proffered are vastly different in their effects.

Mr. Vail arrived at his conclusions by close observation and experience in handling men, and it would be well for all employers to bear in mind and practice the truth so tersely stated by him.

Transatlantic Wireless Service.

In anticipation of the completion and opening of the Marconi transatlantic high-power stations, a vigorous canvass is about to be prosecuted for transatlantic business from all sections of the country. To carry this traffic to the seaboard wireless stations will require the use of land telegraph lines and at the ocean's border competitive conditions will be found. It will then be wireless against cables, but we have no fear for the decadence of the cables through the activity of their young competitor. It has been the history of all improvements that when a new service is introduced along any line it, to a large extent, creates a business of its own and at the same time eventually helps its older established competitors. As an example of this, it may be noted that when the electric light was put into commercial use many persons predicted that the gas companies would be compelled to go out of business. They did not suspend, however, but on the contrary their business increased after the new order of things settled down to normal, and are now doing more business than ever. We believe that this same result will mark the wireless-cable situation, and that each interest will be benefited by the activity of the other.

False "S O S" Signals.

The report on May 1 of the wreck of the steamer "Siberia" off the coast of Formosa, with over 800 persons on board, shocked the world, but the next day it was denied, and the captain reported all well.

There seems to have been some confusion in regard to the origin of the "S O S" signal in this instance. It has been explained, as one of the possible causes of the error that the code signal "M B S" of the steamer "Persia," sent out with the latitude and longitude of that vessel may have been misread into "S O S" by some operator, and to this possible fact the false report may have had its origin. A steamer, in giving her longitude and latitude, sends her own code name twice thereafter. It is considered probable that on the first sending to the steamer's code signal "M B S." some operator failed to receive the "M" and "B" and caught only the "S." Naturally, alert at the first letter of the distress signal, he ran the "M" and "B" together in such a way as to get "O S," when the "Persia" started sending her code name a second time. Dividing the combination of dots and dashes in a certain way would account for the error and it is believed this is what the operator did.

The report of the loss of the "Siberia" caused a heavy advance in reinsurance rates in London, besides great anxiety among relatives and friends of those on board, and it has been suggested that

further measures of international control over wireless are necessary in order to avoid occurrences of this kind. The English underwriters are disturbed and misled by these mysterious wireless distress signals, and suggest that these false reports may be spread intentionally.

The Japanese Department of Communications is investigating the matter, with a view to ascertaining the origin of the error.

The Requisites for a First-Class Operator.

Very few who contemplate becoming practical telegraph operators have any idea of the proper qualifications necessary to make a capable operator. The popular idea seems to be that to learn the telegraphic alphabet and be able to transmit and receive a specified number of words per minute constitutes a standard of excellence and is all that is necessary. To be sure, a proper knowledge of the alphabet and a thorough knowledge of the Morse system is of the first importance, but a good operator can hardly be gauged by the number of words he sends or receives. Speed, when combined with other qualifications, is certainly a very desirable accomplishment, but we desire to impress upon the minds of beginners that it is not the first requisite of telegraphic skill—it is the steady gait and sound judgment that tells. However, on a pure question of manipulation an operator who could sit down at any time and always calculate upon disposing of from 2,000 to 2,400 words an hour, plain English, sending or receiving, and, if copying by hand. making every letter unmistakably legible, might be classed strictly first-class. The same applies to typewriter receiving. Here the quality of the work also counts. There is a great deal to learn about a typewriter, in order to handle the machine properly, and it requires intelligent study to get the best work out of it. It is much like type setting. Proper spacing of letters and words, and the use of the proper characters are based on fixed rules, which are applicable as well to the typewriter.

To constitute a really first-class operator, therefore, much more is required than the mere facility of sending and receiving telegraphic signals. The telegraph needs thorough men and women, not specialists.

To become an expert operator, that is a valuable one to the company, requires the possession of many qualities. In order to be properly qualified to discharge intelligently and advantageously the duties which are likely to devolve upon one assigned to a position of responsibility in the telegraphic service, the first requirement should be a fair general education. Plain and legible penmanship is an important qualification, and one that is often ignored and overlooked. The recipient of a telegram should not be taxed with the duty of deciphering poor handwriting. It is not fair to the patron, and reflects unfavorably upon the company employing such poor writers.

A good moral character. that is, a character that would be esteemed upright and honorable by the general public, is also required. No situation can be long held where reliance cannot be placed upon the operator, and telegraphy is more exacting than most any other business or calling. Physical qualifications are also necessary; the general health must be good, sight and hearing good, the hands capable of quick action, steady nerves, self-confidence, a good memory, and some degree of precision and rapidity of natural movements. The mastery of rules and forms, skill in reading from poor manuscript, and much general knowledge of business, names, customs, geography, etc. The ability to transmit correctly at a rapid rate with one hand, while timing with the other the messages sent, skill in adjusting instruments to every variation in the current, particularly in bad weather or on a faulty line. In sending, the exercise of judgment in gauging the speed of transmission to the ability of the receiver, and the peculiar telegraphic sense to instantly detect an error, even in a cipher message, to never break, except when in doubt as to the correctness of a word, and then always break. The exercise of good manners on the line, and to be always on time and diligent. Besides this, every telegraph operator should make it his business to acquire a knowledge of the elementary principles of electrical science, upon which the telegraphic art is based. There are certain elementary principles of electrical science which are intimately associated with telegraphy, a knowledge of which should be acquired by all who aspire to recognition and position as telegraphers; these are the conductivity and resistance of wires, instruments, batteries, etc., and a general knowledge of connections of batteries, instruments, and lines, so as to be able to make the necessary connections intelligently.

The man afflicted with mental inertia will find no comfort in this advice, but he who is ambitious to advance in knowledge and experience, and rise above the common level, will find it easy of accomplishment.

Handy Electrical Dictionary.

Every student of electricity should have at hand a copy of the "Handy Electrical Dictionary," to help him understand electrical terms met with in his books of study, the meaning of which he may be in doubt about. It covers a wide range of electrical subjects, and is published in pocket size. The definitions of the electrical terms are, in most cases, full enough to constitute a cyclopedia of electricity, and although dictionaries, as such, are not usually recommended for steady reading, there is much interest in reading this book through, in addition to its explanatory feature. The price is twenty-five cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

TELEGRAPH TOURNAMENT.—A movement is on foot in San Francisco, backed up by the Order of Railroad Telegraphers, to arrange a telegraph tournament to take place in that city during the Exposition of 1915.

The Morse Alphabet. Some Remarks on the Morse and Continental Alphabets.

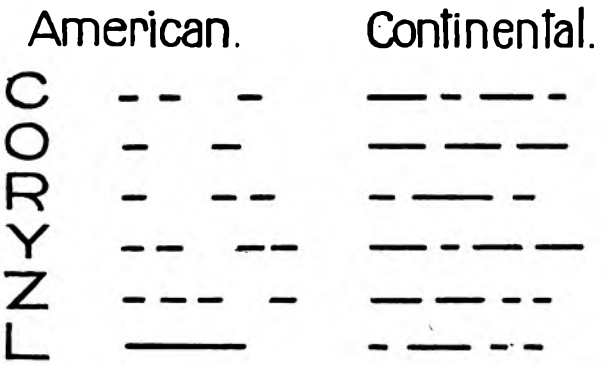
BY GEORGE GRAY WARD, VICE-PRESIDENT AND GENERAL MANAGER, COMMERCIAL CABLE COMPANY, NEW YORK.

In recent years there has been a constantly increasing use in telegrams and cablegrams of cipher code words, words which do not have any meaning in themselves as connected with other words in the telegrams or cablegrams. Many of these words are formless, or are taken from languages unfamiliar to the operator and to him are as difficult as though they were formless.

With this increase in this class of telegraphic correspondence has come a more than corresponding number of telegraphic errors in the transmission of this correspondence over the American land lines. I have read many articles in the past for and against the substitution of the Continental, or what might more appropriately be called the Universal telegraph alphabet, for the American telegraph alphabet, and, in my opinion and the opinions of many with whom I have discussed this question, including the eminent authority on all questions pertaining to telegraphy, the late Lord Kelvin, the Continental alphabet is by far the safer. and is also the quicker mode of transmitting code messages by sound. In fact Lord Kelvin in a discussion I had the honor of having with him on this question. stated to me that he could prove mathematically that the Continental code is faster than the American code, and although I regret that I never pressed Lord Kelvin to make this demonstration, I fully believe that his statement was correct. In any case, the increased use of difficult code words has certainly increased the number of errors, and seems to call for the adoption of any means which will have the effect of reducing the possibility of error. While I can understand that those who have used the American code for years, and have become very proficient in its use, are reluctant to make what appears to be a change in their work, yet I have absolute faith in the belief that the substitution of the Continental code for the American code on the American and Canadian land lines would result in a material decrease in the number of errors traced to the spaced and uncertain letters in the Morse alphabet. An operator, no matter how capable he may be, cannot distinguish with absolute safety between, for example, the letter "Z" and the letters "se." or vice versa (this being a common error) in the present-day code words, both being represented by identically the same telegraphic symbols. The best he can do is to guess at it. In the Continental code each letter has dissimilar telegraphic symbols and should not be misread.

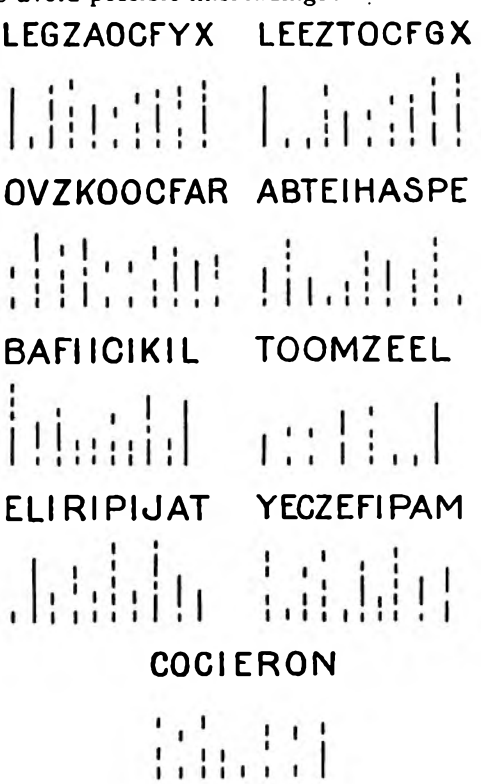
The following comparison of spaced letters of the Morse code, in the order in which they appear in the alphabet, with the same letters in the Continental code, should be convincing of the great advantage which the latter has over the former in respect to accuracy.

It will be seen that the letter "C," which contains two dots, a space and a dot (.. .) can easily be misread for the letters "ie," which contain identically the same signals, or vice versa. Or the letter "O," which is represented by . . can easily be misread "ee," or vice versa; the letter "R" misread "ei," or vice versa; the letter "Y" misread "ii,"



or vice versa; the letter "Z" misread "se," or vice versa. Then there is the letter "L," represented by a long dash, which can very easily be mistaken for a "T," or vice versa. The long dash might be eliminated with advantage, to avoid the mistaking of the letters L and T. A line contact of the interval of two letters might be mistaken for a long dash.

The following are a few code words taken from actual messages. in which, it will be seen, that great care would have to be used in their transmission to avoid possible misreadings:



To avoid errors made possible by the frequent use of spaced letters, the transmission must be slowly and carefully made. I have had a test made of the difference in speed between the American and Continental Morse in code words. Based on

the operation of men with the same quality of skill, and also on automatic transmissions (the perfection of which must be approached as nearly as possible by hand sending to make it accurate), the latter was about seven per cent faster than American Morse.

The possibility of error resulting from the misreading of spaced letters must be apparent. Errors which do occur in the Continental code are common to both codes. With regard to the other differences between the American Morse and Continental alphabets, I have no concern, because, in my mind, it is not important what symbols a letter of the alphabet is composed of, so long as each letter is an unbroken group of symbols which can be distinctly and unmistakably recognized when heard on the instrument, but any letter which is broken up by spaces renders that letter unsafe and liable to frequent misreadings. I have no doubt that the Continental alphabet could readily be put into use throughout the telegraph systems of this continent, and I am equally convinced that the operators would quickly become proficient in its use, and they would not only approve the change, but it would give them greater confidence in their work, and they would never consent to revert to the former method of transmission, because it would render their work safer, and correspondingly reduce the anxiety now attached to their duties. In Great Britain, when the Continental code was adopted, many years ago, three months' preparation was given to the operating staff, and the system was introduced throughout the entire telegraph service of Great Britain in a single day without the slightest difficulty.

The Continental code is in use everywhere throughout the world, except in the United States and Canada, hence it is referred to as the Universal alphabet. It has been adopted as the standard code for wireless transmission. It is as easy, if not easier, to learn than the American code, and is as speedy and more reliable in the transmission of code messages, and if adopted here would not only instill greater confidence in the operator when handling difficult code words, but would considerably broaden his field of occupation. I have known many operators who interchangeably use the Continental and American Morse without the slightest inconvenience, that is to say, an operator who may be receiving or sending by Continental Morse on one circuit is often changed to man an American Morse circuit, and this is done, as stated, without any difficulty whatever, showing the ease with which operators can learn to use both codes. In plain English, the operator can depend on the context to preserve him from error. In code and cipher he has no such protection. He must depend solely on the signals which come to him. This is where the advantages of the Continental code are so obvious. In the Continental code every dot and every dash are of the same duration. There are no unfilled spaces to mislead. In the Continental code if a dot fails, its space makes two words where there should be only one. The check is wrong and the cause may be found by inspection. So far as the telegraph companies are concerned, the Continental code would, in my judgment, improve the efficiency of their service, reduce the number of service enquiries made necessary to correct errors caused by split letters in code words, and would save a good deal of correspondence, unpleasantness and dissatisfaction resulting from complaints on account of mutilations in messages caused by split letters.

There are also patriotic reasons why the Continental code should displace the time-honored Morse. Wireless telegraphy is an important agent in the national defence. Both on sea and land wireless telegraphy will play an important part in military and naval movements. Military and naval orders are always transmitted in secret language. There is no context in them to guide the operator. He must depend on sounds alone. It is of the first importance that he be provided with the best implement possible for this work. It is not a matter in which sentiment for an old friend should be allowed to prevail. The Morse does not lend itself to the new development. An alphabet spaceless and with definite symbols for separate letters is needed and the Continental is the best in use. It may be truthfully argued that there are many errors due to mutilations of letters without split signals. That is no reason why the spaced letters should not be eliminated. I do not wish to imply that the adoption of the Continental code would remove liability to error, but it would reduce that liability. The danger of errors in letters of the Continental code are common to both the Continental and American alphabets, but I contend and feel strongly convinced from actual experience that the split letters in the American code are the cause of many errors which would not occur if it were not for such split letters, and to that extent, the accuracy of the service could be improved by the substitution of an alphabet which does not contain split letters.

I recall many years ago when the Brown and Allen relay was first introduced, stiction often caused a somewhat uneven signal, such as an elongated dot. This made it difficult for Continental Morse operators to read the signals, until they became familiar with the peculiarities of this relay, but, after a while, even though there was some distortion of the signal, the operators could read it with reasonable certainty, because there was no possibility of mistaking the signal for anything but what it was intended to be. This would have been absolutely impossible with the American Morse alphabet. Furthermore, on the present-day long land line circuits there is more or less distortion at times of signals, and, if for example, there should be stiction when the letter "O" (. .) is made, it will easily be transformed into the letter "N" (—.). Such errors, common to the American alphabet only, would be entirely eliminated by the use of the Continental alphabet. Furthermore, the Continental Morse has an advantage over the American Morse code in that no letter exceeds four units. The multiplication of dots in the Morse code is not conducive to accuracy. PLL for 600 is a familiar character of error to the Morse operator.

An error like 700 for MILL would not be possible with the Continental code, the numerals in which preserve a regularity of five units, and, to that extent, numerals are distinctive from letters.

One advocate of American Morse claims that the bulk of the errors, traced in the most difficult traffic which he has ever come across, are due to dropped dots, etc., and not to spaced letters. The regularity of the spacing between letters in Continental code, as compared with the spacing in American code, has much to do with the greater safety of the former. With proper word and letter spacing a missing dot can always be detected in Continental code. Observation of American code working will show how little dependence can be placed upon the regularity of the spacing for the detection of missing dots. For the proper operation of Wheatstone working with difficult traffic the American code calls for one space between the units of spaced letters (and they occur frequently), two spaces between letters and three spaces between words, while the Continental permits of one space between letters and two between words and two lengths of Wheatstone slip prepared in the two codes, as previously mentioned, will show the superiority of the Continental for automatic telegraphy.

I think that the introduction of the Continental code on one or two important long circuits of the American land lines would soon demonstrate its advantages both to the operator and to the companies.

Origin and Development of the Morse Telegraphic Alphabet.

Morse, in the arrangement of his conventional telegraphic alphabet, took as a unit of space or length the shortest available length of line, technically termed a dot. His alphabet was then made up of signs, forty-five in number, formed from three elements: the dot, the space and the dash, arranged in various combinations, representing the following relative values:

The dot.....One unit
The space or break between the elements of a letter .....One unit
The space, employed in the "Spaced Letters." .....Two units
The space, separating the letters of a word Three units
The space separating words .....Six units
The short dash .....Three units
The long dash .....Six units

Prof. S. F. B. Morse, in considering the mechanical means at command for producing at a distance any permanent mark, perceived that by means of the electromagnet, the motion of a lever, up and down, could be easily and surely commanded; and if a pencil at one extremity of it were made to strike upon a piece of paper, a dot would be made whenever the magnet was charged and quickly discharged. This action, however, without a further device, would be unavailing to produce variety, since the lever motion is limited to the simple movement of up and down. Hence the idea of moving the paper at a regular rate beneath the pencil. Thus a dot could be made on the moving ribbon of paper, which, passing onward, the paper was ready to receive (after an interval more or less extended) another dot, or series of dots. Thus, the ability to produce dots in groups at pleasure was demonstrated, and, consequently, groups of dots expressive of various numerals were devised. In pursuing the experiments with the numerals whose elements were a simple dot and space, it was perceived that, by means of the moving paper, not merely a dot could be produced at pleasure, but if the magnet was kept charged while the paper was in movement, the pencil produced a line long in proportion to the time in which the magnet was charged. This fact introduced a third element for combination, to produce variety in the groups, indicating letters, as well as numerals, to wit: the line or dash; so that dots, spaces and lines in any variety of combination were at command for forming a code of signs. Hence originated what is now universally recognized as the Morse code.

In the arrangement of the alphabet it was desired that no letter should occupy more than five dots, or nine units in length; and none of them, with the single exception of the letter J, exceeds that number. Another principle was specially observed, that of the letters occurring most frequently in the English language, were therefore composed of the fewest and shortest elements. The letter E is thus represented by a single dot; the I and T within the space of two dots or three units, and so on. The numerals were comprised within the value of six dots, or eleven units, to distinguish them more readily from the letters.

Upon the introduction of the Morse system into Germany many years ago, an important arrangement of the alphabet was devised, called the Continental or International Alphabet, and this has been adopted and become universal on all submarine cables as well as land lines, in all parts of the world where the Morse apparatus is used, except in America. It is founded on the Morse, and the only letters that differ from the Morse are c, f, j, l, o, p q, r, x, y, z; the additional letters peculiar to foreign languages are ä (æ), ö (œ), ü (ue) eh, é, ñ. The figures are all different, except the figure 4. All these letters and figures are made by dots and lines, the same as the Morse, and only differ in their relative position.

NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.—The proceedings of the annual meeting at Washington, D. C., October 28-31, 1913, of the National Association of Railway Commissioners have been published in book form by the Law Reporting Company, New York. The volume, which contains 612 pages, includes all committee reports and the discussions thereon. As the regulative powers of the railroad and public service commissions, which are members of the association, have recently been extended in many States to cover lighting, power, telephone, telegraph and express companies, these reports are of interest and importance to such companies. The price of the book is $1.00 per copy and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Construction of the Washington-Baltimore Telegraph Line, 1843-1844.

BY G. C. MAYNARD, CURATOR, DIVISION OF TECHNOLOGY, NATIONAL MUSEUM, WASHINGTON, D. C.

(*Concluded from page 203, May 1.*)

Monday, June 10. Took the cars for Baltimore and commenced telegraphing at 9 o'clock and continued until near 2, again at 5 till near 7 k. Capt. Wilkes at Wash. and Mr. Eld here are making experiments to get the distance of Baltimore from Washington.

Tuesday, June 11. Telegraphed all day. Went to Washington this evening.

Wednesday, June 12. Returned to Baltimore and telegraphed all day.

Thursday, June 13. Telegraphed all day.

Friday, June 14. Telegraphed all day and until 11 o'clock, p. m.

Saturday, June 15. Telegraphed all day until 7 o'clock. I have invented a combination of letters, by combinations of two letters taking the twenty-six letters of the alphabet make 676, or taking three letters for a combination, they will make 17,574, or taking 4 letters make 456,976.

Sunday, June 16. This morning went to hear Mr. Johns, of Christ Church, and this evening the Rev. Mr. Bascom, of the Methodist Church.

Monday, June 17. Telegraphed all the morning until ½ past 12 o'clock, and then prepared to go to Washington; took the 5 o'clock cars. Called upon Prof. Morse and found him very lame.

Tuesday, June 18. Went to the Patent Office and Capitol, and called upon Prof. Morse. Packed up my minerals. Prof. M. and myself made agreement with Smith.

Wednesday, June 19. Commenced packing up things for the cars to-morrow. The batteries to be taken to Baltimore.

Thursday, June 20. Loaded cars with things, and put my minerals on board. Called upon Prof. Morse.

Friday, June 21. Set off for Baltimore. Shipped my minerals. Unloaded the cars. Wrote to Prof. M.

Saturday, June 22. Cloudy and appearance of a rain. Visited Messrs. Ellicotts chemical works and they promised me some specimens.

Sunday, June 23. Walked to the Washington Monument, and returning met Mr. Beatty and with him went to Church, returned and dined with him.

Monday, June 24. Got the wires all prepared for two independent circuits and other varieties.

Tuesday, June 25. Went to upper depot, then to Burbank and returned to room. This evening went to Washington. Spent the evening with Prof. Morse.

Wednesday, June 26. Adjusted the wires at the Capitol to try several experiments. Called upon Prof. Morse after dinner, and again in the evening.

Thursday, June 27. Took the cars for Baltimore. Took the Philadelphia cars having a free ticket to go and return. Messrs. Moody and Avery were fellow passengers. Arrived in Philadelphia at 3 o'clock, got some oysters and took the steamboat for Bristol and there the cars for New Brunswick where I arrived at 9 o'clock.

Friday, June 28. Took the 6 o'clock cars for Newark, took M & E cars for Morristown, where I arrived at 11 o'clock.

Saturday, June 29. Went up to Speedwell this morning and arranged some matters.

Sunday, June 30. Went to church; Mr. Stanton preached. In afternoon went to Speedwell.

Monday, July 1. Visited Elizabeth. After dinner went to Speedwell. At dusk returned home.

Tuesday, July 2. This morning got ready to leave for Baltimore; took the cars for Newark, and at nine o'clock took at Newark the cars for Philadelphia. Arrived at ½ past 2, and at 4 o'clock took the steamboat for New Castle; cars for Frenchtown and then the steamboat for Baltimore where we arrived at ½ past 12 o'clock and remain on board.

Wednesday, July 3. Took carriage for Mrs. Carson's, 206 Lombard St. Took board there. Went down to Tel. Off., but did not feel perfectly well.

Thursday, July 4. Spent most of the day at the Tel. Office, and got ready for experiments. Fine day and very quiet in the city.

Friday, July 5. Got the West Battery ready but no action with the leading wires. So that I fear there has been no one at the Capitol to-day. Prof. Morse was at the Capitol but did not discover that the wires of the large magnet were disconnected.

Saturday, July 6. Got all ready and at about 12 o'clock Prof. Morse discovered that the wires of the Great Magnet were not connected, having been disconnected by lightning it is supposed. We have been telegraphing most of the day. All worked well.

Sunday, July 7. This morning I attended church at Mr. Atcherson's. In evening found several churches closed.

Monday, July 8. Put up a new battery and telegraphed all day. Sent the news of the express car from Phil.—and the riots there.

Tuesday, July 9. Prof. Morse came on this morning. I telegraphed last night from 1 o'clock to ½ past for Nat. Int. This morning I find the battery sufficiently active and by experiment find that ten cups are sufficient for the whole distance, after they have been in action day and night or rather in action whenever we have had occasion to use them for 30 hours. This promises well. Went up to the Eutaw House to see Prof. M. this evening.

Wednesday, July 10. Find the battery still active and have this morning taken a double circuit from the main battery. One for the main line and the other for the Local Battery. Raining.

Thursday, July 11. Have been at sundries all day. The battery in action but no communication to-day. Prof. M. returned to Washington.

Friday, July 12. Got all ready this morning and have telegraphed with Prof. M. The trial of the two wires with the ground does not succeed to-day. Some mistake about the wires. Went to Washington this evening, took tea at Mr. Ellsworth's and then went up to the Capitol, made a diagram or

small model of the plan of the circuits, which worked well.

Saturday, July 13. Have been at the Capitol all the morning telegraphing with Mr. Rogers. Tried a number of experiments which go to prove that the wires are right here but wrong at Baltimore, went to the Patent Office and after dinner took the cars for Baltimore at 6. I again experimented and found one of the wires wrong. Corrected it and stopped.

Sunday, July 14. Very hot. At 5 o'clock went to hear Dr. Breckenridge at the corner of Pratt and Light Sts. Good discourse.

Monday, July 15. Commenced at ½ past 8 to telegraph and succeeded admirably with the grand experiment of two wires and ground forming two independent circuits. It worked well. Prof. Morse came on at 6 o'clock on his way to New York, accompanied him to the boat. Rained a little during the night.

Tuesday, July 16. Have made a full plan of the circuits and changes.

Wednesday, July 17. This morning took the cars of the Baltimore and Susquehanna R.R. and went to the Relay House 8 miles, there took horsecar to Barehills where I collected minerals till 1 o'clock, then went to Mr. Comly, Rockhill. Returned on foot to Relay House. Got my dinner at Mr. Erricson's, rode with Mr. Lynch to his house and received from him a beautiful specimen of fibrous hematite iron ore, went to the railroad and picked up specimens of lime stone some with sulphuret of iron in it; met with Mr. Ridder. Took the cars at 6 and returned home.

Thursday, July 18. Have been all day readjusting wires and making out my plot.

Friday, July 19. Continued to work at the wires and have set up two instruments in the room above to practice upon with the wires laid down as they are between here and Washington.

Saturday, July 20. Finished the wires and instruments and have tried all my experiments upon the small plan up stairs and find it succeeds well. Last night we put a zinc plate into the wharf with a wire connected running to our rooms, and find that a circuit formed by the copper and zinc plates in the earth on the galvanometer to be about 10 degrees.

Sunday, July 21. Attended church at Mr. Atcherson's in the morning and heard Mr. Hamlin in the street in the afternoon.

Monday, July 22. This morning I started with Avery for the Hematite Iron mines about 2½ miles from Crockersville. We took the cars on the Baltimore and Susq. R.R. at 9 o'clock and stopped at Timonium, then walked to J. Tyson's, collected some specimens of limestone, iron pyrites, etc., and then walked to Mr. Price's where we took dinner. Then went over to mine bank ½ mile near Mr. Willison's residence and collected a large quantity of iron ore to fill 3 large baskets. Stayed at Mr. W.'s all night.

Tuesday, July 23. This morning we started for the Bare Hills. Walked to Tyson's and then from there to the Relay House. Took dinner at Mr. Erricson's. Walked over to the Bare Hills collected some specimens and, at 6, took the cars for Baltimore, bringing our minerals with us.

Wednesday, July 24. Mr. Rogers went to Wash. this morning and we have been telegraphing several hours. I have also washed some of my minerals.

Thursday, July 25. Washed minerals before breakfast, and telegraphed with Mr. R. till near one o'clock, then stopped for the day. I have packed all my minerals. This evening tried an experiment by which I ascertained that the large battery could be dispensed with entirely—by using the galvanism of the earth.

Friday, July 26. This morning I went down to the Canton Iron Manufacturing Company's establishment and collected several specimens of Iron Ore. Have not been doing much to-day, but preparing to fit up two big magnets with more delicate levers.

Saturday, July 27. Commenced this morning to refit my lever of the big magnet and two others. Got my lever done and found from experiments that 4 cups would work the main line between Baltimore and Washington very well—East wire and ground the circuit. I also tried the two copper plates at one pole of the circuit and zinc plate at the other, to see what power the earth had in working the big magnet and found it reversed the order of things, compared with the galvanic battery. The pen always worked when circuit was broken, but ceased when it was not.

Sunday, July 28. This morning went to Christ Church. Heard a sermon on justification.

Monday, July 29. I have this morning solved the difficulty of Saturday. It seems that the big magnet has some permanent magnetism and in adjusting the lever to work I so fixed it as to be attracted when the circuit was not closed, therefore when I came to apply the galvanism of the earth which current ran in an opposite direction from that necessary to make the permanent magnetism of the big magnet stronger, consequently it made the magnet weaker, so that the lever was attracted by the permanent magnetism, and when the circuit was closed the earth galvanism destroying a portion of the permanent magnetism of the magnet released the keeper. This was the cause of the phenomenon. I have been drawing diagrams of the various changes which can be made with the two wires and ground.

Tuesday, July 30. I find that with a zinc sheet of about 5 feet by 20 inches in the dock and a copper plate buried in the earth here in the depot yard, I get galvanism enough to work the big magnet and the register. The copper plate is about 4 feet by 2 feet. I have purchased 2 copper sheets and 4 zinc of the same dimensions as above. The copper to go to Washington and the zinc to be buried here to see the effect on the long line. Mr. Rogers took the cars for Wash. this evening. I have fitted up his lever for him so that he may correspond with less cups.

Wednesday, July 31. To-day at a little after one o'clock Mr. R. got the lever adjusted and we commenced telegraphing with 20 cups, the lowest number used since we have been in operation. All worked very well. After dinner I then told him to change to No. 7 which is to use the two independent

circuits. I changed the wires at this end so as to throw the battery upon the wire which was common to both circuits, and found the experiment succeeded beautifully, that is—both of us could write independently of each other with only one battery between us, of 20 cups. Mr. Brown got the plates buried and I found an increase of galvanism from the earth which promised the success of the experiment. There was a heavy thunder storm at 5 this afternoon. Several places struck about the city.

Thursday, August 1, 1844. Mr. Rogers and myself have been telegraphing this morning. There was some mistake yesterday in trying the galvanism of the earth, the increase was not as much as there appeared to be. Mr. Rogers returned to Balt. this afternoon. I purchased 2 more copper plates to be put in the ground at Washington.

Friday, August 2. Have been fitting up a more delicate lever to one of the big magnets and have not yet tried it.

Saturday, August 3. This morning I tried the big magnet with the delicate lever by the zinc plate in the dock and copper plate in the yard and found it worked very well, but with the east wire (that is the zinc in the dock with the copper plate in Washington) it would not work. I find however I can with the East wire and this lever with only two cups to the battery work it. But three cups worked very well and sufficient for our purposes—since two cups have worked it very well. This afternoon Rogers, Avery and myself went to Smith's wharf and found two copper bottomed vessels, the Gen. Pinckney and The Maria, both of Baltimore, with two wires prepared with strips of copper on each end, we attached one to the stern of one vessel and the other wire to the stern of the other. The galvanometer went 2 degrees P—with the Pinckney end of the wire in the water while the other remained fast to the copper of the Maria the Gal. needle went Z, 9 degrees—with the one wire to the Maria's stern and the other to the Pinckney's midships, needle went 1 degree. The two wires detached and thrown into the water 40′ Platinum. The needles went 5 degrees when the plates (2 inches long, ½ in. wide) were separated 2 inches. When they were made to touch each other in the water no action. We intend to prepare to go to Havre de Grace on Monday morning.

Sunday, August 4. This morning went to Mr. Atkinson's; in the evening to the Methodist Church in Charles Street.

Monday, August 5. At 9 o'clock Mr. Rogers, Avery, Cleveland and myself with wire and plates took the Philadelphia car for Havre de Grace, arrived there at 11 o'clock a. m., and after dinner hired a boat and commenced measuring the width of the Susquehanna to the island and then we stretched a wire along the island and quit for the night; returned in the boat to the United States Hotel.

Tuesday, August 6. Experimented upon the wire stretched last evening and then stretched another on the opposite side of the river and experimented upon that, and then upon them both together. We returned, first taking up the wire laid on the West Bank. Experiments favorable.

Wednesday, August 7. This morning the other wire was taken up, and we laid two wires one on each side of the Tide Water and Susquehanna Canal. The length of 1000 feet. Upon this we experimented during the day, taking all up and returned to Hotel at 6 o'clock.

Thursday, August 8. At 11 o'clock we all returned to Baltimore and found that the wires in the street had been broken in two places. East wire. This afternoon I spent at the Telegraph office.

Saturday, August 10. Have been telegraphing with Mr. Rogers most of the day.

Tuesday, August 13. Telegraphing most of the day. Prof. Morse returned from the North and went on to Washington. He said provided the sale of the Telegraph was effected, he should proceed to France and endeavor to effect a sale there, and also get a patent in England. I urged upon him the necessity of his registering upon the Patent papers at the Patent Office the assignment which he made to me of my interest in the Telegraph, after much explanation on my part to convince him it had not been done, and the necessity of doing it immediately as in case of his death I should be left without any resource. He said it should be done. I have repeatedly requested him to do it heretofore and his reply has been, that it can be done at any time.

Wednesday, August 14. I have been telegraphing all day with Mr. Rogers.

Friday, August 16. Telegraphed till ½ past 1 o'clock. Rogers and Prof. Morse will come in tonight.

Saturday, August 17. This morning Morse, Rogers and myself visited the Exchange reading rooms; afterwards took a hack and went to Fishing Point to look at the ground for experiments; visited Mount Clare; returned and got some wire ready for experiment. After dinner I again asked Prof. Morse if he had made the record of assignment on the Patent papers. He said No. He must find out what my position was. I told him I had the first agreement made between us and that assigned to me ¼ of the whole; that on certain conditions I had given the ½ of my ¼ to Mr. Smith, as did also Dr. Gale, which made Smith ¼ and Dr. Gale ⅛ and myself ⅛. He thereupon said he would make the record. He stated also as a reason why he had not done it, that it was not so necessary as was generally supposed, this he had from Mr. Ellsworth, and also that it could be done at any time. I told him that it was of vital importance to me in case of his death. I should not be able to get anything if he should be taken away before the record of his assigning to me ⅛ of the whole of the Patent of the Electro-magnetic Telegraph was made upon the Patent papers at the Patent Office. If he has any objection to do it he is not frank in assigning a good and valid objection. It looks bad to find him putting off this matter of so much importance to me and my dependent family.

Monday, August 19. This morning I went up to the upper depot; visited Mr. Winans and in returning got a blacksmith to make a cast-steel magnet for me; went to the office and have been putting up my minerals.

Tuesday, August 20. Have been occasionally tele-

graphing with Rogers. My steel magnet not finished yet. The man broke it.

Wednesday, August 21. This morning I took the cars for Washington with four large sheets of copper; on my arrival there went to the Capitol and then to the Patent Office; bought 8 boxes, and got galvanometers; got my dinner at Mrs. Kenneday's; went to the Capitol and Telegraphed with Rogers, and then experimented with Prof. Morse on the Banks of the Canal, very successful; after which I again went to the Capitol and telegraphed with Rogers.

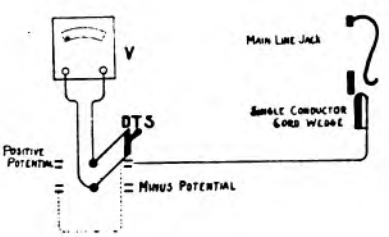
About this time the Washington telegraph office was moved from the Capitol building to the City Post Office building on Seventh Street, between E and F. Streets, N. W. The practical success of the Morse Telegraph had been fully demonstrated and the line was opened for the transmission of public business. Subsequent entries in Mr. Vail's diary relate to incidental electrical experiments, the collection of mineral specimens, etc., and record no important facts concerning the operation of the telegraph line.

Voltmeter Testing.

BY J. B. DILLON, DALLAS, TEX.

The article by Mr. Joseph Marshall on voltmeter testing, in TELEGRAPH AND TELEPHONE AGE of January 1, has caused a lot of experimenting by wire chiefs, and many who are unfortunate enough not to possess one of the Western Union standards, recognize the importance and necessity of watching closely the position in which cord wedges are inserted in the main-line jack, and of exercising care in selecting the proper pole of the battery, turning over the wedge, etc.

The accompanying diagram shows a method which enables anyone possessing a dead-beat volt-



CONNECTIONS FOR VOLTMETER TEST.

meter to get results quickly, it not being necessary that the zero point be in center to turn the cord, or fear connecting the wrong pole of the battery.

V represents a voltmeter with the zero point at the extreme left. The wedge used is one of the standard single-cord wedges. If the wire is open place the cord in the main-line jack, throw the double-pole switch to the right and read the deflection from the minus pole. If the switch is thrown to the left the reading will be from the positive pole. It is not necessary to remove the regular battery plug from the line; merely slip the wedge in the main-line jack with the rubber side up.

If a generator or storage battery is used for current supply the battery leads to D T S should have a 350-ohm lamp between the switch and source of supply. When not in use D T S is left open, standing at right angles to the base.

New Book.

THE PRACTICAL TELEPHONE HANDBOOK. By J. Poole, technical staff, British Post-office Telephones, London, England.

This is the fifth edition of this excellent work, and has been revised and enlarged so as to bring it up to date in the details of practice. It is very comprehensive and covers every phase of telephone practice.

Although it treats of English methods and practice, the latter do not differ materially from the American; it is only in a few details that the English depart from American standards.

The writer of the work has endeavored to touch on all the engineering departments of telephony, and has handled his task in a masterly manner. To describe telephone practice in detail is a laborious undertaking at best, but Mr. Poole has succeeded very well indeed.

The introductory chapter describes the various electrical terms used in electrical science and literature, and the succeeding twenty-four chapters are on the following subjects: Batteries; History, Receivers in General Use; Transmitters in Practical Use; Sub-station Apparatus; Sub-station Instrument Connections; Intermediate Switches and Extension Instruments; Intercommunicating Telephones; Switchboard Apparatus; Relay and Lamp Signaling; Small Switchboards; Larger Sub-exchange and Private-branch Exchange Switchboards; Multiple Switchboards—Magneto Series; Multiple Switchboards—Magneto Branching; Principles of Common-battery or Central-energy Working; Common-battery Multiple Switchboards; Junction-line Working; Trunk Line Exchanges; Party-line Working; Apparatus Room; The Power Plant; Traffic Statistics; Aerial Line Construction; Underground Work; Long-distance Lines—Pupin System of Line Loading; Submarine Telephone Cables; Faults and Their Localization; Electrical Measurements; The British Insulated Company's Telephone System and Later Post-office Exchange Practice; Special Exchange Systems; Automatic Exchanges; Development Studies of Fundamental Plans; Wireless Telephony, Miscellaneous Applications, and an Appendix.

The book has 613 pages and 527 illustrations, and is bound in cloth. The price is $2.50, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

TAXATION OF PUBLIC SERVICE CORPORATIONS.—The report of the Committee on Taxation of Public Service Corporations, by Charles J. Bullock, of Harvard University, Cambridge, Mass., has been reprinted in pamphlet form by the National Tax Association, Madison, Wis. Mr. A. E. Holcomb, 15 Dey street, New York, is the treasurer of the Association.

Three-Way Polar Repeater.

BY A. J. EAVES, ENGINEERING DEPARTMENT, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The three-way polar repeater used by the Postal Telegraph-Cable Company supersedes the former arrangement of working three duplex circuits into a house circuit by means of half repeaters.

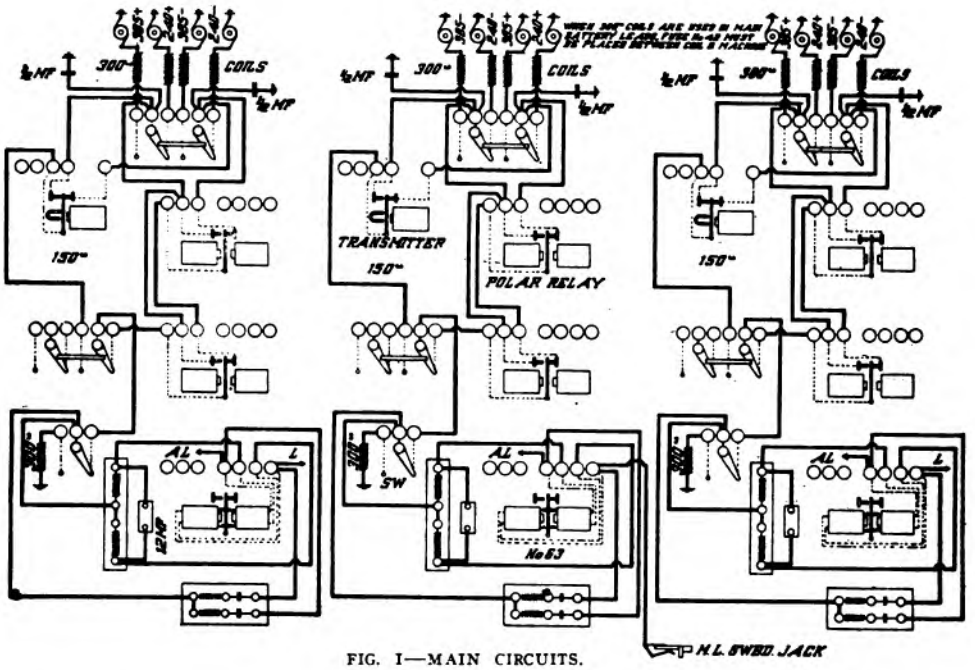


FIG. I—MAIN CIRCUITS.

The superiority of this repeater is clearly shown by assuming three duplexed circuits working into a house circuit and compare the number of performances at the repeater station with that of the three-way polar repeater. When the polarity at a distant station is reversed in the former arrangement there are four performances that take place before the polarity of the other two lines is reversed, namely, the main-line polar relay armature opens the transmitter circuit of the half repeater, the transmitter in turn breaks the house circuit. The electromagnets of the half-repeater relays then become demagnetized and their armatures are released and break the circuits through the coils of the pole-changers of the other two duplex sets and they in turn reverse the polarity of the line. With the three-way repeater, the main-line relay armature alternates current in the opposite electromagnets of the pole-changers and they in turn reverse the polarity of the line, reducing the number of performances fifty per cent.

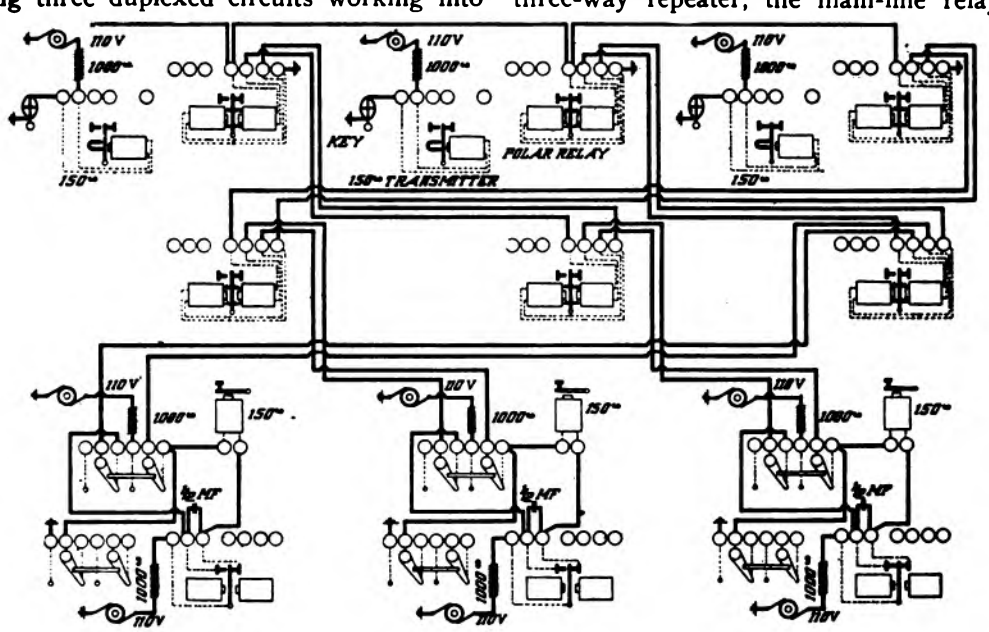


FIG. 2—LOCAL CIRCUITS.

By referring to the theoretical sketch (Fig. 3) it will be seen that the house circuit and the half repeaters are entirely eliminated, thereby taking out of the repeating system all slow-acting apparatus. The polar relay pole-changers are high-speed instruments and their figure of merit is below one-half milliampere.

There are seven pole-changers in the complete unit, one controlled by the branch office. Each main-line relay operates a pole-changer supplying current to each of the other two lines. The armature and closed contact point of the branch office transmitter are in series with one of the main lines. The open contact is equipped with the opposite polarity to that of the closed pole of the pole-changer of this line. This places the branch office on an equal transmitting basis with the repeating system.

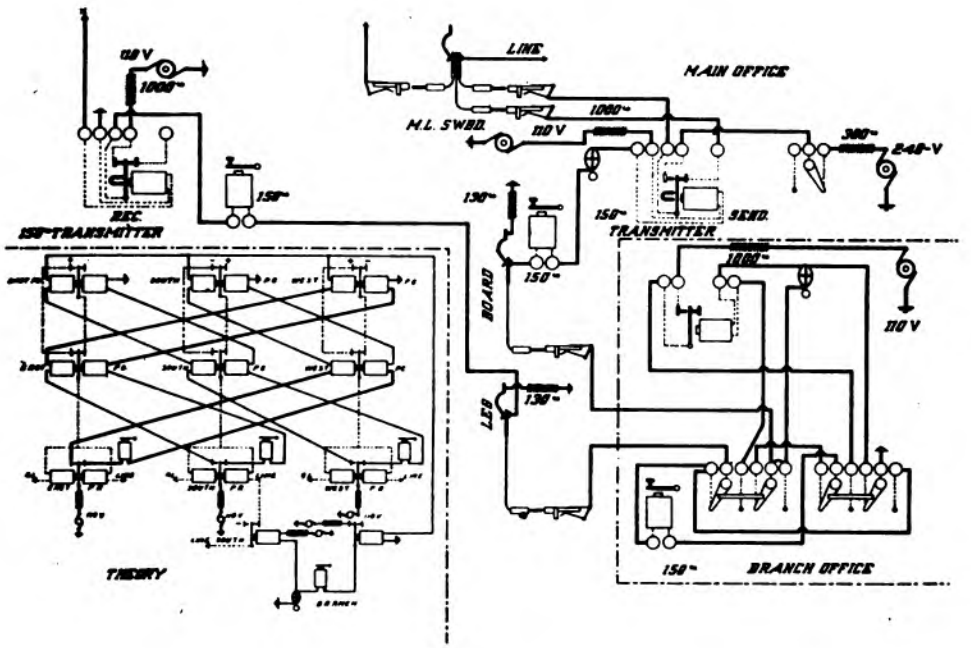


FIG. 3—THEORY AND BRANCH OFFICE.

When the branch office signals, the polarity of the south line is reversed and the circuit through the main-line coils of the south relay is broken, leaving current in the left-hand coils only. This condition moves the armature to the open contact and current is then transferred from the right-hand coils of the east and west pole-changers to the left, reversing the polarity of the east and west lines.

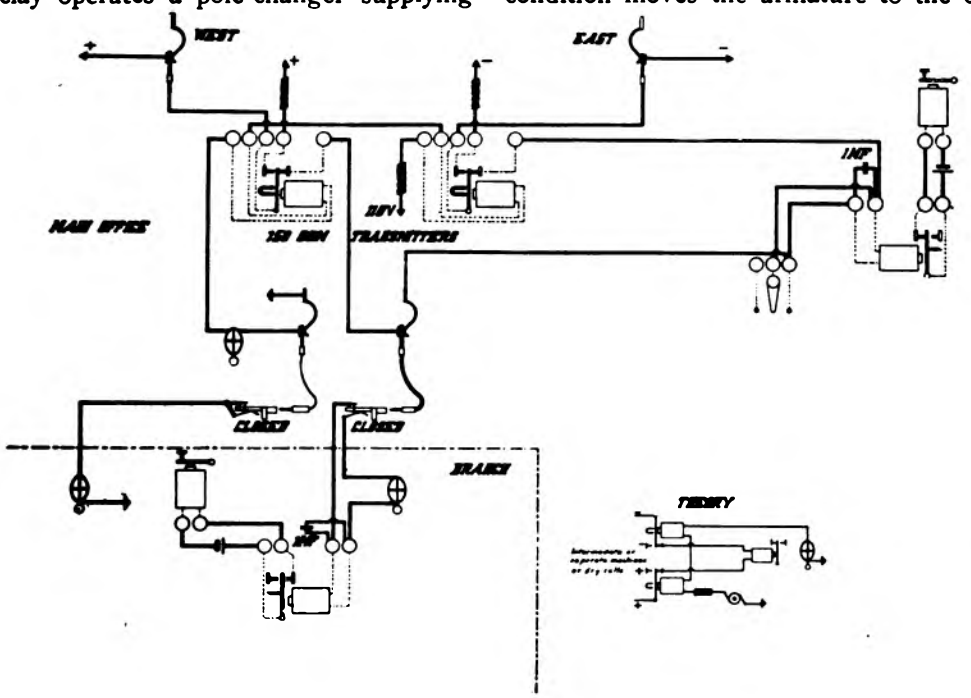


FIG. 4—INTERMEDIATE STATION.

All circuits from the left hand, or open, contact points of the main-line relays through the pole-changer coils take a common ground through the coils of a relay that repeats the received signals from all lines to the branch office.

One important advantage of the use of polar relays as pole-changers in the manner shown in the sketch is the "bug-catching" feature. The main-line relay cannot cause the reversal of the polarity of the other two lines until its armature has made contact with the back stop sufficiently long to give the pole-changers time to act; therefore any momentary kicks in the relay, where the normal condition is restored in the relay coils before the pole-changers have had time to perform their functions, will not be recorded on the other two lines, but will be noticeable on the reading sounder and can be detected by the attendant.

It sometimes becomes necessary to cut an intermediate office into one of the three duplex circuits. When the intermediate office does very little sending an ordinary relay and key are cut directly into the line and the polarity of the contact points of the pole-changer of the repeater are reversed (open-negative, closed-positive), so as to meet the negative-closed pole of the distant battery. When the way station signals, the circuit through the main line coils of the polar relays at the terminal stations is opened and the signaling is effected in the same manner as done by the branch office at the repeater terminal. This arrangement is very effective on well-insulated lines, but when the intermediate station is near a terminal and the line is very leaky between the way station and the more distant terminal, this simple apparatus becomes very inefficient.

Fig. 4 shows a transmitting arrangement for intermediate stations that is very effective on leaky lines. With a voltage on the open contacts of the transmitters equal to the pressure at the terminals, the way office can control the distant relays with the same speeds and accuracy as if the station were equipped with full duplex repeaters.

Dry cells or a small generator can be used for the main-line current supply at intermediate stations.

Pole-Line Leakage and Insulators.

BY M. M. DAVIS, ELECTRICAL ENGINEER AND CHIEF ENGINEER OF TELEPHONES, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

TELEGRAPH AND TELEPHONE AGE, in the issue of May 1, prints an article by Mr. Willis H. Jones upon Pole Line Leakage and Insulators. The article is timely and the subject deserves and gets much study by telegraph engineers.

Mr. Jones explains very clearly why it is that insulators do not insulate in wet weather, but one of his statements seems to me to be very wide of the facts. Mr. Jones says, "By this method the outer wet edge of the glass is removed an inch or more from the wooden pin, and as the inner side of the glass is dry, the direct route of current to the pole is thus broken by the high resistance thus inserted. If there were no other factor to contend with this dry portion of the insulator alone would prevent an excessive escape of current. Unfortunately, however, wet or moist air is a comparatively fair conductor of electricity; consequently, the current still finds a chance to reach the pole by following the air-gap between the insulator and the pin." It is, of course, true that "wet or moist air is a comparatively fair conductor of electricity," but I do not think that the pressures used in telegraphy cause any current to pass through the air at the point described.

Some years ago I assisted Mr. Francis W. Jones in making an experiment intended to conclusively show whether the pressures used in telegraphy did or did not cause leakage of current through moist air. Three plates of thin metal, each about five feet square, were suspended, within one inch of each other, upon insulated supports placed on the roof of a building near the corner of Broadway and Dey street, New York. These metal plates were so suspended that they hung parallel with each other, with the flat sides very close together. One pole of a grounded dynamo electric machine, running, if I remember correctly, at a pressure of about 100 volts, was connected with an extremely sensitive mirror galvanometer and thence to the two outside metal plates. The other plate was connected with the earth.

On several wet days I went to the roof to connect and disconnect the insulated leads while Mr. Jones watched the galvanometer needle. The experiment was tried during heavy rain and during very thick fog, but Mr. Jones never succeeded in getting a reading which indicated the passage of current from metal plate to metal plate through the air. As a matter of fact, the deflection obtained when the leads were connected with the plates was not disturbed when one of the leads was removed and Mr. Jones, at the galvanometer, was not able to detect the opening of the lead.

Of course, Mr. Jones and I were aware that we were merely checking up our convictions. In telegraph practice there is no appreciable leakage through the air. The leaks that bother us are at points of support, contact with trees, at arresters, in defective cables, etc.

Answers to Questions.

"In using the Barclay printing telegraph system, sometimes after the signature the blank jumps up one space, as if the line feed was used, then where the time should appear there come one or more letters. These letters must be erased, leaving a slight blur, and causing a lot of trouble. Kindly inform me what causes this. Is the perforated tape punched this way, or is the trouble in the printer?" R. K. S.

Answer.—An examination of the incoming signals on the blue tape, and the cutting in of a spare printer, should quickly decide whether the trouble is local or due to imperfection in the tape or improper trimming of the same at the end. The chances are, however, that one of the fifth bank relays on which the contact springs for the "period" and "line feed" are located opposite each other is not performing its functions properly. Try a snappier reset on this relay.

The Grand Trunk Pacific Telegraph Company.

April 7 was an historical and eventful date, not only in the railway, but also in the commercial development of Canada, and, to a particular degree, of northern British Columbia. On that date the two track-laying machines, one having commenced to lay track from Prince Rupert, B. C., eastward, and the other from Winnipeg, Man., westward, met at the Nechaco River, B. C., a point 1,374 miles west of Winnipeg, thus completing the laying of steel on the National Transcontinental Grand Trunk Pacific Railway, the only transcontinental railway having its entire main line located on Canadian soil.

Ten days later, on April 17, another event of the utmost importance in the development of Canada occurred at the same place; namely, the meeting of the two telegraph construction outfits, resulting in the completion of a transcontinental telegraph line.

The first pole erected in the construction of the telegraph line on the Grand Trunk Pacific, west of Winnipeg, was placed in position on September 13, 1906, since which date the construction of the line and erection of wires has proceeded concurrently with that of the laying of the steel. The Grand Trunk Pacific standard of telegraph construction has been a high one, and has been strictly adhered to. It was also adopted by the National Transcontinental Railway Commission as the standard for construction of telegraph lines on that portion of the road built under its jurisdiction, *i. e.*, from Moncton, N. B., to Winnipeg, Man.

Since September 13, 1906, the Grand Trunk Pacific has constructed, west of Winnipeg, 3,175 miles of pole line, 800 miles of which is through mountainous country, and has erected 7,499 miles of iron wire, and 3,516 miles of copper, a total wire mileage of 11,015.

In addition to telegraph circuits, special telephone train-dispatching circuits have been erected, and are in operation on the Lake Superior and Mountain division, the most modern selective apparatus being installed in connection therewith.

The erection of a copper metallic telephone train-dispatching circuit is now being proceeded with from Winnipeg, Man., to Edmonton, Alta., a distance of 793 miles. These circuits, when completed, will be equipped with the latest selective telephone apparatus.

On September 21, 1908, the Grand Trunk Pacific Telegraph Company inaugurated a commercial telegraph service, which is now in operation as far west as Prince George, B. C., with important offices at Winnipeg, Man., Regina, Sask., Saskatoon, Sask., Calgary, Alta., Edmonton, Alta., and numerous other points on the lines of the Grand Trunk Pacific Railway in Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. The erection of additional circuits is now being vigorously carried on, in order that a commercial telegraph service to and from Prince Rupert, B. C., may be established at the earliest possible date, which, it is anticipated, will be on or about September 1. When this is accomplished, northern British Columbia and the Yukon territory will be afforded more direct communication with the important commercial centers of Canada and the United States.

The telegraph lines are also rapidly being extended along the various important branches in Manitoba, Saskatchewan and Alberta now in course of construction.

The construction of the Grand Trunk Pacific telegraph lines, and the organization of not only the Grand Trunk Pacific commercial telegraph system, but also the railway time service department, has, since its inception, been under the management of Mr. A. Bruce Smith, manager of telegraphs.

Mr. Smith commenced his business career with the Montreal Telegraph Company. On the formation of the Great North Western Telegraph Company he became identified with it, and, in 1889, was appointed superintendent of construction for that company. On November 1, 1905, on the invitation of the late Mr. Chas. M. Hays, president, Mr. Smith severed his connection with the Great North Western Telegraph Company, to assume the position of manager of telegraphs of the Grand Trunk Pacific Railway, with head office at Montreal, Que. Subsequently, in order to maintain direct supervision over all construction and development work in the West, Mr. Smith, in 1906, transferred his office to Winnipeg, Man. On January 1, 1913, Mr. Smith's jurisdiction was extended to include the entire Grand Trunk Railway system, with headquarters at Montreal, Que. Mr. Smith is a staunch Canadian, of Scottish extraction, is a tremendous worker, enterprising, resourceful and progressive, being fully abreast of the times in all that pertains to telegraph, telephone and modern electrical development.

In his great and important work, Mr. Smith's chief assistants have been Mr. H. Hulatt, born in London, England, February 15, 1883, who previous to entering the service of the Grand Trunk Pacific in 1907 as private secretary to the manager of telegraphs, had had considerable commercial and journalistic experience. On January 1, 1910, he was promoted to be chief clerk, and from that time until January 15, 1913, when he was appointed commercial and traffic superintendent, and superintendent of time service, Grand Trunk Pacific Telegraph Company, Winnipeg, was the manager of telegraphs' chief assistant in the organization and operation of the Grand Trunk Pacific commercial telegraph system, and time service department; Mr. W. J. Rooney, born in Toronto, Ont., May 22, 1882, entered the service of the Electric Light Company, Toronto, as a junior on October 19, 1896, and resigned January 17, 1903, to accept a position in the construction department of the Great North Western Telegraph Company at Toronto. In 1905 he severed his connection with that company to take service in the telegraph department of the Grank Trunk Pacific Railway. In 1910 he was appointed general foreman, and was actively engaged in supervising construction work at the front, up to January 15, 1913, when he was appointed superintendent of plant, telegraph department, Grank Trunk Pacific, Winnipeg.

Development of Railway Telephone Service.*

BY JOHN A. KICK.

One cannot imagine the completeness of the telephone systems of communication on the railways ten years hence, unless the present system of the Pennsylvania Railroad in the Altoona district be accepted as one nearly approaching perfection; and there is reason to doubt if its present comprehensive scope is more than introductory.

It is difficult to find words to voice the opinions of an enthusiast, and it is entirely impossible even to assume a basis for comparison with the methods of yesterday and do real justice to the systems of to-day. The wildest guess ten years ago on the completeness of the present-day railway systems of communication would be only a weak effort and not worthy of a student of progress to use as a basis for computing the next ten years' advancement.

Only about thirty per cent of the railway mileage in the United States is dispatched by telephone, and while this is the result of only about seven or eight years' development and perhaps a precedent in the acceptance of an improved utility, yet the fact that only a very small mileage is equipped with message and commercial telephone service indicates the possibilities for the future.

It can scarcely be conceived that radical changes will be made in the systems of signaling as they are applied, nor does it appear probable that a much higher efficiency factor in voice transmission will be produced. However, there may be perfected an applicable and practical means for using higher power voice transmission which will result in its acceptance as solving the problem of the loud-speaking telephone train-dispatching system.

While worthy of noting in passing, these are only incidentals to the factor of education which is most necessary to the increase of these systems, as the important elements are, first, utility; second, practicability; third, value in relation to cost; fourth, acceptance; and fifth, financing.

The first two elements are settled, and so well known as to be considered no longer of dispute, but the third is not always so easily proved to any one who demands statistical evidence, which is no nearer of production in a convincing form than it was at the beginning.

Acceptance of the utility as one of value frequently suggests reason for and a means of financing: hence the importance of the educational factor.

Failure to finance is, in some cases, a severe impedance to progression, but, in the main, this factor has not been so serious as materially to retard the growth of the systems.

Simplex circuits superimposed on selective signaling circuits have furnished excellent duplex telegraph service, and on short lines acceptable quadruplex service. Printing telegraph systems have been placed in service on these simplex circuits, and, in general, the tendency has been toward the full use of the wires.

Phantom telephone circuits on parallel selective signaling circuits have been utilized in limited numbers, owing to the necessity of careful design of transposition systems to be fully effective.

The transposition systems are being gradually improved, by reason of observation on working systems. The results of the year's work is convincing that these phantom circuits are very valuable utilities when properly engineered and the results carefully applied.

It has been established that on two selective signaling circuits the phantom transposition sections are best established as between each two permanent telephone stations and as multiples of the standard section.

Accepting a standard transposition section as being of eight miles, then a derived section between two telephone stations five miles apart would be based on five-eighths of all standard measurements, that is, five-eighths of 1,300 feet, etc. A devoid section between two stations ten miles apart would be ten-eighths, and so on, thus bringing the bridges or loops at a section terminating point.

Investigation has been made of the practicability of using selective signaling apparatus for controlling various train directing semaphore mechanisms and with results to justify further research.

During the past year several selective signaling systems have been changed in some details, but the fundamentals are practically as before, with the result that the changes are productive of claims of additional marginal values without complete redesign. Some novel and more or less practical accessories were developed, but not of such consequence as to attract unusual notice. All of the developments were simple applications of mechanisms and circuits previously known to the art, and are novel only in their application.

One of the most noticeable developments of the year is that of the improved standards of railway telephone and telegraph systems, both in respect to equipment and its installation.

The meeting of the Association of Railway Telegraph Superintendents in St. Louis, last year, was the most successful and best attended of its history, indicating the degree of interest in the educational advantages of these meetings, and the importance of exchange of practical ideas.

During the year many railways made arrangements for emergency protection, such as emergency cables, coils of wire and instruments to insure prompt action in restoring interrupted service.

These arrangements are not so much an indication of the increased importance of the system of communication as they are a general recognition of the vital importance of communication—which has always been important, but not always so recognized.

The future for these systems is no greater in prospect than is that of the officials and engineering forces engaged, and it is to be hoped that inventive genius will not be neglectful of these systems.

* *Telephone Engineer.*

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The EDISON—BSCO cells are shipped with the plates permanently assembled in the frames, thus eliminating the disagreeable features incident to the renewal of wet cells; no parts that have been in solution are handled when recharging.

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THE RAILROAD.

MR. W. C. BESLER, recently elected president of the Central Railroad of New Jersey, was chief train dispatcher on the Chicago, Burlington and Quincy Railroad in 1884. He is a graduate of the Massachusetts Institute of Technology.

MR. W. J. CAMP, assistant manager of telegraphs, Canadian Pacific Railway, Montreal, Que., attended the gathering of Shriners at Atlanta, Ga., on his way to the New Orleans convention of the Association of Railway Telegraph Superintendents. He is accompanied by Mrs. Camp.

TRAIN DISPATCHERS' CONVENTION.—The annual convention of the Train Dispatchers' Association of America will be held at Jacksonville, Fla., June 16.

WIRELESS TELEPHONY ON LACKAWANNA.—Wireless telephone conversation was held on May 1 between the Lackawanna Limited, on its way to New York, and the Scranton, Pa., fixed station of the Lackawanna Railroad. The train was going at a speed of fifty miles an hour between Scranton and Stroudsburg, Pa., and during the run between the two points, a distance of fifty-three miles, conversation was distinct and uninterrupted. The De-Forest amplifier was used with success.

New Orleans Convention of Railway Telegraph Superintendents.

The thirty-third annual convention of the Association of Railway Telegraph Superintendents, which will be held at the Grunewald Hotel, New Orleans, La., May 19-22, inclusive, promises to be one of the most important and interesting ever held by the association. There is promise of a large attendance, and while there is plenty of work laid out for the meeting, the members will have some time for entertainment.

WM. BENNETT, CHICAGO, ILL., PRESIDENT ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS

An informal get-together assembly will be had Monday, 8 p. m., May 18, in the Gold Room of the Grunewald. Members should register at that time.

The first business session will be called at 10 a. m., Tuesday, May 19.

The Grunewald Hotel is the newest and largest hotel in New Orleans, and represents an investment of over $3,000,000. It is equipped with a wireless telegraph station on the roof, which, no doubt, will have particular interest to the superintendents.

Some excellent and practical papers will be presented at the convention, and as copies of these have been sent to the members in advance, it is hoped that they will come prepared to enter the discussions and add their experiences to the general fund of knowledge.

Following is a list of the papers:

Organization of Gangs, Including Plans for Boarding the Men. By M. B. Wyrick, division plant superintendent, Western Union Telegraph Company, Dallas, Tex.

The Fitting of Applicants for Telegraph and Telephone Service on Railroads. By J. B. Sheldon, superintendent of telegraph, Union Pacific Railroad, Omaha, Neb.

Unit Cost of Railroad Pole Line Construction and Repairs. By V. T. Kissinger, superintendent of telegraph, Chicago, Burlington and Quincy Railroad, Chicago, Ill.

The Printing Telegraph. By Archibald Wray, assistant superintendent telegraph, Chicago, Rock Island and Pacific Railway, Chicago, Ill.

The Maintenance and Telephone and Telegraph Equipment. By M. B. Overly, engineer telegraph department, Cleveland, Cincinnati, Chicago and St. Louis Railway, Indianapolis, Ind.

Organization of Forces for Restoring Wire Service Interrupted by Storms. By J. C. Hubbard, general supervisor of lines, Western Union Telegraph Company, New York, N. Y.

Wireless Telegraphy in Railroad Service. By L. B. Foley, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York, N. Y.

The order of the Sons of Jove will entertain the superintendents at Spanish Fort in the evening of May 19.

MR. L. L. LEECH, manager and wire chief, Atchison, Topeka and Santa Fe Railway, at Albuquerque, N. M., writes: "Enclosed find $2.00 for my renewal. Thank you for your kindness in keeping my name on your books."

MR. BENJAMIN F. THOMPSON, telephone inspector, Baltimore and Ohio Railroad, Baltimore, Md., writes: "It gives me pleasure to enclose check for $2.00 for renewal, for which I get value received."

THE JAMES D. REID MEMORIAL.—The trustees of the Reid Memorial Fund have contracted for the erection of the monument to the memory of the late James D. Reid at the head of his grave in Mount Hope Cemetery, Rochester, N. Y. It is expected that the monument will be formally unveiled in the early fall.

STATISTICAL INFORMATION REGARDING TELEPHONE TRAIN-DISPATCHING ON RAILROADS IN THE UNITED STATES AND CANADA, CORRECTED UP TO MAY 1.

NAME OF RAILROAD	Name of Superintendent of telegraph	Total mileage	Total mileage operated by telegraph	Total mileage operated by telephone	Telephone mileage increase during previous 12 months
Atchison, Topeka and Santa Fe	L. M. Jones	11,170	3,726	7,444	840
Atlantic Coast Line	W. P. Cline	4,816	3,399	1,192	104
Baltimore and Ohio	C. Selden	5,471	3,826	1,174	397
Bessemer and Lake Erie	F. W. Smith	206	0	206	0
Boston and Maine	S. A. D. Forristall	2,302	2,019	282	56
Canadian Pacific	W. J. Camp, As. Mgr.	14,184	7,710	6,121	1,311
Chicago and Northwestern	Wm. Bennett	7,899	5,608	2,180	269
Chicago, Burlington and Quincy	V. T. Kissinger	9,041	5,681	3,344	200
Chicago Great Western	G. O. Perkins	1,496	838	658	315
Central Vermont	M. Magiff	536	171	365	95
Cincinnati, Indiana and Southern	W. L. Connelly	322	0	322	0
Chicago, St. Paul, Minneapolis and Omaha	Geo. Boyce	1,753	1,673	0	0
Chesapeake and Ohio	C. W. Bradley	2,342	473	1,475	149
Chicago, Rock Island and Pacific	C. H. Hubbell	8,316	5,534	2,218	146
Chicago and Eastern Illinois	Chas. McCormack	1,282	1,064	218	0
Central Railroad of New Jersey and New York and Long Branch Railroad	F. G. Sherman	676[1]	602	75	35
Chicago, Milwaukee and St. Paul	E. A. Patterson	10,368	6,913	3,454	200
Chicago, Terre Haute and Southwestern	F. H. Van Etten	360	194	166	0
Cleveland, Cincinnati, Chicago and St. Louis	C. S. Rhoads	1,919	360	1,559	0
Colorado and Southern	J. L. Henritzy	1,871	1,722	0	0
Denver and Rio Grande	John M. Walker	2,598	2,222	376	330
Denver, North Western and Pacific	C. A. Parker	214[2]	0	50	0
Delaware, Lackawanna and Western	L. B. Foley	985	0	985	0
Erie	E. P. Griffith	2,227	1,322	905	406
Grand Trunk Railway System	A. B. Smith	4,765	2,711	2,076	0
Grand Trunk Pacific Railway	A. B. Smith	3,170	305	2,643	0
Great Northern	E. J. Little	7,526	2,652	4,875	108
Illinois Central	F. T. Wilbur	3,019	1,742	1,277	162
Kansas City Southern	R. L. Logan	826	826	0	0
Long Island	L. S. Wells	388	17	370	304
Lake Shore and Michigan Southern	F. F. Riefel	1,682	36	1,646	0
Lehigh Valley	J. F. Caskey	1,439	163	1,275	0
Louisville and Nashville	R. R. Hobbs	4,923	2,634	1,929	375
Maine Central	J. B. Norcross	1,360	1,360	0	0
Michigan Central	J. J. Ross	1,701	166	1,418	0
Missouri Pacific	E. A. Chenery	7,284	6,016	1,131	0
Missouri, Kansas and Texas	W. H. Hall	3,817	1,820	1,813	954
Minne., St. Paul and Sault Ste. Marie	P. W. Drew	4,013	3,797	194	0
New York, New Haven and Hartford	N. E. Smith	2,000	1,900	100	0
Norfolk Southern	C. P. Dugan, Supt. of Transportation	907	146	618	157
Northern Pacific	M. H. Clapp	6,313	3,263	2,730	675
Norfolk and Western	W. C. Walstrum	2,018[2]	235	1,783	0
New York Central and Hudson River and Boston and Albany	A. B. Taylor	3,264	790	2,474	297
New York, Chicago and St. Louis	W. L. Blair	523	0	511	0
Oregon Short Line	B. F. Frobes	2,085	1,770	315	267
Oregon, Washington R.R. and Navigation Co.	E. A. Klippel	1,992[2]	1,648	344	0
Pennsylvania	J. C. Johnson	4,700[2]	2,200	2,500	0
Pennsylvania Lines West of Pittsburgh	G. A. Cellar	4,930[3]	4,690	130	0
Pittsburgh and Lake Erie	L. A. Lee	221	0	221	0
Pere Marquette	W. K. Tasker	2,325	2,318	650	79
Pittsburgh, Shawmut and Northern	C. L. Lathrop	270	144	126	0
Philadelphia and Reading	C. M. Lewis	3,558	3,558	0	0
Queen and Crescent	W. S. Melton	630	294	336	108
Richmond, Fredericksburg and Potomac	T. R. Gooch	112[2]	0	112	0
Southern Pacific and Arizona and Eastern	E. L. King	6,858	6,016	842	38
Seaboard Air Line	W. F. Williams	3,081	1,381	1,700	107
San Pedro, Los Angeles and Salt Lake	C. J. Steinel	1,040	1,040	0	0
Southern	W. H. Potter	7,033	6,752	281	0
St. Louis and San Francisco	H. D. Teed	4,748	2,703	1,901	1,136
Texas and Pacific	Frank Tremble	1,885	1,885	0	0
Terminal Railroad Assn. of St. Louis	F. E. Bentley	14	14	0	0
Union Pacific	J. B. Sheldon	3,616	2,894	722	117
Wabash	J. P. Church	2,135	1,287	848	0
	Totals	204,526	126,232	74,664	9,908

[1] Including trackage rights. [2] Report same as 1913.

[3] Mr. G. A. Cellar, superintendent telegraph, Pennsylvania Lines West of Pittsburgh, Pa., under date of April 4, writes: "I would advise that there has been no change on the Lines West of Pittsburgh since my letter to you of April 9, 1913, which reads as follows: 'The telephone dispatching matter with us is just about as it was a year ago. The total mileage includes 110 miles of branch lines to coal mines, which have neither telephone or telegraph communication.'"

[NOTE—It is proper to add an additional thousand miles increase of telephone dispatching on the smaller roads, as the table covers trunk lines only.]

MUNICIPAL ELECTRICIANS.

FIRE DEPARTMENT TELEPHONE SERVICE.—The Red Oak Telephone Company, of Red Oak, Iowa, and the fire department are divided over the sending in of alarms. In a hearing before the mayor the telephone company declared that it places too much responsibility upon the company to have the fire call locations told to Central, who then rings the proper signal at the fire station and locates the chief and volunteers somewhere in the city. The firemen say discontinuance of the system will greatly inconvience them and jeopardize the community.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, who has been in Europe six weeks, arranging for new wireless stations in Norway and elsewhere, and has visited Brussels, Paris and London, returned to New York on the steamer "Imperator" May 9.

WIRELESS OUTFIT STOLEN.—A wireless outfit recently installed by the Marconi Wireless Telegraph Company was stolen from the laboratory of the East Side Y. M. C. A in New York. The equipment stolen was the most modern type of commercial receiving apparatus and was valued at $500.

Transatlantic Wireless Service.

During his recent trip to England, Wales, France and Belgium, Mr. E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, completed arrangements with the foreign Marconi companies for the opening of the new high-power transatlantic wireless service which will occur in June. Besides the regular fast service there will be a plain language "deferred" service a daily letter service, and a week-end letter service. Substantial reductions from existing rates will be given to the latter classes.

The new stations of the American Marconi Company, at Belmar and New Brunswick, will work with the new stations in Wales, which will be connected with the British land line systems, and through them to all points on the Continent.

In the United States the American company has a traffic arrangement with the Western Union Telegraph Company, by which every Western Union office will be a Marconi office for the reception and delivery of Marconigrams.

Long-distance wireless service with France, Germany and Norway will soon follow. Powerful stations are being built at Marion and Chatham, Mass., which will be connected with Boston and New York, and work with Stavenger, in Norway, for Russia and Northern Europe traffic.

Mr. Nally said that Dr. Marconi had completed his tests and got out practical designs for wireless telephone apparatus based upon principles which had not hitherto been attempted.

Wireless Amateur Penalized for Violating the Wireless Law.

A wireless amateur of Los Angeles, Cal., was reported to the United States Attorney for operating his station without a license and causing interference, being a violation of section one of the Act of August 13, 1912, to regulate radio communication, for which a penalty of $500 is provided and the apparatus may be confiscated, in the discretion of the court.

Judge Wellborn, of Los Angeles, in passing sentence upon the offender, stated that as this was the first prosecution under the law in his district, he would assess only a nominal fine, with the understanding that all future prosecutions under this Act would be dealt with summarily, and the punishment materially increased. In view of the fact that the offender had disposed of his radio apparatus shortly before his indictment, the judgment did not include the confiscation provided by law.

Institute of Radio Engineers.

The May meeting of the Institute of Radio Engineers, New York, was held in Fayerweather Hall, Columbia University, May 13.

Messrs. L. L. Israel and E. J. Simon presented a paper on "The Operating Characteristics of a Three-Phase, 500-Cycle, Quenched-Gap Transmitter." This paper reviewed experiments conducted last November at the New York Navy-yard radio station, together with the observations recorded at the Bureau of Standards and at the Arlington radio station, near Washington.

Vice-president Stone spoke on the subject of the "Resistance of the Spark and Its Effect on the Oscillations in the Primary and Secondary Circuits."

Notes on American Telegraphs.

Mr. J. H. Bell, telegraph expert for the Western Electric Company, New York, and formerly of the telegraph section of the British Post-office, London, is the author of "Some Notes on American Telegraphs" in the April number of the *Post-office Electrical Engineers' Journal*, of London. Mr. Bell describes the American practice as to single wire, duplex, quadruplex and repeater operation. He also describes and illustrates the principle of the sending machine and says, "There is no doubt that by using these semi-automatic devices, many men afflicted with cramp, who would otherwise have been compelled to retire from the telegraph service, have been able to continue as expert operators."

"One noticeable feature of American conditions," says Mr. Bell, "is the remarkably high insulation of aerial lines which exists throughout the greater portion of the year. During some experiments in which the writer was interested," he continues, "an aerial circuit of nearly 500 miles in length showed practically no loss of current, the current at the receiving end being within 99.5 per cent of that sent out."

Coding the Code.

It is a source of wonder to many how operators, in receiving code, can spell the words out on the typewriter and keep up with the sending operator. As a matter of fact, the ability to do this requires long experience and the exercise of good judgment, and it is comparatively few operators who can master the task with success.

Some operators are so expert at code receiving that the most rapid code senders cannot get ahead of them in the matter of speed. The following story is an example of ultra-coding, and while it is full of pathos, it is suggestive of the possibilities in that line of work.

A few years ago, when the bonus system was young, the general manager of one of the commercial companies questioned an operator about the very high rate of speed that was being maintained on certain circuits. "How do you do it?" he asked.

"It isn't so much a question of speed, as it is one of systematization," the operator told him. "For example, the sending operator transmits merely the signal 'Jqx' for a message reading, 'Your mother-in-law is dead, or 'Your mother-in-law is dead, are you coming?' or, in fact, any message wherein the joy-maker of the home is represented as having departed for other climes. The receiving operator, upon hearing this combination of letters, fills in a sufficient number of words to correspond with the 'check,' being particular *only* not to omit the joyous tidings. Sometimes a message of this character is rendered, 'Your mother-in-law is dead. *Congratulations.*'"

The general manager threw up both hands. He was amazed at the probability of such wanton abandonment of care.

"We have unbounded confidence in the consistency of human nature," continued the operator, "and we, therefore, have no fear that the recipient of such a message—if he be mentally normal—will take chances on its revocation by questioning its accuracy in any detail. It's the safest thing we do."

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 20). What is the most economical method of obtaining electrical current on a large scale?

To what purposes is the use of primary batteries limited?

What has been the principal result of the introduction of the common-battery system in telephony?

(Page 21). What are the different terms used to designate the force which sets up a current of electricity?

What is the unit of measurement of this force, and what is its legal definition?

Is there a point anywhere in nature at actual electrical zero potential?

If there were such a point what would be the practical effect?

In practice, where is the arbitrary zero obtained?

What is the term used to designate a potential higher than that of the earth, and a potential below that of the earth?

Is the potential of the earth steady?

Are the terms positive and negative absolute in their meanings?

(Page 22). What was the early theory regarding the zero potential of a body charged with electricity?

In studying electrical phenomena it is often advisable to magnify the particular factor under investigation; how can this magnification be obtained?

What peculiar quality does amber exhibit when rubbed?

Are the electrical effects produced by the rubbing itself? If not, what is the cause?

(Page 23). In experimenting with pith balls, why do they attract each other and then, after contact, they repel each other?

What is the lesson taught by the attraction of the two pith balls, and what do we learn when they repel each other?

(Page 24). Is there any difference between static and dynamic electricity?

What is static electricity?

What is dynamic electricity?

In distributing static electricity over a wire, why does the charge cease instantly, while the current from a battery continues?

What is the most conspicuous manifestation of static electricity?

(To be Continued.)

Telephone and Telegraph Statistics.

The American Telephone and Telegraph Company has issued, through the office of the statistician, an eight-page pamphlet giving telephone and telegraph statistics of the world, by countries, to January 1, 1913. It gives the number of telephone stations; telephone and telegraph wire; telephone and telegraph gross earnings; telephone investment; comparative table of first-class mail, telegraph and telephone traffic, Europe and the United States; telephone development of each city in Europe with over 500,000 population; telephone development—urban and rural—Europe and United States.

The total number of telephone stations in the world is 13,570,874, of which 8,729,592 are in the United States. There are 33,261,934 miles of telephone wire and 5,196,891 of telegraph wire in the world, of which there are in the United States 20,248,326 and 1,814,196 miles respectively. The total telephone investment in the United States is $1,094,800,000, and in the world, $1,906,041,000.

CUBAN TELEPHONE COMPANY.—The report of the Cuban Telephone Company, dated January 31, shows that the company had 16,053 subscribers, as compared with 11,389 on the same date in 1913. The gross receipts for January, 1914, were $87,000, as against $65.000 in January, 1913. Extensions of plant are rapidly being made over the entire island.

BLIND TELEPHONE OPERATORS.—Several private telephone exchanges in Oklahoma are operated by blind men, who perform the work as rapidly and unerringly as do men with perfect vision. T. M. Warrell, who has been blind since he was two years of age, is a half-owner of the McCurtain exchange and attends to all of the outside work of the exchange. He is relief and night operator of the system. He keeps his own books, using the New York point system.

BOWLING BY TELEPHONE.—The tie between New York and Buffalo in the Long-distance telephone bowling contest, which took place on the evening of April 18, was played off on Friday evening, May 8. The New York team played on the alleys of the Telephone Club, 353 West Seventeenth street, New York. Long-distance telephone circuits were established between New York and Buffalo, and the scores were transmitted as each player completed a frame. Scorers stationed at the telephone received and transmitted the scores, which were placed on blackboards in the two cities for the information of the players and spectators.

FULL OF ELECTRICITY.—A man was recently committed to a western insane asylum because he imagined that he was a living telegraph instrument, "full of electricity," and that he was constantly fighting with himself for the circuit. O, electricity, what crimes are committed in thy name!

INDUSTRIAL.

Adaptability.

In speaking of people being adapted to do certain things we usually imply that either they do or do not do these things as well or better than the average person—in other words they either do or do not qualify for certain things.

In speaking of systems of telephone or telegraph equipment, the same terms apply. A system is either adapted to accomplish certain things well, or is not adapted to such service.

The personal non-adaptability may be due to several causes such as lack of education, lack of experience, lack of tact, lack of efficiency for any cause.

The material non-adaptability is due to either lack of development, lack of engineering, lack of design, lack of wearing qualities, in short, lack of efficiency for any cause.

The test of adaptability is results, and the cost of producing them. In telephone and telegraph work, things with which all are familiar, there are two fertile places to look for this quality, which above all others, should be considered.

Take a private branch exchange proposition as it now stands with a manual board, the calls originate with a subscriber calling the operator. The operator repeating the number, putting up the connection and ringing the second subscriber, or if the line is busy, testing the line and either plugging into a busy jack, or reporting back to the first subscriber.

The time consumed is twenty-five seconds on an average. The cost per connection in time is a little more than four times as much as it should be.

The unnecessary motions made and things done unnecessarily are: 1. Plugging in to answer the call; 2. Questioning the subscriber; 3. Testing the line; 4. Plugging into the called line; 5. Supervising the connection.

A machine nowadays which will do away with four or five operations is in great demand in all branches of industry. If such a machine is available for private branch boards, it ought to be used. Such a machine is available, and in a few years will find a long-felt want in all offices, shops and other points where now there is an operator, and such things as business leaks through operators will be a thing of the past.

Many of the industries of the country to-day are equipped with such equipment, and every day more are being equipped. There are two or three devices on the market for doing this work. Some of them are proving very satisfactory, and the subscriber is the winner. He gains in time, money, satisfaction and efficiency. No one is the loser, as the only thing eliminated is manual work, electrical work being substituted for it, and a few unnecessary pieces of equipment being eliminated.

Or, take the question of telephone train dispatching and telephone message work on railroads. Nearly all the railroad men now agree that the old telegraph systems are obsolete, cumbersome and expensive. The new up-to-date equipment reduces the labor of the dispatcher, saves him a world of time, and makes him more competent to handle his work, as the strain of calling is removed, and the time left for thought, planning and keeping informed is increased correspondingly. Along these lines a great deal still remains to be done.

Every year new inventions are being placed on the market, and new plans for increasing the efficiency of machinery and men are made and carried out. Every man on the firing line should do his duty, and a little more, accept the privileges and advantages offered him, and go into the new proposition with an earnest desire to show not only his company, but the world, that he means business, and is really working for the interests that pay him his salary. If we look at the successes of the world, we find men who have done a little more than their duty demanded on every task assigned them.

It behooves engineers, superintendents, and managers, or what not, to study to improve the service rendered by them or are responsible for. There are many ways of doing it. The two outlined would be good places to start.

The private branch exchanges of railroads in this country cost these railroads close to a million dollars a year more than they need to. The obsolete forms of telegraph operation is expensive, and unprofitable. Many are improving, all are longing, some are acting.

Finally, "are you doing a competent man's work by allowing losses to continue to occur, which can be stopped. Here's to the best that is in us. Hoping for a prosperous and useful career, which is the just deserts of the competent man, and is the sure reward of the man adapted to his work, who uses the tools best adapted to perform that work."

The General Railway Signal Company, Rochester, N. Y., recently issued some very attractive and instructive literature on its well-known products. It consists of pamphlets on the G. R. S. Model 2-A Signal; G. R. S. Improved Lightning Arrester, and G. R. S. E-Z Motion Plate Rail Clips and R. S. A. Detector Bars. Each pamphlet is very complete in the description of the subject to which it is devoted, and well illustrated. Views are shown of actual installations, and much valuable information is given on the general subject of railway operation. The company has also issued several loose leaves for insertion in the loose-leaf catalogue. These are devoted to the R. S. A. mechanical dwarf signal.

Successful Office Boys.—The *Western Electric News* for May is dedicated to the office boys and contains forty pages of contributions either relating to or furnished by those who are either at present serving the company in that capacity or have done so in the past. There are pictures of thirty-nine Western Electric men now holding important positions with the company, all of whom started as office boys.

Telegraph Company Suspends Business.

The Chicago-Milwaukee Telegraph Company, which has been doing business in Milwaukee since 1878, will cease to do business. This company has been operating through lines between Milwaukee and Chicago, the Chamber of Commerce in Milwaukee and the Chicago Board of Trade having been their principal patrons. Some commercial business was handled, however. M. P. Addis has been the manager of the company since it was first organized. Lack of business is said to be the cause of suspension.

The original owners of the company were members of the Chicago and Milwaukee boards of trade, and when the company started business it adopted a ten-cent message rate between the two points and rendered quick service. The ownership changed hands some years ago and the company finally passed into the hands of a receiver. Mr. U. W. Boggess, manager of the Western Union Telegraph Company at Marion, Ohio, was connected with the company for eighteen years, but left the service eight years ago.

A Simple Telephone Circuit.

In Mr. W. H. Jones' article in our issue dated April 16, a slight discrepancy occurred between the illustration of the simple local telephone circuit and the text describing it. The article reads, "The normal position of the switch levers, when the circuit is idle, is on the left-hand discs." The article, in order to make the drawing symmetrical, slightly deviated from the arrangement of the connections as described in the text, with the effect that one lever would have to be turned to the left and the other to the right to be in normal positions. The cause of the error is obvious to anyone who understands electrical connections, but for the benefit of those who do not, we make this explanation.

T. & T. L. I. A. Proceedings.—The proceedings of the forty-seventh annual meeting of the Telegraph and Telephone Life Insurance Association, which was held in New York, March 11, have been issued in pamphlet form. It contains the usual detail statistics and general information. Mr. M. J. O'Leary, New York, is secretary of the Association.

Jove Steals Words from Telegraph Lines.—A Texas paper, in referring to the effect upon the operation of the telegraph lines during a recent thunder storm, says the words were "knocked off" the wires. If any Texan happens to find any of the missing words laying around in the grass no doubt the telegraph company will be glad to have them restored to the wires.

Telegraph and Telephone Age

No. 11 NEW YORK, JUNE 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

Principle of the Magnetic Circuit.

No doubt many students of electricity who have constructed and experimented with home-made electromagnets have realized that they usually require more current to magnetize them to a given strength than do similarly wound standard design magnets. The iron core of a home-made instrument may be of the same length and diameter as that of the standard instrument, and wound with the same size and number of turns of copper wire, yet it is much weaker magnetically for equal volumes of current. In order to understand why this is so, the student should study the laws which govern every magnetic circuit.

The general laws which govern such circuits were, of course, fairly understood by many early experimenters. For instance, they knew that more current meant a stronger magnet; that the strength of a magnet could be increased by either increasing the strength of the current flowing in the conductor, or by increasing the number of turns of wire in the coil, without increasing the line current. They also knew that leakage and the design played important parts, but it was not until about 1873 that the laws which govern magnetic circuits were put in shape for making accurate computations, such as Professor Ohm evolved for regulating the electric current itself. The method adopted was suggested by Professor Rowland, of Baltimore, and is practically Ohm's law applied to magnetic lines of force instead of to the current. In Ohm's law $\frac{E}{R} = I$, E represents the electromotive force, R the resistance of conductor, and I the strength of the current. By merely using different terms for these three factors, E, R, and I, the same formula, or rule of three, can be, and, in fact, is used for measuring magnetic circuits, viz.: $\frac{\text{magneto force}}{\text{reluctance}} = \text{magnetic flux}$. Magneto force stands in the same relation to the strength of magnetism developed in the iron core, as the term volt, or electromotive force, E, does to current strength, I, in amperes developed in the conductor. Its value is always equal to the product of the current in amperes flowing through the line and number of turns in the coils. Magnetic flux is the equivalent of current strength, or amperes, while reluctance and resistance means the same thing, the former referring to the resistance the iron core offers to the flow of magnetic lines of force through it. In an electric circuit the current is confined to a continuous unbroken conductor, and its strength is the same throughout the entire length thereof. Magnetic circuits, however, except where the core is in the form of a ring, consist of at least two parts, one of which is iron and the other an air-gap, while the density of the flux differs in different parts of the circuit, according to the size and design of the magnet. The variations are caused by leakage due to our inability to properly insulate magnetic lines of force. Such lines are constantly endeavoring to find other metallic fields to explore, and some of them will reach out and become diverted through any other piece of iron that happens to be placed sufficiently near them.

They also become denser, and therefore stronger on the inner edges of a horseshoe-shaped iron core, because they endeavor to contract the circumference of the magnetic circle in which they flow. If the metal is not completely saturated they will naturally crowd towards the inner side. For the latter reason it follows that the two prongs or cores of the magnet should not be too close together. If such is the case some of the lines will cut across the intervening space, in preference to continuing on and crossing the air-gap between the two end pole-pieces. All escapes of this kind, of course, weaken the strength of the magnet at the pole-pieces where useful operation occurs.

Again, the strength of a magnet depends upon the length, diameter, and quality of iron used, and the manner in which the coil is wound around it. Some specimens of iron offer greater reluctance (resistance) to the magnetic lines than others. The longer the core the greater the reluctance; hence, it should be no longer than is actually necessary to hold the required number of turns of wire in the coil. The maximum number of layers of turns per-

missible in a coil depends upon the diameter of the iron core. The thickness of the winding should not be greater than the diameter of the core, otherwise the magnetism developed will not be increased in proportion to the additional energy required to overcome the resistance in the outer layers. The iron core should not be wound flush up to the pole ends. It should protrude a very short distance from the coil, otherwise the lines of force carried by the end layers on opposite pole-pieces will antagonize and lessen the total output developed.

If a yoke is used to connect two straight iron cores together, as is usually the case, the bar and screws should both consist of the highest grade of soft iron, and properly fitted, otherwise unnecessary reluctance will be added to the magnetic circuit.

There are, of course, other factors to be considered in connection with the construction of magnets, such as the particular purpose or requirement of the instrument. Quick action may be required in one and slow action in another; or, one may be required to attract from a distance, while another type is used for holding or lifting purposes by "traction" or direct contact with another piece of iron.

The basic principles employed in the construction of a magnetic circuit, as roughly indicated by the writer, should make it very plain to students why magnets constructed in a haphazard manner and designed for no single purpose, must, obviously, be of an inferior order.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, May 26.

American Telephone and Telegraph Co.	122⅛
Mackay Companies	81
Mackay Companies, Pfd.	68½
Marconi Wireless Tel. Co. of Am.	3⅝
Western Union Telegraph Co.	61⅞

Telegraph and Telephone Patents.

ISSUED MAY 5.

1,095,342. Wireless Receiver. To H. Merton, London, England.

1,095,354. Telephone Transmitter. To J. Redding, Malden, Mass.

1,095,539. Calling Device for Telephone Exchanges. To C. A. Anderson, Chicago, Ill.

1,095,666. Telephone System. To F. R. Parker and E. R. Corwin, Chicago, Ill.

1,095,950. Device for Disinfecting Telephones. To R. B. Adams, L. Adams, C. H. Wells and H. G. Payne. Westerville, Ohio.

ISSUED MAY 12.

1,096,108. Telephone System. To B. G. Jamieson, Chicago, Ill.

1,096,127. Telephone Receiver. To A. Rosenberg, London, Eng.

1,096,153. Telephone Transmitter. To E. B. Craft, Hackensack, N. J.

1,096,434. Telephone Transmitter Cut-out. To A. R. Langdon. Hartford, Conn.

1,096,676. Telephone Receiver. To S. G. Brown, London, Eng.

1,096,677. Telephone Transmitter. To S. G. Brown, London, Eng.

1,096,717. Oscillator for Wireless Transmission. To C. D. Herrold, San Jose, Cal.

PERSONAL.

MR. ANDREW CARNEGIE sailed from New York for England on the steamer "Oceanic" on May 23.

DR. A. S. MCALLISTER, editor of the *Electrical World*, New York, has been elected president of the Illuminating Engineering Society, New York.

MR. W. E. NEWCOMBE, an old-time telegrapher, employed at one time in New York and Chicago, and for some time past manager of the Western Union Telegraph Company at Ashland, Ore., has been elected president of the Ashland Commercial Club, of that city.

MISS MADELEINE EDISON, daughter of Mr. and Mrs. Thomas A. Edison, West Orange, N. J., will be married to Mr. John Sloane, of South Orange, N. J., on June 17. Mr. Sloane is the son of Dr. T. O'Conor Sloane, the well-known educator in electricity, and author of several books on that subject.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager of this company, has completed his visits to the company's offices in the New England and a large number of the Southern States. Mr. Reynolds was greeted in an extremely friendly way by everyone identified with the service. His next visit will probably be to the offices in the Western Division. He proposes to pay his respects personally to every manager in the service.

MR. E. KIMMEY, superintendent, New York, is absent on a trip through his district.

MR. J. F. SKIRROW, associate engineer, and Mr. J. P. O'Donohue, division engineer, have returned from a trip of inspection of the principal offices east of New York as far as Gloucester, Mass.

MR. J. J. WHALEN, manager of the New York operating department, has returned from a trip to Pittsburg, Cincinnati, Louisville, Indianapolis, St. Louis, Chicago, Detroit, Toledo, Cleveland and Buffalo. Mr. Whalen inspected the traffic service in these cities.

MISS B. M. ATKINS, manager at Fitchburg, Mass., accompanied by Miss Anna M. Wenzel, bookkeeper, and four messengers of the Fitchburg office, visited New York on May 23. They arrived on the boat in the morning and were taken in hand by Mr. M. F. Geigle, manager of the messenger department, who showed them the principal points of interest. The party visited a theatre in the evening and left for home on the midnight train.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: L. E. Waugh, Guthrie. Okla. (Mackay office).

NEW LINES OPENED IN CALIFORNIA.—This company has completed its own lines from Los Angeles to Long Beach, Cal.

C. F. Leonard, President of Magnetic Club, New York.

Mr. Christopher F. Leonard, president of the Magnetic Club, New York, is a born leader of men and he is leading the affairs of the Club onward and upward. He possesses the happy faculty of making friends with everyone he comes in contact with, and in the service of the Postal Telegraph-Cable Company of which he is one of its district

C. F. LEONARD, PRESIDENT MAGNETIC CLUB, NEW YORK.

superintendents at New York, he is a friend and adviser as well as a hard worker. Mr. Leonard is an orator of considerable ability, and when he addresses a gathering he is always sure to say something instructive and interesting. He is yet a young man, having been born in Flushing, L. I., in 1870, and with the progressive spirit that he possesses and his high sense of justice, he will certainly make a deep impression upon the telegraph service and its affiliated interests.

Postal Outing.

The Branch Managers' Association of the Postal Telegraph-Cable Company, New York, will hold its seventh annual outing at Witzel's Point View Island, College Point, Long Island, on Saturday, June 27. The steamboat "Montauk" will leave Pier 8, East River, foot of Old Slip, New York, at 1.30 p. m. sharp.

Luncheon will be served on board. The usual athletic events will be held at the grounds, followed by a dinner and the distribution of prizes.

Tickets may be secured from M. F. Geigle, 253 Broadway; H. E. Wilson, 45 Broadway; J. H. Flood, 293 Greenwich street; J. F. McNeill, 503 Fifth avenue.

ANNIVERSARY OF THE MORSE TELEGRAPH.—May 24 was the seventieth anniversary of the formal introduction of the Morse electro-magnetic telegraph. It was on May 24, 1844, that the historic message "What Hath God Wrought" was sent.

THIEVES ARE EXTREMELY BUSY in these days cutting copper wire from the poles of the Western Union Telegraph Company, the Postal Telegraph-Cable Company and the railroad companies. Even the wires carrying high-tension currents are not overlooked.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

VISITING OFFICIALS.—The following general managers visited New York during the past week to attend the conference of executive officials: Messrs. C. H. Gaunt, San Francisco; W. W. Ryder, Chicago; W. J. Lloyd, Denver, Col.; S. M. English, Dallas, Tex.; and H. C. Worthen, Atlanta, Ga.

EXECUTIVE OFFICES TO BE MOVED.—The offices of this company will in June be moved into the section of the new building at 195 Broadway and Dey street, now nearing completion.

NEW OPERATING HEADQUARTERS.—The operating department of this company at 195 Broadway will on June 21 be moved to the new quarters in the Walker-Lispenard Building.

MISS TRUE WORTHEN, sister of Mr. H. C. Worthen, general manager, Atlanta, Ga., was killed on May 11 by being struck by an automobile in that city.

MR. J. B. DILLON, of the Dallas, Tex., office. was a recent visitor at Atlanta, where he met and was entertained by officials of the company.

NEW DETROIT OFFICE.—The Detroit office of this company was moved into new quarters at the corner of Shelby and Congress Streets on May 23.

Conference of Executive Officials.

The conference of executive officials and general managers of the various divisions took place in New York on May 25 and the sessions were continued throughout the week. Those present were Messrs. Newcomb Carlton, president; A. G. Saylor, general manager; G. M. Yorke, general superintendent of plant; W. N. Fashbaugh, general superintendent of traffic, New York; and the following general managers from out of town; W. W. Ryder, Chicago; H. C. Worthen, Atlanta, Ga.; S. M. English, Dallas, Tex.; W. J. Lloyd, Denver, Col.; C. H. Gaunt, San Francisco, Cal. Messrs. H. F. Dodge and M. T. Cook, assistant general managers at San Francisco and Chicago, respectively, were also present, besides all of the division traffic and plant officials from the various divisions as follows: Division traffic superintendents: S. B. Haig, New York; T. W. Carroll, Chicago; J. P. Edwards, Atlanta, Ga.; H. C. Chase, San Francisco; B. L. Brooks, Denver, Col., and B. P. Hancock, Dallas, Tex. Division plant superintendents: M. C. Allen, New York; R. W. Whitehead, Chicago; L. H. Beck, Atlanta, Ga.; R. W. Gray, San Francisco; W. C. Titley, Denver, Col.; and M. B. Wyrick, Dallas, Tex.

On Wednesday afternoon the party was taken on a boat-ride around Manhattan Island and in the evening a dinner was given to them at the Lafayette Hotel, at which president Newcomb Carlton presided. Mr. Belvidere Brooks, vice-president, was also present.

Western Union New Telephone Quarters in Chicago.

The Western Union Telegraph Company, Chicago, Ill., on April 11 cut in a new twenty-four-position, special-type telephone order table, a four-position No. 4 private-branch exchange, and a twenty-four position standard telegraph table, to be used for the delivery of telegrams and baseball scores to patrons. In the evening the girls of the telephone department held a reception to celebrate the opening. A number of the officials of the Western Union and of the Chicago Telephone Company were guests. Remarks were made by Messrs. A. B. Cowan, district commercial superintendent; C. H. Finley, city traffic superintendent, and Jay R. Page, district plant superintendent, Western Union Telegraph Company.

Presentation to Mr. Theodore P. Cook.

Mr. Theodore P. Cook, the retiring general manger of the Western Union Telegraph Company at Chicago, was, on April 27, presented, at his residence, by a delegation of former employes, with a Victrola and supply of records, as a token of the high esteem in which he was held by the officials and employes of the Western Division. Mr. Cook was agreeably surprised and exhibited much feeling. The presentation was made by Superintendent A. B. Cowan, of Chicago, who said:

"The few of us here this evening represent a large number of those who were fortunate enough to serve the company under your leadership, and our purpose is to show the appreciated and high esteem in which you are so universally held by all, and impress upon you the pride and pleasure which such service gave each one individually.

"Many of us were fortunate enough to serve with you for extended periods, and while you may not see us so often, yet, we want you to feel assured that we will never forget the value of your good council and advice, so freely given, as well as the admonitions which were so freely tempered with kind consideration of our welfare.

"We all learned not only to respect but love you, and your good work will show results for many years to come. We all appreciate that you have well earned a much needed rest from the cares of a business life, but will miss you greatly, and will all be more than glad to see you at every possible opportunity.

"We have all felt that we could not permit your retirement without giving voice to our sentiments, and at the same time presenting you some small token, as a reminder of the large number who will miss you so much.

"Feeling that you now have more time to enjoy some of the pleasures that, in a measure, are denied a busy man, it is our happy privilege to present you with a Victrola and some records, and assure you that we all hope the strains of music produced by it may be as free from discord and as harmonious as the relations you so well established and maintained in the Western Division."

Mr. Cook responded as follows:—

"My friends: Speaking in public is an accomplishment I could never learn, besides no matter how gifted in that direction, I do not think anyone can find words that fully convey his feelings on an occasion like this, and I can only thank you for your kind expressions, and this additional evidence of your friendship.

"In retiring from my work, extending over an unbroken period of fifty-one years, the regret of giving up daily companionship with associates to whom I was much attached, was as great or greater than giving up the work that had grown to be a part of me, but I realized it must come to us all.

"During my long business career, I have at all times felt a deep interest in the welfare of the company, and, at the same time, also, in the welfare and happiness of those associated with and under me, and I take it if one has contributed anything in that direction his life had not been a failure. Among the large number of letters received from associates and friends upon my retirement, I was particularly gratified to receive many from the rank and file from various sections, calling attention to something I had done for them that gave them a start, or smoothed out some rough spot in their lives.

"I have heretofore been the recipient of letters and tokens of remembrances, in connection with changes in position or promotions, which were highly appreciated, but none will be dearer to me than this one, which must come from the heart, as I am not now an official and no reason to remember me on that account.

"Please be assured that my retirement from the service will in no way lessen my interest in you, and sincere wishes for your continued health, prosperity and happiness will follow you always."

THE CABLE.

Mr. Charles V. Auger has been appointed superintendent of the Western Union Cable System at Liverpool, England, vice T. Healy, retired.

Mr. E. Chambers, superintendent of the Western Union Cable System at Penzance, England, has retired from active service. Mr. Chambers contemplates visiting friends on this side of the Atlantic during the coming summer.

Death of R. K. Gray, Prominent English Cable Engineer.

Robert K. Gray, aged sixty-three years, for many years engineer-in-chief and managing director of the Silvertown Company, London, England, manufacturer of submarine cables, died on April 28. Mr. Gray was born in Scotland. He was instrumental in bringing the Pacific cable project to a successful issue. In 1870 he accompanied his father, the late Matthew Gray, to lay the cable from Gravelines to Bordeaux, during the Franco-German war, and in 1872 he acted as electrician-in-chief throughout the expedition for laying the direct Spanish cable, and the Marseilles-Algiers cable for the French Government.

His early experiences, and the general trend of

his subsequent professional work, combined to give him an insight into foreign negotiations. He had the advantage of being a good linguist, and he maintained to the end his cordial regard for his many friends in France, Spain and Italy. The various submarine cable operations with which he was occupied, took him to countries as widely spaced as Mexico and Senegal, Brazil and Algiers, but he never lost touch with developments at home. In later years his labors were directed towards developing an extensive manufacturing business which demanded knowledge far wider than that associated with telegraphy and electric lighting. Notwithstanding the claims that his manifold activities in the commercial and professional world made upon his time and upon his energy, he found means to aid science, and to bestow help upon all who claimed and seemed to him to deserve his assistance. He was a member of the Institution of Civil Engineers, of the Institute of Metals, of the Royal Institution, of the Royal Society of Arts and a benefactor to many charitable institutions. He was elected president of the Institution of Electrical Engineers in 1903. In late years he was engaged in commercial and professional activities.

The funeral was attended by many prominent men in the scientific and technical educational world, including Mr. William Duddell, president of the Institution of Electrical Engineers; Sir J. Denison Pender, Chairman Eastern Telegraph Company; Mr. J. Rippon, manager Halifax and Bermuda Telegraph Company; Mr. Frederick Ward, Commercial Cable Company; Prof. Silvanus P. Thompson; Charles Bright, consulting engineer to the Australian Commonwealth, and representatives from the Silvertown staff.

CANADIAN NOTES.

Mrs. George D. Perry, wife of the general manager of the Great North Western Telegraph Company, Toronto, Ont., died on May 15 in that city. The floral tributes were very many and particularly beautiful. Mrs. Perry was prominent in church work, and was active in work among the poor. Besides her husband, she leaves two daughters and three sons.

William Wainwright, aged seventy-four years, first vice-president of the Grand Trunk Railway System and second vice-president of the Grand Trunk Pacific Railway Company, and director of the Montreal Telegraph Company, Montreal, Que., died at Atlantic City, N. J., May 14. He was born in England.

Mr. J. D. McAneeny, the popular night chief operator of the Canadian Pacific Railroad Company's Telegraphs, Quebec, Que., was married on April 25 to Miss Alice Crepault, daughter of Mr. R. W. Crepault, of the Department of Public Instruction. Mr. and Mrs. McAneeny have just returned from an extended western trip, which included stops at Montreal, Toronto, Detroit and other cities en route, where they were royally entertained by friends.

THE TELEPHONE.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, New York, has returned from Europe, where he spent a two months' vacation.

Mr. Thomas D. Lockwood, general patent attorney, American Telephone and Telegraph Company, Boston, Mass., will sail for Europe in June for a two-months' trip.

Mr. Val B. Mintun, division commercial superintendent, the Missouri and Kansas Telephone Company, Kansas City, Mo., is the author of an article in *The Rotarian* on "Kansas City's Railroad and Navigation Facilities." Mr. Mintun presents interesting facts concerning the transportation facilities in, to and out of the city, and a brief history of the development of these utilities.

Mr. E. L. Kendrick, of Birmingham, Ala., has been transferred to the repeater service of the American Telephone and Telegraph Company at Cincinnati, Ohio.

Mr. Harry E. Upton, recently in the United States Signal Service, with headquarters in New York, has again gone with the New England Telephone and Telegraph Company, in the plant department, with headquarters in Lowell, Mass. Mr. Upton has had large and varied experiences in the electrical field, having been manager for both Western Union and Postal Telegraph Companies; wireless expert; foreman for electric lighting companies, and telephone engineering work.

The Boston Plant Chapter of the Telephone and Telegraph Society of New England held its twenty-sixth meeting in the Auditorium of the Franklin Union Building, on May 26. The big feature of the evening was the showing of the new famous motion-picture film, entitled, "Spinners of Speech," which explained the handling of a telephone call from Denver to New York. The annual election of officers and committee members also took place.

Transactions of Telephone Pioneers.

The proceedings of the third annual convention of the Telephone Pioneers of America, which was held in Chicago, October 17 and 18, 1913, have just been issued in book form. The book contains 108 pages and is printed in neat type on cream-colored paper. A large group portrait of the Pioneers in attendance is given at the front of the book, and portraits of prominent individual telephone men are scattered throughout the pages. These include Dr. Alexander Graham Bell, president Theo. N. Vail, vice-president N. G. Kingsbury, B. E. Sunny, and others. Pictures are also shown of the players in "Telephonery, Past and Future," the Western Electric Works, etc. The list of members is printed in large black type, which is very clear and easily read. The total membership is shown to be 1,183.

This volume is a valuable addition to the very interesting publications of the Pioneers, and its execution reflects much credit on secretary Henry W. Pope.

United States Telephone Center of World.

There are, to-day, in this country, upwards of 9,000,000 telephones. The United States, with less than six per cent of the world's population, has more than 65 per cent of the world's telephone development. Europe, with four times the population of the United States, has less than one-half the number of telephones.

The United States, according to the census just published, has nine telephones per hundred inhabitants, and has gained, during the last year, nearly as many stations as Great Britain has to-day in its entire system. Great Britain, by the way, has one and a half telephones per hundred inhabitants, or one-sixth of our telephone development. Germany has two telephones per hundred inhabitants; Netherlands two telephones per hundred inhabitants; Switzerland two telephones per hundred; Belgium four-fifths of a telephone per hundred; France four-sixths of a telephone per hundred. The entire country of France has about the same number of telephones as we have in New York City alone.

The Greatest Long-Distance Telephone Office in the World.

The largest and best-equipped long-distance office in the Bell System is in the new telephone building, 24 Walker street, New York City. This office is described at length in the *New York Telephone Review*, which gives many interesting facts in connection with it.

The designing, manufacture and installation of the switchboards and associated apparatus took five years, and the office was cut into service in ten seconds. It has 1,700 trunks, 500 toll lines, and 315 switchboards and testboards.

Distributed over three floors and a portion of a fourth, the office covers approximately 45,000 square feet of floor space. The telephone switchboards are on the fourth and fifth floors of the building, and between these floors is a false floor, through which runs a penumatic-tube system of eighty-nine individual tubes, with an aggregate length of 7,700 feet. This system is used for sending tickets for long-distance telephone calls, and about 30,000 ticket trips are made daily.

There are 400 toll lines to eighty-nine of the principal cities in the Eastern, Southern and Middle Western portions of the United States. The total outward calls handled daily at New York amount to approximately 7,000 and the total inward to about 6,500.

As an example of the speed with which a long-distance telephone call is handled over the Bell lines, the *New York Telephone Review* states that "from the time the New York subscriber removes his receiver until he is talking with the Philadelphia party is on the average approximately one minute."

The operating force of the new central office numbers about 350. A training school for new operators is maintained, and approximately 10,000 square feet of floor space is devoted to the operators' quarters, which include sitting, dining and locker rooms, etc.

RADIO TELEGRAPHY.

MR. WILLIAM MARCONI expects to visit the United States in July, in connection with his wireless telephone. He states that he is able to telephone a distance of 100 miles. The apparatus is now being tested.

H. E. JENSEN, aged seventeen years, assistant wireless operator on board the Scandinavian-American steamer "United States," died in mid-ocean of peritonitis on May 22 and was buried at sea.

AN AMATEUR wireless telegrapher has been fined $25.00 for violating one of the acts regulating radio communication. He used a wave length in excess of 200 meters, the maximum allowed by law for radio stations of this class.

WIRELESS IN THE PHILIPPINES.—The Philippine legislature has passed a bill giving permission to the Marconi Wireless Telegraph Company to erect a high-power receiving and dispatching station in the islands. The franchise has a period of fifty years.

TABLET IN MEMORY OF KUEHN.—A tablet to the memory of Ferdinand J. Kuehn, the wireless operator of the Old Dominion's steamer "Monroe," who lost his life in the sinking of that steamer, was unveiled in Public School 40, in New York, on May 22. The tablet is a gift from the alumni association of the school, of which young Kuehn was a member.

WIRELESS TOWERS FOR PANAMA.—The United States Government is erecting three 600-foot steel towers near the Gatun Locks, Canal Zone, Isthmus of Panama, which will be used to support the antennas of the Panama wireless-telegraph station. The towers will be of triangular section, measuring 150 feet at the base and tapering to ten feet at the top.

SAVING A WOUNDED WIRELESS OPERATOR.—A wireless operator named Peakes of the Heathpoint, N. F., station, was accidentally shot by a fellow-operator named Keating. Keating sent out a wireless call for aid, which was caught by the steamer "Victoria," at sea. The steamer put back to the relief of the wounded man and took him on board for medical aid.

WIRELESS TELEPHONE IN GERMANY.—Successful experiments with wireless telephony have been conducted by the Telefunken Company at Nauen, Germany. Pieces of music sent by wireless from the station at Nauen were clearly heard at Vienna. Conversations took place between Nauen and Pola, the Austrian fortified seaport. The distance between the two stations is nearly 600 miles, and the wireless route is over land all the way.

WIRELESS TELEPHONE.—Wireless telephone conversation was held on May 13 between the Marconi stations of the Wanamaker stores in New York and Philadelphia. Communication was also had with two steamers at sea, one of them being seventy-five miles out. Music from a phonograph was transmitted by the wireless telephone, and was plainly heard at several stations. One unidentified operator criticized the music, remarking, "Am hearing music clearly, but that's a rotten phonograph. Get a new one and some new records.

THE TROPICAL RADIO TELEGRAPH COMPANY.—The headquarters of this company will shortly be removed from New Orleans to New York, and Mr. G. S. Davis, general superintendent, will transfer his offices from the former to the latter city. Mr. Davis brings with him to New York, Mr. C. P. Pitcher, chief operator of the company, and Mr. W. E. Beakes, chief engineer. Mr. A. F. Parkhurst, now division superintendent at New York, will be transferred to New Orleans, where he will have charge of the Gulf Division.

F. S. Van Valkenburgh in Mexico.

Mr. F. S. Van Valkenburgh, a railroad telegraph superintendent of Saltillo, Mexico, and well known in New York and other sections of the United States, recently escaped from prison at that place where he had been confined for some time for no other reason except that he was an American. Mr. Van Valkenburgh made his way to Vera Cruz, where he received the necessary protection and friends in the United States at once offered to lend him any assistance necessary. Mr. Van Valkenburgh was a United States Military Telegrapher during the Civil War, and because of his affable disposition made numerous friends, all of whom will be glad to learn of his timely escape from a Mexican dungeon.

Mr. Van Valkenburgh's army service covered a period of over five years. He first enlisted as a soldier in 1861 and was detailed from his regiment for service, as a military telegrapher. In March, 1861, he was a member of the St. Louis Western Union staff before he enlisted as a soldier. After being transferred to the military telegraph corps, he was assigned to duty as third lieutenant, telegraph engineers. He constructed military telegraph lines along the Iron Mountain Railway, and also repaired and reconstructed telegraph lines where necessary, in Missouri and Arkansas. He was later transferred from the Department of Missouri to Kentucky to construct Government lines. Colonel J. C. Van Duzer selected Mr. Van Valbenburgh for the delicate duty of tapping Confederate wires. He remained inside of the Confederate lines at one time for over a month, gathering important information regarding the movement of Confederate troops. He was afterwards appointed chief operator of the Nashville, Tenn., office, and cipher operator for General Sherman, whom he accompanied on the Atlanta campaign. He was later appointed superintendent of the United States Military Telegraph Corps for the District of Middle Tennessee. He accompanied General Thomas in his campaign against General Hood. Not many of those identified with the United States Military Telegraph service had a more remarkable and exciting career during the Civil War than Mr. Van Van Valkenburgh.

Under the terms of the Act of Congress, approved by Grover Cleveland, on January 26, 1897, he applied for a Certificate of Honorable Service, which was issued by the War Department on June 8, 1908. United States Consul Canada, at Vera Cruz, telegraphed to Mr. David Homer Bates, secretary of the Society of the United States Military Telegraph Corps, New York, that Mr. Van Valkenburgh had left that city on the steamer "Mexico" for New Orleans a few days previous.

TRAIN DISPATCHERS' CONVENTION.—The Train Dispatchers' Association of America will hold its annual convention at the Hotel Seminole, Jacksonville, Fla., June 16.

OFFICERS OF THE RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—The Railway Telegraph and Telephone Appliance Association elected officers in New Orleans, La., May 21, as follows: W. E. Harkness, of New York, chairman; H. G. Thompson, of New York, vice-chairman; G. A. Nelson, of New York, secretary-treasurer.

THE NEW YORK ELECTRICAL SOCIETY held its 329th meeting, by courtesy of Columbia University, in Room 309, Havemeyer Hall, on May 25. Dr. L. A. Bauer, Ph. D., D. Sc., Director, Department of Terrestrial Magnetism, Carnegie Institute of Washington, lectured on "The Non-Magnetic Yacht 'Carnegie'—Her Work and Her Cruises." Dr. Bauer's lecture was followed by a short informal talk by Lieutenant John Cyril Porte, R. N., on "Aerial Navigation," which bore especially on the Rodman Wanamaker transatlantic flight, soon to be undertaken by Lieutenant Porte.

THE AMERICAN TELEGRAPHER.—The first copy of the *American Telegrapher*—the May number—has made its bow to the telegraph fraternity. It is a magazine of telegraph tales and is published monthly at Los Angeles, Cal., Jeff W. Hayes being the editor, and P. G. Tompkins, business manager. The first number contains several interesting stories and an abundance of items of personal interest.

THE BAUDOT SYSTEM IN ARGENTINA.—According to the *Prensa*, of Buenos Aires, the Baudit system of telegraphy has been introduced in the service between Buenos Aires, Rosario, and Cordoba, this being the first time the system has been used in South America. It will be remembered that we recorded in the March issues of our paper the fact that Augustin Sal, inspector general of national telegraphs, Argentina, was in New York, having just returned from a trip of inspection to England, France and Germany, and that he was on his way back to Buenos Aires. It is likely that the introduction of the Baudot system in that country is the result of trip.

OBITUARY.

EDWARD STEWART, a telegrapher employed in the State Department of the Government, at Washington, D. C., for many years, and a very excellent operator, died on May 3.

JOHN J. C. SMITH, aged seventy-nine years, inventor of a method of manufacturing insulated wire, died in Passaic, N. J., May 12. Mr. Smith was one of those instrumental in forming the first telephone company in America, and was connected with the Okonite Company for a short time some years ago. He received over sixty patents for inventions.

Rapid Restoration of Crippled Telephone Service.

Two recent fires in telephone central offices—one in Worcester, Mass., and the other in Canonsburg, Pa.—and the subsequent rapid restoration of service to subscribers have served to give proof of what can be done by a well-equipped organization in time of emergency.

Telephone service was restored to nearly 19,000 subscribers in less than nine days after the fire in the New England Telephone and Telegraph Company's office at Worcester in the early morning of Saturday, March 28. The flames worked their way into the intermediate distributing frame, and before they were extinguished the entire city and several small suburban towns were without telephone service.

The telephone company sent its call for help to the home of the Western Electric Company's general foreman in Boston. He set the necessary wheels in motion, and within a few hours tons of material and scores of men were hurried into Worcester. The destroyed circuits were replaced and the damaged lines sorted out and reconnected at a rate which gave back service at the rate of 2,000 subscribers every twenty-four hours.

The wind-up came on Sunday, April 5, when at 9 o'clock p. m. the Mayor of Worcester soldered in the last connection. The installing crews worked a total of 207 hours. During this period they placed in position 35,145 feet of cable of various styles,

FIG. 1—SPLICERS AT WORK ON SIX HUNDRED CABLES, EACH SPLICE INVOLVING HANDLING OF 192 WIRES, WORCESTER, MASS.

and 156,000 feet of three-stranded, cross-connection wire.

The other record for the quick restoration of crippled telephone service was made at Canonsburg, Pa., after fire had destroyed the switchboard in the local Bell exchange there, putting nearly 1,100 lines out of commission. Communication was completely cut off for about twenty hours.

The fire started in the terminal room about eleven o'clock at night. The night operator was the only one on duty. She noticed the room filling with smoke and summoned the fire department. It was not until the store room and offices on the ground floor and the terminal room on the second had been badly damaged by smoke and water that the flames were extinguished.

The Western Electric Company was called about 2.30 a. m. and material ordered for shipment from

FIG. 2—WIREMEN REPLACING BURNED AND WATER-SOAKED CABLING TERMINATING IN THE PARK SWITCHBOARD, WORCESTER, MASS.

its Pittsburgh house. A special train carried five sections of a No. 102 switchboard to be used temporarily to handle the common battery subscribers and two magneto sections for the rural and toll lines. At 3 o'clock that afternoon the first subscriber's line was cut into the switchboard and the work was then soon completed. On the tests not a single case of trouble developed. This emergency switchboard took care of the traffic until new equipment was put into service ten days later.

Careful organization and perfect co-operation with the forces of the telephone company, and the location of Western Electric distributing houses at business centers, made these records possible.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, JUNE 1, 1914.

The New Orleans Convention of Railway Telegraph Superintendents.

The thirty-third annual convention of the Association of Railway Telegraph Superintendents, which was held in New Orleans, May 19-22, was a success in all respects. Notwithstanding the great distances most of the members had to travel to reach the convention city, the attendance was large; the weather was moderately warm and did not cause much discomfort in moving about, and the papers read were of high class and ably discussed. It would be difficult to state which of the papers received the most attention, for they were all good and practical, and the discussions indicated that the subjects selected had direct interest to the members.

The printing telegraph is a live subject with railway telegraph superintendents at the present time, and the paper on this topic brought out much earnest discussion. It appeared to be the consensus of opinion that practical printing telegraphy for railroads is assured. Many of the members had an opportunity to witness the practical operation of a printing telegraph of recent development, and were highly pleased with its performance.

Wireless telegraphy for railroad work was the subject of a paper, and the discussion which followed indicated that the superintendents were alive to the problem. An impression seemed to prevail that the wireless interests advocated the unrestricted use of wireless in railway operation, but this, it was explained, was not true. What was claimed for the system is that it is an auxiliary to the wire telegraph, and its chief merit lies in its availability in the event of a breakdown, or destruction of the wire lines. Thus, for the first time in the history of the Association, wireless telegraphy has been taken up in the deliberations of the body as a factor to be reckoned with in the future in railroad work.

The selection of Rochester, N. Y., as the place for the convention of 1915 meets with hearty approval. It is a central location and offers quite as much in the way of facilities and entertainment as do many of the larger cities. San Francisco was advocated by a few of the members, but owing to the great distance most of them would have to travel to get there it was not seriously considered.

Women Operators.

Women operators in the telegraph service in this country are in the minority, as compared with the number of male operators, but their average ability to perform their duties is relatively high. As a rule, they become first-class operators, that is, as far as transmitting and receiving is concerned, and they are faithful and painstaking, but so far they have not shown any particular desire to take up the engineering side of their profession. There are exceptions, of course, and those who have been placed in charge of repeater stations have, as a rule, rendered a good account of themselves. There have been cases where they have given satisfactory service in higher technical duties, but these are rare. We see no good reason why they should not aspire to higher positions, unless it is that by fitting themselves for technical duties they, in a sense, become unfitted for social duties. Every one knows of the difficulties telephone companies have in keeping their ranks of switchboard operators intact, so great is the tendency to resign and get married. This, however, does not cause so much complaint in the telegraph service, because the operators do not come into contact with the public to the extent that telephone operators do.

Male employes do not take well to the performance of minor duties, such as women become expert in, so, after all, what is lacking in one, is supplied by the other. Young women become especially proficient in perforating and handling tape, such as is used in printing telegraphy, and there seems to be a widening field in this class of work, as everything points to the printing telegraph as the system of the future between busy commercial centers.

The article in our May 16 issue on the qualifications of a first-class operator applies as well to female operators as to males, and probably more of these qualifications are found in a greater degree among the women operators than among the men.

The Universal Telegraph Alphabet.

"Do it now" is an expression frequently seen in print these days, meaning, of course, to take advantage of present opportunity and not delay. It is appropriately applicable to the agitation having for its object the substitution of the Universal telegraph code for the Morse alphabet now used in the United States alone.

That the proposition is receiving consideration in high telegraphic and cable circles is evident. Mr. George G. Ward, vice-president and general manager of the Commercial Cable Company, is the first representative of large interests to publicly express his opinion of the proposal, and he has placed himself squarely in favor of the change.

His communcation, printed in our May 16 issue, is a forceful plea for the discontinuance of the use of the time-honored Morse and the adoption of the safer Universal code. Mr. Ward has shown conclusively that the spaced letters of the Morse code have many sins of omission and commission to answer for, and he gives actual examples of words selected from business correspondence that look terrifying, even to expert Morse code operators. Mr. Ward admits that errors are possible in the use of the Continental code, but they are not caused by spaced letters, which constitute a very prolific source of mistakes in telegrams. No code could be devised that would circumvent the lapses in the action of the human mind, but it must be admitted that the Continental code comes nearer to accomplishing this result than does the Morse.

Morse and Continental Telegraph Alphabets.

BY A "FORMER TELEGRAPH OFFICIAL."

I was very much interested in the article of Mr. G. G. Ward, in your May 16 issue, on the subject of the Morse and Continental alphabets. His argument in favor of the adoption of the latter in America is positive and convincing, and is in line with what I have found to be the truth in practical experience.

The spaced letters in the Morse alphabet are dangerous things, particularly in cipher messages, which constitute a large, growing and important part of the commercial telegraph correspondence—domestic and foreign.

While it is a fact that the Morse code is, to a certain extent, shorter than the Continental, when calculated mathematically, in practice, I believe that the difference largely disappears, owing to the fact that greater care and deliberation are necessary in the transmission of spaced letters and combinations of the same. High-speed transmission of spaced letters is always accompanied by the element of doubt in the mind of the receiving operator, and if the sending operator is careless, "breaking" is the least of the resulting effects. The receiving operator is not always sure that his work is correct, but he does the best he can and takes some chances. With the use of the Continental or Universal code this element of danger would be largely eliminated.

Mr. Ward has pointed out that cipher messages can be transmitted by the Continental code quicker than by the Morse, and this is easily demonstrable and so plainly evident that any further discussion on the point seems unnecessary. The same argument, in a lesser degree, perhaps, applies to ordinary messages containing spaced letters.

Let any operator test the matter for himself. Let him send such words a "reiced," "echoed," and others of that character, and he will at once conclude that his speed must be reduced, in order to transmit them correctly, while there need be no slackening of speed if the Universal code is used.

When Professor Morse devised his alphabet he was dealing with the (then) present. He could not foresee the difficulties that would arise in the future use of his code. His alphabet was formed to meet an existing situation, and, no doubt, was the best that could be devised at that time for the purpose, but conditions have changed since then. Improved methods have been adopted in every element of the telegraph but the alphabet, which is admittedly inferior in important respects to the improved code used all over the world, except in the United States and Canada.

I believe the time is now ripe for the substitution of the Universal code for the Morse. Let us act now and "have it over with."

"Air Plants" on Electric Wires.

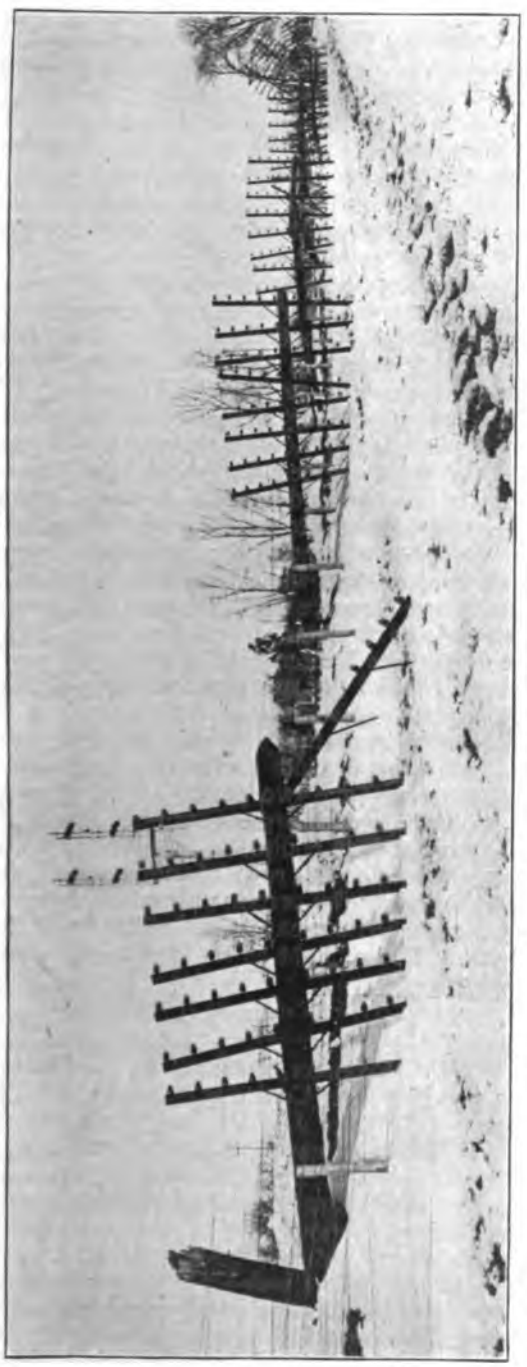
Reference was made in a recent issue to "air plants" which grow on telegraph and telephone wires in Porto Rico, at points where the insulation of the

AIR PLANTS ON WIRES IN PONCE, P. R.

wire becomes abraided and the seed or spores of the plants find lodgment. The accompanying illustration from *Leslie's Weekly*, shows the appearance of a line in Ponce, P. R., with these curious plants. The humidity of the atmosphere is so great that the plants continue to grow until they are removed by linemen.

Effects of the Recent Blizzard.

Some idea of the damage done to telephone lines by the March storm may be obtained from the accompanying illustration, which is a view of a prostrated line along the tracks of the Central Railroad of New Jersey. Over 6,000 poles of the telegraph



VIEW OF DESTROYED LINES ON CENTRAL RAILROAD OF NEW JERSEY BY THE RECENT BLIZZARD.

and telephone companies went down in the storm-stricken districts and it required, according to the *Western Electric News*, 150 carloads of poles, 16,000 miles of wire, 14,000 cross-arms, fifty miles of cable, fifty miles of strand, 200,000 insulators and vast quantities of other material to rebuild the damaged lines.

The demand for rubber gloves for the linemen was enormous. After the Western Electric Company's stock was exhausted the stocks of the principal rubber companies in New York were drawn upon so long as they held out. As all rubber gloves must be inspected under high voltage it was necessary to send inspectors to the warehouses of the factory, there to make an examination of the gloves. As fast as a lot of fifty were examined, they would be rushed to the testing laboratories by taxicab, put through the electrical tests, and sent to the field by messenger boys.

Edison's Dreams.

BY T. B. A. DAVID, PITTSBURGH, PA.

Apropos of the article in your issue dated April 16, entitled "Edison's Dreams," the following is worth repeating. Wendell Phillips, in an address delivered to the scholars of the public schools of Boston, in 1865, in which, after comparing the great facilities afforded them with those of his boyhood days, and directing their attention to the fact that more was to be expected of them than their predecessors had accomplished, made this utterance: "We have invented a telegraph, but what of that? I expect, if I live forty years, to see a telegraph that will send messages without a wire." This was predicated solely upon his faith in the latent ingenuity of the times, for electric science had not reached the visionary stage of even a telephone.

Now, about Edison's dreams. One day, back in 1878, I was walking down Broadway with Mr. Edison from his place on Union Square to his office on Church street, New York. We were both feeling downcast over having been treated badly in the telephone combination, and we did not talk much. After a prolonged silence Edison burst out with: "Well! they can't shut up my factory." Thinking that perhaps his plant at Menlo Park might be in jeopardy, I asked what he meant. Tapping his forehead with his finger he said: "They can't keep me from getting out new things." This was before the phonograph and the incandescent lamp.

Handy Electrical Dictionary.

Every student of electricity should have at hand a copy of the "Handy Electrical Dictionary," to help him understand electrical terms met with in his books of study, the meaning of which he may be in doubt about. It covers a wide range of electrical subjects, and is published in pocket size. The definitions of the electrical terms are, in most cases, full enough to constitute a cyclopedia of electricity, and although dictionaries, as such, are not usually recommended for steady reading, there is much interest in reading this book through, in addition to its explanatory feature. The price is twenty-five cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

How Cables Are Made, Laid, Operated and Repaired.

(*Continued from page 264, May 1*)

The present-day type of deep-sea sounding machine was invented by the late Lord Kelvin, formerly Sir William Thomson. Lord Kelvin has contributed more toward the science of cable telegraphy than any other person. This sounding machine is composed of a large drum containing thousands of feet of pianoforte steel wire. The machine is driven by electricity, and has a gauge registering the number of fathoms paid out. The sounders (weights) vary in pattern. The form of sounder invented by Captain (now Rear Admiral) Sigsbee, U. S. Navy, probably possesses all the essential features of the others, and may be taken as a typical one. It consists of a central tube fitted with valves at top and bottom, and three smaller tubes fixed beneath the central one. As the sounder descends the valves of the central tube open upwards, and the water rushes through. On reaching the bottom, both valves close, and a sample of the bottom water is retained. The three smaller tubes sink into the ooze, and bring specimens of it to the surface for chemical analysis. In order to increase the speed with which the sounder sinks, shot weighing from thirty to sixty pounds are slipped over it, becoming automatically detached on reaching the bottom and remaining there.

The temperature of the bottom water plays an important part in submarine telegraphy. A low temperature increases at the same time the conductivity of the copper wire and the insulation of the gutta-percha covering and is therefore the most suitable for cables. Faults are usually located by the electrical resistance of the conductor. It is known that a conductor, when in normal condition, gives a certain resistance per nautical mile at a given temperature. If the cable is broken so as to expose the conductor, one has only to divide the resistance obtained from the tests by the resistance per nautical mile in terms of the same temperature in order to arrive at the approximate distance of the fault from the testing station. A knowledge of the bottom temperature is therefore indispensable for accurate results, and in taking soundings a thermometer is always attached to the wire a short distance above the sounder.

Sea water follows a different law from fresh water in the relation between its density and its temperature. The density of fresh water increases with decreasing temperature down to 39 degrees Fahrenheit, so that until this temperature is reached the coldest water is always sinking to the bottom. After 39 degrees Fahrenheit, fresh water begins to expand again, the coldest water remains at the top, and ice forms there instead of at the bottom. This law plays a very important part in the economy of nature. Our fresh water lakes and ponds would otherwise be frozen into a solid mass in winter, and all the fish would be destroyed. As it is, the ice on the surface prevents any further loss of temperature from evaporation, and the process of freezing is greatly retarded. In the case of sea water, contraction continues down to its freezing point, 25 degrees Fahrenheit, and the coldest water is always at the bottom.

For this reason, when taking a sounding, a maximum and minimum thermometer gives the correct top and bottom temperature. In great depths, an ordinary thermometer cannot be used, as the pressure causes an error 8 degrees to 10 degrees Fahrenheit, and has been known to cause implosion of the bulb. For deep soundings a special thermometer, the Miller-Casella, is used. The bulb of this instrument is enclosed in an outer bulb filled three-quarters full with alcohol. Before sealing this outer bulb, the alcohol is warmed, so as to expel some of the air. Between the two bulbs a cushion is thus formed, which takes up the pressure, and the inner bulb remains unaffected by it.

As low temperature as 27 degrees Fahrenheit has been taken in the South Atlantic in the neighborhood of icebergs. Another sounding of 2,900 fathoms further north in the same ocean, gave a bottom temperature of 32 degrees Fahrenheit, the last 1,000 fathoms being described as absolutely glacial. In the second 1,000 fathoms the temperature rose to 36½ degrees Fahrenheit, and in the next 500 fathoms to 40 degrees Fahrenheit. Four hundred fathoms seems to be the limit to which the heat of the sun can penetrate. The most marked difference is at the top, where the surface temperature was in one instance 83½ degrees Fahrenheit, while at only 20 fathoms depth, the thermometer stood at 64 degrees Fahrenheit.

The light rays of the sun penetrate only a short distance beneath the surface of the sea, and as far as extraneous illumination is concerned, the ocean abysses remain in absolute darkness. Some deep-sea fish, however, have two parallel rows of small circular phosphorescent organs running down the whole lengths of their bodies, so that they resemble ships at night with double rows of shining portholes. It is thought possible by certain naturalists that portions of the sea bottom may be as brilliantly illuminated by this kind of light as the streets of a large city after sunset.

(*To be Continued.*)

MR. W. W. MORRISON, manager of the Mackay Telegraph and Cable Company, Oklahoma City, Okla., writes: "Your Des Moines, Iowa, agent, Mr. C. F. Wright accuses me of not being a subscriber to TELEGRAPH AND TELEPHONE AGE, and realizing that such charge against a man in the telegraph business is a serious one, I hasten to drop you a note. My friend, Mr. Wright, attached a letter from you, stating that I was a non-subscriber, and further stating that you hoped he would be able to line me up. By referring to your records for the past fifteen or sixteen years, you will find that I have missed very few months in that time. My first subscription was sent in from Beatrice, Neb., about sixteen years ago; it has been practically continuous since. It came to me when I was manager at Des Moines, at Salt Lake, Utah, Lincoln, and is now reaching me regularly at Oklahoma City, and has been for over two years."

Wireless Telegraphy in Railroad Service.*

BY L. B. FOLEY, SUPERINTENDENT OF TELEGRAPH, DELAWARE, LACKAWANNA AND WESTERN RAILROAD, NEW YORK.

The Lackawanna Railroad Company has had in contemplation for the past five years the installation of wireless telegraphy for break-down, or emergency service and in 1909 conducted some experiments in that direction, but the apparatus at that time was not sufficiently developed to be of practical use. During the spring and summer of 1913 we erected steel towers at Scranton and Binghamton, obtaining wireless apparatus of the Marconi company for two kilowatt stations, one at Scranton and one at Binghamton, with a one kilowatt installation on our limited train running between Hoboken and Buffalo.

On the roof of our Scranton passenger station we erected a tower seventy feet in height, giving a total elevation above the surface of the ground of about 175 feet, and from this point to a stack 175 feet high at our locomotive shops. 750 feet distant, installed a four-wire flat-top antennæ. Lead wires were brought from the eastern end of the passenger station over the edge of the roof of the building to the operating room on the second floor. In this station is located a two-kilowatt radio-telegraph equipment. The transmitter includes a motor generator installed in the basement of the station and which, running at 1750 r.p.m., converts the sixty-cycle three-phase central station energy into the required frequency at 250 volts for the radio outfit. The current is then led through a sending key to a transformer, where the electromotive force is stepped up to 20,000 volts, and is used to charge a bank of six copper-plated Leyden jars (total capacity .012 microfarad) which discharge through a multiple plate quenching spark-gap in the usual manner, giving a high-pitched musical spark.

Inductively coupled transmitting circuits are used, the radio-frequency transformer and inductances being wound of strip copper in flat spiral form, clock spring fashion. A hot wire ammeter in the antenna circuits gives a reading of fourteen amperes when the station is sending on a wave length of 1620 meters. The station is equipped with a small control panel carrying voltmeter, ammeter, wattmeter, frequency meter and generator field rheostat. The motor generator is started and stopped by two signal relays operated by a hand switch. The detector used is of the double crystal form. The receiving tuner is of the inductive coupled type with a switch for connecting the detector circuits directly to the antenna for "picking up" under broad tuning adjustment. No difficulty is experienced from interference and a broad-tuned circuit is used altogether for working with Binghamton and the train. Messages received at Scranton from Binghamton (sixty-three miles distant) are copied on a typewriter. The Binghamton towers are 175 feet in height, with a four-wire flat-top antenna 400 feet long and have lead wires from the middle point to the station office, which is located on the second floor of the Binghamton passenger station building and is equipped with the same apparatus as that used at Scranton. A change-over hand switch is used to transfer the antenna from sending apparatus to receiver. The quenching gap and blower are located just behind the operator.

On the "Lackawanna Limited" train the aerial or antenna is formed of wire arranged in four rectangles, one on the roof of each of the four forward cars, lengthwise, with an addition wire lengthwise, and all wires parallel with the top of the car, each rectangle being carried on porcelain insulators at the corners and center of each car, with wire linking connections between cars. The installation of the additional wire lengthwise and parallel with the top of the car, which at first was omitted, increased the transmission radius from the moving train to fixed stations from fifty miles to eighty-seven miles, *i. e.*, thirty-seven miles. The four-car antenna form a flat top about 280 feet long, ten feet wide and twelve feet above the rails. The wires clear the tops of the cars about eighteen inches, being low on account of bridges and other overhead interferences; therefore, the radiating power is limited, but it is expected to make changes later, in the aerial on the train, to obtain a radius of 100 miles or more. The lead is taken from the middle of the antenna through the side of the second car, near the roof, into a compartment two feet by four feet, which contains the wireless apparatus and operator. The wireless apparatus upon the train is of one kilowatt rating and similar in principle and operation to that at Scranton and Binghamton. The motor-generator on the train is operated on thirty volts direct-current from the car-lighting generator, which carries on its lines a set of storage cells. This motor-generator draws about forty amperes and provides alternating-current at 250 volts for the radio transmitter, including a ten-unit quenching gap, three glass jar condensers of .002 microfarad each, and the usual radio-frequency transformers. The antenna current is high, due to the peculiar antenna conditions.

During the months of January and February we were obliged to make use of our wireless system to handle messages and train orders between Binghamton and Scranton on account of telegraph and telephone wires being damaged and communication interrupted by storms. On Sunday, March 1, one of the most disastrous sleet storms known in this section of the country, followed by a heavy fall of snow and high winds, began in the afternoon and continued for a period of eighteen hours, prostrating poles and wires within a radius of 100 miles from New York in Pennsylvania and New Jersey. The only service we had for a period of five days was by wireless; we handled all of our telegraph work by wireless between Hoboken and Scranton for a period of ten days. During the ten days 1,125 messages were sent and received; on March 6, 120 messages were handled by wireless between the points named between 9 a. m. and 6 p. m., many of the messages containing fifty words or more.

In addition to wireless installations at Scranton,

* Paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

Binghamton and on the Buffalo limited train, temporary wireless stations were installed at Hoboken and Dover.

The Lackawanna company now has five wireless stations as follows, with calls and wave lengths; Hoboken, W B U, 2,100 meters; Dover, W B X, 1,000 meters; Scranton W P T, 1620 meters; Binghamton, W B T, 1,620 meters; Limited Train, W H T, 1,000 meters.

We are equipping a five-kilowatt station at Buffalo which, when completed, will give us wireless service between Hoboken and Buffalo.

On April 1 our company ran a special train, equipped with wireless telegraph apparatus, from Ithaca to Hoboken, carrying 550 Cornell students; our operator on board the train handled 128 radiograms from the train to fixed stations at Binghamton, Scranton and Hoboken for the accommodation of the students, who were en route to their homes for Easter.

Our experience with the wireless telegraph during the few months that we have had it in operation has been invaluable in many ways and it has been decided to extend the service over the entire system.

We have recently made some experiments with the wireless telephone in connection with our present installations, having transmitted communications a distance of sixty-three miles between fixed stations and a distance of fifty-three miles with a moving train.

After a few weeks use of the wireless we discovered many ways to use the service to advantage and, at the suggestion of one of our associate members, now in the wireless field, Mr. E. J. Nally, I compiled a list of some of the advantages to railroads of having wireless service as an auxiliary to the telegraph service. Later, in the great storm of March 1 and 2, we discovered that the wireless was not an auxiliary to the telegraph, but was a valuable substitute.

To the members who may not have read the communication referred to I take the liberty to quote a few of the conclusions:

"Communication by wireless telegraph to and from stations and moving trains is no longer an uncertainty. There are many fields for the wireless telegraph in railroad train operation. It will not be necessary to increase the number of trainmen, as a trainman can easily learn the telegraph alphabet, or a telegrapher can be utilized to operate the wireless, also performing the duties of a trainman. Later it may be found necessary and profitable to install a telegrapher on limited trains running long distances without stopping, to handle commercial telegrams for the public. Telegraph offices on trains, in the future, may be of as much value to the public as branch offices in hotels or other places where large numbers of people congregate. With direct communication the train dispatchers can keep in touch with the conductor of a train; in fact, the wireless permits the dispatcher to board every train. The Lackawanna company has used the wireless for handling train orders and finds it as accurate and reliable as the telegraph or telephone in transmitting these orders. The total loss of means of communication between stations, caused by prostration of poles and wires, is a thing of the past."

The Fitting of Applicants for Telegraph and Telephone Service on Railroads.*

BY J. B. SHELDON, SUPERINTENDENT OF TELEGRAPH, UNION PACIFIC RAILROAD, OMAHA, NEB.

We recognize that this is a subject that is becoming more prominent and important from day to day, not only on account of the increasing difficulty of securing the necessary help to fill our telegraph positions, but also on account of our desire that the intelligence and ability of such help may be equal to the constantly increasing demands of the service. The time was, in the quite recent past, that anyone who could telegraph to some extent was considered a full-fledged operator, with practically nothing more to learn, whether or not he had any particular education or other knowledge of railroad work. Now, the conditions are different, because, with the more scientific and systematic plans of railroad operation and the numerous national and State laws to understand and observe, better educated and more intelligent help is required to secure the desired results. It is true, innumerable high-class employes have grown up in the service in the past, without any particular education or qualifications at the start, but they were energetic and diligent and would have won their way in any line of work. The average telegrapher did not care to learn or do much more than to telegraph, which, even with the less complicated system of handling and accounting for the business, as compared with the one now in vogue, made it difficult for us to fill satisfactorily many vacancies in agencies.

At the present day, it is very important not only that the beginner should learn to be a good, reliable operator, but that he should have a fair education and seek to become proficient in the knowledge of station work in general, so as to be prepared for and to enable him to be in position to obtain promotion to an agency, which is the natural line for his advancement. The old way of picking up helpers locally along the road, with a view of making operators of them, was a very slow process and frequently many who were thus secured could never be expected to qualify for operators' positions or to do much more than ordinary station drudgery. They often lacked ordinary education, had no ambition for promotion, and, living at home at very little expense, were satisfied indefinitely with the small salary received.

It is considered important that beginners in this line of work should start when fairly young, preferably from sixteen to eighteen years of age, after securing a good common school education, as they can then learn more readily than when older and, until they qualify as operators, they are better satisfied with the small wages allowed them as helpers, than in the case of older students whose needs are

* Paper read before the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

likely to be greater. They should be bright and industrious, they should have an earnest desire to make a success of the work, their habits should be good, they should be courteous and it is essential that they should be qualified to pass a rigid physical examination especially with respect to eyesight and hearing. As, without previous opportunity for study and practice, it takes an indeterminate length of time for helpers at stations to progress even fairly well in telegraphing, owing to the lack of time in which to practice, and often the withholding of encouragement and help by others employed at stations, it is necessary, in order to meet the demands, that telegraph schools should be maintained to prepare at least partly those who desire to enter the service.

If the demand for station helpers on railroads was quite uniform the year round, the railroads could no doubt operate schools for providing telegraph help for their own stations to very good advantage; but, as the calls for such help are very uncertain and fluctuating, it is probable that better general results can be had by encouraging and patronizing reliable schools outside of railway service on account of the larger field for selection that is afforded.

Railroad telegraph schools would be preferable in some ways, especially in the matter of the selection of the students. Only such applicants should be accepted in railroad schools as would appear to be reasonably well fitted for development in the service, and those not making progress should be dropped; while most of the outside telegraph schools accept everybody who can pay the necessary tuition, whether or not they show any promise of making desirable employes, and the railroads are then expected to take care of the undesirables along with the better material. The graduating of inferior and unsatisfactory students is a handicap to these outside schools, as well as to the railroads, as such men cannot be used to an advantage, and the impression is created that the schools are more or less failures. The success of the telegraph school, in the minds of those who come in contact with the situation, depends much more upon the quality of the graduates than upon the number of the students graduated.

In outside telegraph schools, it seems to take the average student about four months to complete the course, which, besides contemplating a school proficiency in telegraphing to the extent of from eighteen to twenty words per minute, usually embraces a brief course in arithmetic, spelling, typewriting and practice in penmanship. The last mentioned is a very important qualification, in which we find most of the students, as well as graduates, are extremely deficient. All schools should require more penmanship practice and not permit their students to graduate until they are able to write in a good plain manner. Nearly all of the outside schools have succeeded in securing connections with local railroad wires for use in their advanced practice rooms, which is very desirable. It is believed the railroads should encourage the outside schools by arranging for these connections as far as conditions will permit.

After graduating from outside schools, students are usually far from qualified to be of real assistance as helpers to agents at stations, much less to be used as operators, and it is considered that a finishing course under railroad directions is desirable to fit them better for positions as station helpers. After completing such a course they can be of substantial help to the agents from the State, which usually causes the agents to take more interest in their welfare and progress and is of much benefit to them. A railroad finishing school should be equipped with dispatcher, railroad message and commercial telegraph wire connections, to enable the students to keep up their telegraph practice, a certain length of time per day, approximately three hours being assigned to such practice. Various station forms and report blanks should be supplied, so that the students can become familiar with them. Rules and instructions of the various departments, including freight, passenger, baggage, express and telegraph tariffs, should be provided for their study.

Instead of going too much into detail and embracing too wide a field of study, this finishing course, which is intended to cover a period of approximately a month, should treat more of the essential duties that are usually required of helpers, such as: Sealing cars and making seal reports; checking cars in yard and making car reports; making bills-of-lading, freight bills and way-bills; copying way-bills and daily reports; making abstracts of freight received and forwarded; Western Union rules, rates and reports; sale of local tickets and making ticket reports; checking baggage and figuring excess and storage charges; express rates and billing and reporting express; filing freight and passenger tariffs; use of "Official Guide," time table folders, etc.

In addition, general instruction may be given in regard to switchboards, wire testing and patching, instruments, batteries and the use of telephone train dispatching equipment, although these duties do not devolve directly upon the students until they become operators.

They should also be instructed as to the value of courtesy to patrons, as well as to fellow employes; the necessity of obeying instructions from their superiors; and the desirability of taking an interest in their work and in the business and affairs of the road in general. They should understand that it will generally devolve upon them to keep the station clean and orderly; to carry mail to and from the post-office; to handle freight, baggage and express; and to do whatever other work may be assigned them—so they will not have the mistaken idea that clean clerical work is all they will have to do.

It is considered that this railroad school preparation is largely for the benefit of the railroad, so that no tuition or other expense in connection therewith should be charged the students. Without the railroad school, most of the instruction outlined would be left for agents to give upon the arrival of the new helpers at their stations; but agents are usually too busy with their own duties to pay at all times close attention to their helpers, and, as a consequence, much is likely to go wrong with new helpers

who have not had previous general instructions concerning their work.

The cost of this railroad finishing school instruction, where a fair number of students is provided, for, averages only about $10 per student, which is very reasonable for the benefits derived. Before students are taken into the railroad finishing school, they should pass the prescribed physical examination, so there may be no question as to their qualifications in this respect for service on the road upon the completion of the course.

After putting the students through the finishing school and assigning them to helpers' positions at stations on the road, they must still be supervised, to see that they have some opportunity to practice telegraphy and that they are promoted to operators' positions as soon as conditions will permit after they are considered to be fully qualified and have passed an examination to show their ability. Helper positions should pay enough so that the students assigned to them can pay their board and properly maintain themselves, in an economical manner, until they are promoted to operators' positions. It is desirable to have helpers' positions at different rates of pay and to promote the helpers to better paying positions from time to time, as conditions will permit, so as to keep them better satisfied and to compensate them more and more as they become of greater value.

It seems to take, on an average, about a year for the students to secure telegraph positions, after beginning to work for the road as helpers. They frequently become discouraged, with this seemingly long wait, especially, as is often the case, if they were led to believe when entering an outside telegraph school that operators' positions awaited them immediately upon graduation, and much encouragement and patience from agents and officials is usually required to keep them in their positions until they finally achieve their ambition and become actual operators.

There is frequently a proneness on the part of dispatchers to hesitate to work with newly made operators, which, considering their responsibilities, is quite natural; but this hesitancy should be limited to taking suitable precautions for safety, rather than be applied to such an extent as to keep qualified students from occupying operators' positions.

In some states laws have been enacted that have interfered very much with the promotion of qualified students to operators' positions. In one State, a law was passed preventing the use in night operators' positions of operators under twenty-one years of age. This has been a great discouragement to students, as most helpers cannot afford to wait, with small rates of pay, until they reach the prescribed age, while in other lines of work they can do better. We have endeavored to secure a modification of this clearly unjust law, so as to permit the use of operators eighteen years or more of age in night positions, but so far without success. In another State there is an unqualified law against the employment of operators who have not had experience as such for a year or more. This is so clearly unreasonable and impracticable, in that its general application, it would entirely prevent additions to the supply of operators, and it ought not to exist. We should watch for and try to prevent or to modify such extremely adverse legislation, which is not only unjust to the young men who are struggling to secure a place in the world in their chosen field of endeavor, but which handicaps us greatly in our efforts to develop a sufficient and satisfactory staff for our needs.

Then, with their acquired knowledge of station work and the railroad service in general, the students should, after their promotion to operators' positions, be ready to advance as far as conditions, their ability and ambitions permit.

A very desirable feature in connection with the training of our own operators, as far as conditions will permit, is that they usually stay with us, instead of traveling about the country, as experienced operators coming to us from other places are very prone to do. As a demonstration of this, we can point to the fact that, after a few years of effort in this respect, about one-third of the operators now employed on this road are of our own training; and, in addition, they understand our road, its methods and business much better than could be expected for a long time from those trained elsewhere.

Correspondence school courses may be provided for those who wish to receive instruction and to progress in certain lines of railroad work; but, ordinarily, there is hardly enough demand on any one railroad, for any particular line of instruction, to warrant the expense of providing such courses. Generally, such courses, on nearly all pertinent subjects, can be arranged for by the employes themselves with schools that are prepared to supply operators to any road, to a better advantage than for the separate roads to provide their own courses.

Electrical Measuring Instrument.

If we send a current through a light coil suspended between the poles of a permanent magnet, the coil becomes an electromagnet and tends to turn until its north pole faces the south pole of the permanent magnet, and vice versa. If we arrange the leading-in wires at top and bottom suspension, and adjust them so that they tend to keep the coil normally in a position where its axis is at a right angle to the field of the permanent magnet, and mount on the coil either a pointer or a mirror, we have a galvanometer which can be made almost as sensitive as the most delicate needle instrument, or can be made easily portable and mechanically strong. As the air gap in which the coil swings is made very small, either by placing a soft iron block inside the coil or by making both the coil and the distance between the pole pieces small, the field set up by the permanent magnet has so much more effect on the coil than does any ordinary external field that the instrument is practically shielded from disturbing magnetic influences. — *Electricity and Magnetism in Telephone Maintenance.* By G. W. Cummings. ($1.50).

Utility of Wires on the Pennsylvania Railroad.

(Continued from page 266, May 1)

Suppose, now, that two wires of 1,000 ohms each connect the two stations, as in Fig. 10, forming

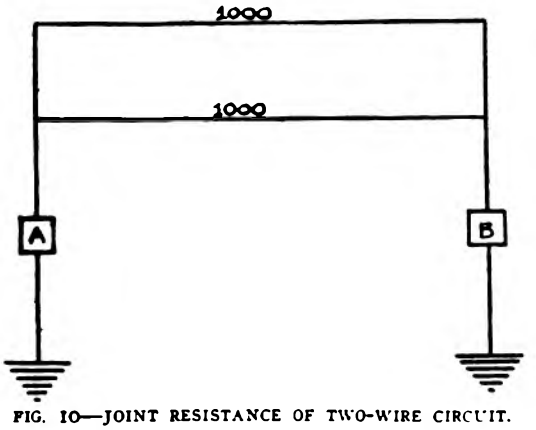


FIG. 10—JOINT RESISTANCE OF TWO-WIRE CIRCUIT.

(be it carefully noted) not a metallic circuit, in which each wire would carry a current in the opposite direction, but a divided circuit, where each wire carries a current in the same direction. The joint, or equivalent, resistance of the double line is, now,

$$\frac{1{,}000}{2} = 500 \text{ ohms}$$

and the necessary voltage to send a current through either instrument, 0.07 of an ampere in strength, is

$$E = 0.07 \times 500 = 35 \text{ volts.}$$

For four wires, as in Fig. 11, the joint resistance will be

$$\frac{1{,}000}{4} = 250 \text{ ohms}$$

and the necessary voltage to maintain a current of 0.07 of an ampere will be

$$E = 0.07 \times 250 = 17.5 \text{ volts.}$$

These rules will not apply to divided circuits

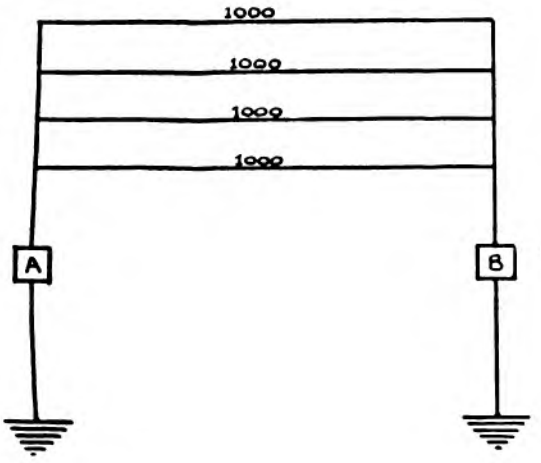


FIG. 11—JOINT RESISTANCE OF FOUR-WIRE CIRCUIT.

when the resistance of the different branches are unequal.

TRANSPOSITION.

When two telephone circuits are stretched side by side on the poles there may be induction between them, resulting in cross talk, which means that a message in the first circuit may be heard, by induction, in the second one. This induction will disappear if the two wires, constituting a circuit be

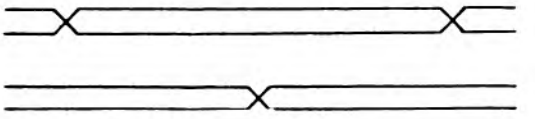


FIG. 12—TRANSPOSITION.

twisted into a cable. As it is not always convenient to do this, the same effect may be approximately obtained by transposing the wires on the poles, as in Fig. 12.

CONDENSER.

A condenser consists, essentially, of two conducting sheets separated by a non-conducting layer. In practice these are usually sheets of tin foil separated by paraffined paper or mica. Many such layers are combined to give a greater surface, the alternate

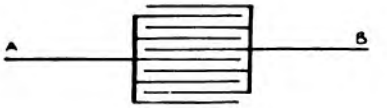


FIG. 13—CONDENSER.

layers of tin foil being electrically connected, as in Fig. 13.

The condenser is often represented in diagrams as in Fig. 14.

A steady current will not pass through a condenser on account of the insulating layer. If, however one side, A, in Fig. 13, be connected to one pole of an alternating-current generator, and

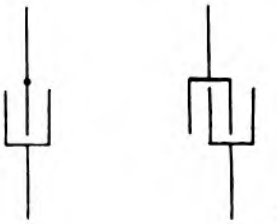


FIG. 14—THEORETICAL DIAGRAM OF CONDENSER.

the other side, B, to the other pole, the alternating current will flow fairly well through the condenser. This is due to what is called electrostatic induction, taking place between the two sides of the condenser.

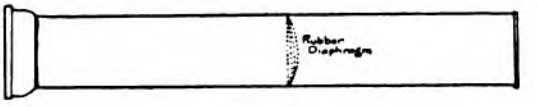


FIG. 15—WATER ANALOGY ILLUSTRATING ACTION OF CONDENSER.

The action of the condenser may be best understood by considering a water analogy. Suppose we have a water pipe, with an india-rubber diaphragm stretched across it (Fig. 15).

No steady flow of water is possible; but if a series of impulses be given, the water on one side from a pump of some kind, the diaphragm will bulge and contract in time with the impulses and transmit these impulses to the water on the other side.

The insulating layer in a condenser acts as the diaphragm in a water pipe, permitting no steady flow, but transmitting alternations of electrical pressure. The ease with which the insulating layer allows this passage to take place depends upon the extent of surface and the nature and thickness of the insulating layer, and is measured by what is called the capacity of the condenser. A condenser with many sheets of tin foil and very thin insulating layers is of great capacity, and readily transmits small changes of pressure, such as a very thin diaphragm would do in the water pipe.

(To be Continued.)

Full Use of Wires.

(Concluded from page 272, May 1)

Mr. W. S. Melton, Queen & Crescent Route, Danville, Ky.: "The Cincinnati, New Orleans and Texas Pacific Railway is now entirely equipped with parallel telephone circuits for handling train orders and messages and similar installations are being made on all districts of the Alabama Great Southern Railroad. It is our intention to phantom the circuits for through telephone service and to also utilize the wires for Morse service. In addition to having two copper metallic telephone circuits on each district we have transposed a pair of iron wires to be used for patching and the latter will be used to some extent in local telephone service. We placed telephone circuits in service between Cincinnati, Ohio, and Danville, Ky., in October, 1913. The following abstract from a letter received from Mr. J. D. Potts, one of our dispatchers, will no doubt be of interest: 'I have used the telegraph for thirty years, and the telephone for four months. I am for the telephone first, last and always.'"

Mr. H. D. Teed, St. Louis and San Francisco, Springfield, Mo.: "I think that the tendency of many railroad officials is to expect their telegraph departments to get more out of circuits than can reasonably be expected, considering the present necessity of keeping down the maintenance expense. On the Frisco, we are at present working seven quadruplex circuits out of Springfield, Mo., our general relay office, and are working a total of eleven quadruplex circuits on the system. We also have three telephone circuits simplexed, on two of which we work quadruplex and on one single Morse. We have no duplexes. We phantom all of our local and train dispatching copper telephone circuits, with splendid results. We have not attempted to further utilize these circuits, as we have had no demand for it. We are still experimenting and discarding all schemes that do not prove dependable.

"During the latter part of December, last year, we suddenly decided to change 1,849 miles of telegraph dispatching into telephone dispatching. As we were unable to secure selector and telephone equipment on such short notice, we were obliged to use magneto party-line equipment. This has all been replaced with Western Electric C-type selectors and telephones with No. 1048-DC transmitter arms. All of these circuits are No. 8 iron and are made up by utilizing paralleling iron circuits on adjoining pins, usually the train wire and the local message wire on each division, transposed every half mile. Each circuit was gone over carefully and every joint carefully bridged and soldered. The circuits so equipped are as follows: Ft. Scott to Afton, Okla., 118 miles; Tower Grove, Mo., to Chaffee, Mo., 144 miles; Monett, Mo., to Ft. Smith, Ark., 134 miles; Sapulpa, Okla., to Oklahoma City, Okla., 105 miles; Monett, Mo., to Sapulpa, Okla., 157 miles; Thayer, Mo., to Harvard, Ark., 132 miles; Yale, Tenn., to Amory, Miss., 122 miles; Sapulpa, Okla., to Francis, Okla., 101 miles; Francis, Okla., to Sherman, Tex., 105 miles; total, 1,118 miles. The latter three are not yet completed, but will be within a few days. Two of these circuits are already simplexed. It is our intention to cover the territory later with at least one copper circuit and in all probability, two. The iron circuit will then be utilized for a local or division message circuit, and the second copper for through or exchange business. The transmission and articulation on the iron circuits thus far installed have proven far better than we expected, and we will probably string a number of other iron circuits in the near future, endeavoring to hold the limit within 100 miles. The transformation worked, in connection with our long-distance service already in use, has resulted in approximately fifty-two per cent reduction in telegraph operating expense, and is proving more flexible and satisfactory to our operating officials than the telegraph. We will continue to extend the telephone in replacing the telegraph as fast as we can afford to do so, and will probably formulate some arrangement whereby we will eliminate the telegraph almost entirely, except between the larger and more distant points."

Chemical Action Stimulated by Alternating Currents.

In a paper read before the Royal Society, London, England, Mr. S. G. Brown described some interesting experiments on the effects produced by passing an alternating current of high frequency through simple voltaic cells.

The general effect is to stimulate chemical action; with the result that the cells will give a greater supply of continuous current than would ordinarily be possible. The alternating current will prevent the cell from polarizing, this being one important effect. Another is that if the zinc anode is small, thus limiting the delivery of continuous current, the alternating current will stimulate a greater chemical action between this pole and the electrolyte, and thus increase the continuous current. The magnitude of this stimulating action depends upon the alternating-current density; if this is sufficiently high, the chemical action produced may rise to such an intensity as to oxidize any known metal which may form the anode.

Annual Convention of the Association of Railway Telegraph Superintendents.

[Next annual convention to be held at Rochester, N. Y., June 22-25, 1915.]

The thirty-third annual convention of the Association of Railway Telegraph Superintendents was held in New Orleans, La., on May 19-22, and was largely attended. The headquarters were at the Grunewald Hotel, and the meetings were held in the "Cave," a large and unique apartment finished to represent the interior of an underground cavern with stalactites hanging in profusion from the ceiling.

At the opening session, on Tuesday morning, many ladies were present. Mayor Martin Behrman, of New Orleans, delivered the address of welcome, and spoke in very complimentary terms of the high character of the railway telegraph superintendents. He referred at length to the great developments made in the city in late years; of the

W. C. WALSTRUM, ROANOKE, VA., PRESIDENT ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.

perfect systems of drainage, sewerage and water supply, which problems were, a few years ago, considered impossible of execution, but which have been successfully carried out by the aid of science. He characterized New Orleans as one of the healthiest cities in the country, and extended a hearty welcome in the name of the citizens to the members and their wives.

After a photograph was taken, Secretary Drew read letters of regret at their inability to attend the convention from Messrs, Belvidere Brooks, vice-president, New York; W. W. Ryder, general manager, Western Union Telegraph Company, Chicago; E. P. Griffith, superintendent of telegraph, Erie Railroad, New York; L. B. Foley, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York; E. J. Nally, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, and others.

The following new members were elected:

Active members—R. G. Gage, signal and electrical engineer, Canadian Government Railways, Moncton, N. B.; E. C. Newton, superintendent, Marconi Wireless Telegraph Company for the Pere Marquette Railway and Steamship Company, Cleveland, Ohio; J. McMillan, general superintendent of telegraph, Canadian Pacific Railway, Winnipeg, Man.; E. A. Burkitt, general foreman telegraph, Illinois Central, Chicago; W. J. Kelly, superintendent telegraph and telephone, Timiskaming and Northern Ontario Railway, North Bay, Ont.; W. L. Blair, superintendent telegraph, New York, Chicago and St. Louis Railway, Cleveland, Ohio; E. L. King, superintendent of telegraph, Southern Pacific Company, San Francisco; G. R. Stewart, general wire chief, Northern and Western Lines, Illinois Central, Chicago; Horace Johnson, general foreman of telegraph, Illinois Central, Chicago.

Associate members—C. A. Hoppock, commercial engineer, Chesapeake and Potomac Telephone Company, Baltimore, Md.; F. P. Brennan, salesman, Ferrin Cables, Boston, Mass.; F. A. Cannon, superintendent right-of-way, Mountain States Telephone and Telegraph Company, Denver, Colo.; David Sarnoff, contract manager, Marconi Wireless Telegraph Company of America, New York; L. C. Morris, railway sales, Kellogg Switchboard and Supply Company, Chicago; R. D. Sinclair, vice-president, Mudge Company, Chicago; Charles F. Massey, president, C. F. Massey Company, Chicago; M. B. Wyrick, division plant superintendent, Western Union Telegraph Company, Dallas, Tex.; J. G. Hilbert, division superintendent of lines, Western Union Telegraph Company, Dallas, Tex.; J. O. Carr, Morkrum Company, Chicago; H. M. Horton, Radio Telephone Company, New York; J. S. Calvert, district superintendent, Western Union Telegraph Company, Richmond, Va.; R. J. Meigs, valuation engineer, Western Union Telegraph Company, New York.

The reports of Mr. P. W. Drew, secretary and treasurer, were read and approved. They showed the Association to be in a healthy condition, financially and in number of members. The total membership at the present time is 203, consisting of 120 active members and eighty-three associates. Mr. W. W. Ryder, general manager of the Western Union Telegraph Company, Chicago, and a former active member of the Association, was elected an honorary member.

Secretary Drew read the report of the executive committee. Three deaths occurred during the year. The report of the auditing committee was read and approved, as was also that of the High-Tension Crossing Committee, of which Mr. G. A. Cellar, of Pittsburgh, is chairman. Certain recommendations were made, all of which were agreed to. At the afternoon session Mr. M. B. Wyrick, division plant superintendent, Western Union Telegraph Company, Dallas, Tex., presented a synopsis of his paper on "Organization of Gangs, Including Plans for Boarding the Men."

In the discussion of Mr. Wyrick's paper, Mr. J. F. Caskey, of the Lehigh Valley, stated that he found it better to work smaller gangs than large ones. When there are too many men they get in one another's way. He thought it important that foremen look after the physical and moral welfare

of the men. On his road the men preferred boarding-houses to camp cars. The latter afforded no amusement. The Lehigh Valley Road, he said, allowed the men a certain amount a day for expenses. He explained the duties of the general foremen on his road.

Mr. G. A. Cellar, of the Pennsylvania Lines West, expressed himself as being a hearty advocate of good supervision. He did not favor camp cars. They were generally over-crowded and hard to keep cool in hot weather.

Mr. J. McMillan, of the Canadian Pacific, explained the practice on his road. He favored the boarding car. His men were better satisfied, besides it was difficult to arrange for the boarding of men in his territory, owing to the distances to go.

Mr. William J. Camp, of the same road, told of his experience with a gang of men. The men did not like hotels, but were happy in boarding cars. A good foreman, he said, could handle eighteen or twenty men.

Mr. J. C. Hubbard, general superintendent of lines, Western Union Telegraph Company, also made a few remarks on the general subject.

Mr. M. B. Overly, of the Cleveland, Cincinnati, Chicago and St. Louis Railway, read a paper on "The Maintenance of Telephone and Telegraph Equipment."

In the discussion of this paper Mr. W. E. Harkness, of the Hall Switch and Signal Company, New York, emphasized the necessity of establishing more definite standards and specifications for the installation of inside wiring; keeping definite and complete records of equipment in use, together with a system of periodic inspection based on such data and the providing of adequate and reliable facilities for inspection and testing of lines and apparatus; reporting, recording and summarizing troubles in such a manner as to obtain accurate, uniform reports from which fair comparison may be made, both as to the kinds of trouble, their causes, and the expense involved in locating and clearing them; selection of employes best fitted for the work to be done, definite divisions of the work, together with united responsibility for all things affecting the interest of the company; education of employes in the fundamental principles underlying the particular branch of work in which they are engaged; standardization by the railroads of the methods of operation, and the equipment to obtain the desired results and their co-operation with the manufacturers of equipment, with the purpose of eliminating the causes of trouble and more careful study on the part of the manufacturers of apparatus of the conditions of service under which the apparatus furnished must operate and the design of apparatus to meet these conditions, instead of attempting to push the sale of standard types designed for other classes of service would, without doubt, greatly reduce the maintenance expense, and render more continuous and reliable service without greatly increasing the first cost.

Mr. J. A. Kick said that while the paper is one expressly on maintenance, yet he believed it was right and proper to discuss installation, as its proper conception and execution represents a large percentage value in the maintenance cost factor. Many of the original installations were so expensive to maintain that it was found profitable to entirely rewire and re-arrange the equipment, so that it could be properly and promptly tested, inspected and repaired. The present remarkable status of the telephone in train operation is due, in a great part, to the record time made in installation at times when funds were available, and the establishment of a sufficient number of circuits on important territories was desirable for a demonstration of the practicability of the system. On some of these hurried installations it was later found that maintenance was prohibitive, and after a more extended experience with the class of equipment used, the methods of installation in their relation to maintenance were more carefully considered. In general, it was his belief that all installations should be made in accordance with specifications, covering the proper location and treatment of wiring forms and their proper protection.

Mr. J. J. Ross, of the Michigan Central, also made a few remarks.

Mr. E. C. Keenan, of the New York Central Lines West, believed that inside telegraph men could be trained to handle telephone equipment.

Mr. William J. Camp, Canadian Pacific, said that he could not say whether the telephone or telegraph lineman made the better maintainer. His object, since the introduction of the telephone on his road, had been to educate the telegraph lineman to do the telephone work.

Mr. J. McMillan, Canadian Pacific, referred to the practice on his division of instructing telegraph linemen in telephone maintenance. He believed that telegraph linemen would become competent to take care of telephone equipment.

A paper on "Unit Costs of Railroad Pole Line Construction and Repairs," by Mr. V. T. Kissinger, of the Chicago, Burlington and Quincy, was read by Mr. W. P. Cline, of the Atlantic Coast Line, Wilmington, N. C. In the discussion of Mr. Kissinger's paper, Mr. M. H. Clapp, of the Northern Pacific, said the plan of applying piecework to gang work is entirely consistent with the spirit of the times, and the paper could be considered an example of scientific management.

Mr. M. B. Wyrick stated that performing work of construction, reconstruction and repairs by piece work did not appear to him to be practical or economical, for the reason that it seemed to him to be impossible to arrive at a unit cost for piece work that would be acceptable to the workman and economical to the company.

The meeting then adjourned.

At the opening of the Wednesday morning session Mr. G. C. Kinsman, a former active member, now retired, was welcomed and made a few remarks, expressing his pleasure in meeting his former fellow-members.

The first paper read was that of Mr. J. C. Hubbard, general superintendent of lines, Western

Union Telegraph Company, New York, on "Organization of Forces for Restoring Wire Service Interrupted by Storms." The paper was discussed by E. C. Keenan, G. A. Cellar, J. J. Ross, W. J. Camp, M. B. Wyrick, C. S. Rhoads, F. H. Van Etten, and others.

Mr. Keenan agreed that to be successful it is necessary to have systematic organization. On railroads the organization should be headed by the joint superintendent of telegraph, who should have under him a good general foreman in complete charge of restoring service after storms, and all should endeavor to assist him. He believed a concrete pole could be designed to withstand heavy loads in sleet territory. He thought, however, that a more practical construction was an A frame, made from two wooden poles.

Mr. Ross said that while the methods outlined by Mr. Hubbard were desirable, the first thing really to do is to restore service, the train wire being the most essential, in order that trains be moved. Without this service it is impossible to accomplish much in the way of getting over the road with men and material. In summing up his discussion he said that if the telegraph superintendent was given the necessary material and men he would make good on all storm repairs.

Mr. W. J. Camp stated that he had found the best results in restoring lines after storms to use single wires or twin wires. Referring to the suggestion of Mr. Keenan, he pointed out that if the strength of the pole is increased the strength of the cross-arm should also be increased, and this would make the construction much more expensive.

Mr. M. B. Wyrick emphasized the importance of co-operation in making repairs. He thought all foremen use diagrams of their own design, because they could not otherwise remember all the details of their work.

Just before adjournment for luncheon Messrs. W. J. Lloyd and S. M. English, general managers of the Western Union Telegraph Company, at Denver, Colo., and Dallas, Tex., respectively, were introduced to the members.

At the afternoon session Mr. H. A. Emmons read a paper by Mr. J. B. Sheldon, of the Union Pacific Railway, Omaha, Neb., on "The Fitting of Applicants for Telegraph and Telephone Service."

In the discussion of Mr. Sheldon's paper, Mr. L. M. Jones, of the Santa Fe, stated that his company maintained two schools. He discouraged the teaching of girls, because it was hard to place them. The best material for operators, he said, came from the farms.

Mr. W. H. Hall, of the Missouri, Kansas and Texas, believed in assisting the young students and operators in every way, and taking a personal interest in them, so as to make them satisfied with their work. He knew of many cases of discouragement through the attitude of the agent or the division operator toward them. He pointed out that if courtesy be expected from employes courtesy must be extended to them.

Mr. G. O. Perkins, of the Chicago Great Western, described the methods of training operators on his road.

Mr. W. J. Camp, of the Canadian Pacific, explained the methods used on his line of supplying operators. He told of the efforts of the representatives of the men to have the Railway Commission make the age limit of employment twenty-one years instead of eighteen, but the Commission refused to make the change, one of the principal arguments against it being that young men were compelled to wait three years longer before they could get employment.

A paper on "Wireless Telegraphy in Railroad Service," by Mr. L. B. Foley, of the Lackawanna, was, in the absence of the author, read by President William Bennett. Mr. E. A. Chenery, of the Missouri Pacific, opened the discussion of Mr. Foley's paper, saying he endeavored to look at the matter in a fairly pessimistic light, in the belief that discussion would clear up thoughts that are now purely conjectures. Wireless telegraph in railroad service, he said, was hard to discuss in a "safe and sane" manner. It appeals too much to the imagination, and arouses an enthusiasm that is apt to lead one astray, and make it hard to justify any considerable expenditure by actual results obtained, compared with the same results obtained in another way. Would the expense of maintaining a wireless system, in addition to the wire plant, be justified by its use to bridge over a single storm break a year? he asked. Mr. Foley's steel towers must have cost considerable money, Mr. Chenery continued, "and if he erects very many of them, I imagine he will find an entirely new maintenance condition to contend with, which could easily become a large item. Would not an equivalent amount of money spent on his wire plant do much greater good in lessening the duration of storm interruptions and giving better all-year-around service?" When wireless telegraphy and telephony were developed to a point where the wire plant could be dispensed with altogether, or in considerable part, then, said Mr. Chenery, it would be time to seriously consider the matter. He closed by stating that Mr. Foley deserved unqualified praise for his pioneer work in wireless telegraph in railroad service, and that his (Mr. Chenery's) remarks were not made in a spirit of opposition to progress, but with the object of provoking discussion to get the truth in the exploitation of this new art.

Mr. David Sarnoff, of the Marconi Wireless Telegraph Company of America, New York, made an able defense of the wireless system, and removed much doubt in the minds of many of his hearers as to what was really being accomplished in the development of wireless in railroad operations. His discussion answered many of the questions brought up by Mr. Chenery. He explained in detail how interference is prevented when two or more stations are transmitting at the same time, citing cases where this is constantly being done. He emphasized the fact that wireless will be of inestimable value to railroads as an auxiliary means of communication. While wireless communication with moving trains was practicable, he felt that its greatest utility on

railroads at the present time is perhaps in the way of fixed stations, which are ever ready to set in operation when all other means of communication fail. He pointed out the importance of organization of installing apparatus so as to produce the best results. The Marconi Company, he said, showed its confidence in its apparatus and its ability to produce all that is claimed for it by the fact that no immediate profit is sought; that is to say, the apparatus is not sold outright to the steamship owners or railway people, thus leaving it to themselves to work out their own salvation and best method of operation. On the contrary, his company designs and furnishes the apparatus at its own expense, charging the users a rental figure, for which the lessee enjoys the advantages of all additional improvements in the art which is continually being developed. Further, the Marconi Company makes regular inspections of its equipments, maintains the apparatus in good and operative condition and effects repairs when necessary. Such an organization has made possible the present entirely practicable means of radio communication at sea, and the same Marconi organization will make possible reliable radio communication over land, regardless of the number of wireless stations that may be erected within a given vicinity. Mr. Sarnoff answered several questions asked by members as to the effect of wireless on wire systems and the cost of installations.

Mr. H. M. Horton, of the Radio Telephone and Telegraph Company, New York, described the De Forest audion amplifier, and showed one of the instruments.

At the session of Thursday morning Mr. A. Wray, of the Rock Island, read a paper on "The Use of the Printer Telegraph on Railroads," which gave rise to a lengthy and interesting discussion.

Mr. W. J. Camp stated that on his road various systems of printing telegraph had been tried with satisfactory results. He described two printer circuits now being operated between Montreal and Toronto, one between Montreal and Quebec, and one between Montreal and Ottawa. He predicted that before long Morse operators would be found only in museums.

Mr. J. O. Carr described the Morkrum printer. He did not doubt that there was a place for the printing telegraph in railway service. Printers, he said, would be worked duplex, as wire plant was too valuable to work single.

Mr. H. A. Emmons, of the Western Union Telegraph Company, stated that the prime object of the printing telegraph is to save time, labor and plant, and he explained in detail how these objects were attained in practice. He stated that it was not difficult for women operators to transmit sixty messages per hour on the keyboard typewriter after three or four months' training. There were women operators who could handle 100 messages an hour, nine hours a day. There is a difference of from twenty-five to forty per cent between the direct keyboard and tape transmission.

Mr. G. H. Groce, of the Union Switch and Signal Company, told of his efforts to find a printer specially adapted to railroad work and described a machine based upon the Wright instrument, now being manufactured by his company. It transmits on the Baudot principle. A circuit equipped with these machines is now being operated on the Illinois Central road, between Memphis and New Orleans. During a visit to Europe he found that 4,000 printers of one make were in use in Germany

Mr. M. H. Clapp presented a paper on "Physical and Phantom Transposition." After a brief discussion of the paper by Messrs. R. F. Finley and I. C. Forshee, resolutions of thanks were passed for the courtesies extended by the Cumberland Telephone and Telegraph Company, the Grunewald Hotel, Mr. and Mrs. W. A. Porteous and the Railway Telegraph and Telephone Appliance Association. Resolutions were also passed on the deaths of three members during the year.

Rochester, N. Y., June 22 to 25, 1915, were selected as the place and time for the next annual convention. The election of officers resulted as follows:

President, W. C. Walstrum, of the Norfolk and Western, Roanoke, Va.; first vice-president, E. C. Keenan, New York Central Lines West, Chicago, Ill.; second vice-president, L. S. Wells, Long Island, New York; secretary and treasurer, P. W. Drew, Minneapolis, St. Paul and Sault Ste. Marie, Chicago, Ill.; chairman of the Eastern Division, W. H. Potter, Southern, Washington, D. C.; chairman of the Western Division, M. H. Clapp, Northern Pacific, St. Paul, Minn. The convention then adjourned.

EXHIBITS AND NOTES.

The Railway Electric Manufacturing Company, Chicago, was represented by President H. O. Rugh. Mr. Rugh exhibited the Remco alternating-current selector, and also demonstrated the telegraphone and dispatcher's listening device.

Mr. W. E. Pierce, New Orleans, exhibited an improved phonoplex for long-distance work, whereby a circuit can be imposed on quadruplex wires and passed through repeater stations without the use of repeaters, and working a regular sounder or pole-changer at the terminals.

The Stentor Electric Manufacturing Company, New York, had an exhibit of an artificial line having all of the electrical constants of a 216-mile No. 9 B. & S. gauge copper open wire, divided into seventy-two sections of three miles each, with twenty loud-speaking receivers distributed throughout the line. A dispatcher's chest transmitter was connected to one end of the line and all the receivers operated. This instrument is not a loud speaker, but reproduces the voice with practically the same loudness and definition as the speaker's natural voice. The company was represented by Mr. R. F. Spamer, general manager, and J. L. Spence, chief engineer.

Thomas A. Edison, Inc., Orange, N. J., was represented by Mr. E. E. Hudson, vice-president and sales manager, primary battery department, and exhibited Edison primary cells for telephone train dispatching and telegraph service. The type 202 cell

(Continued on page 335)

EDISON BSCO PRIMARY BATTERY

The Standard Closed Circuit Cell

Some interesting figures in connection with telephone dry cells recently published, show a capacity of twenty-three ampere hours for the best 6" types when new. The shelf depreciation ranges from .02 to .07 ampere hours per day.

The "high internal resistance," dry cell deteriorates at the rate of .02 ampere hour per day, thus wasting one ampere hour in fifty days; the "high amperage" cell wastes .05 ampere hour per day or one ampere hour in twenty days, and the "ignition" type .07 per day or one ampere hour in about fourteen days. Therefore, if the service is such as to exhaust the battery in 150 days, the most efficient type will deliver twenty ampere hours to the circuit and three ampere hours are lost.

The type of EDISON-BSCO cell generally used for switchboard or railway despatchers' transmitters has a capacity of 475 ampere hours, about twenty-four times the life of the best dry cell described; the smaller size EDISON-BSCO used for less important 'phones has a capacity of .230 ampere hours, more than eleven times the life of the dry cell.

These are interesting figures for telephone men and clearly indicate the improvement in service and economies that the adoption of the Edison-Cells will effect.

Edison-BSCO Type 403 Cell, 400 Ampere Hours' Capacity.

Catalog on request.

The Cheapest Form of Battery Energy.

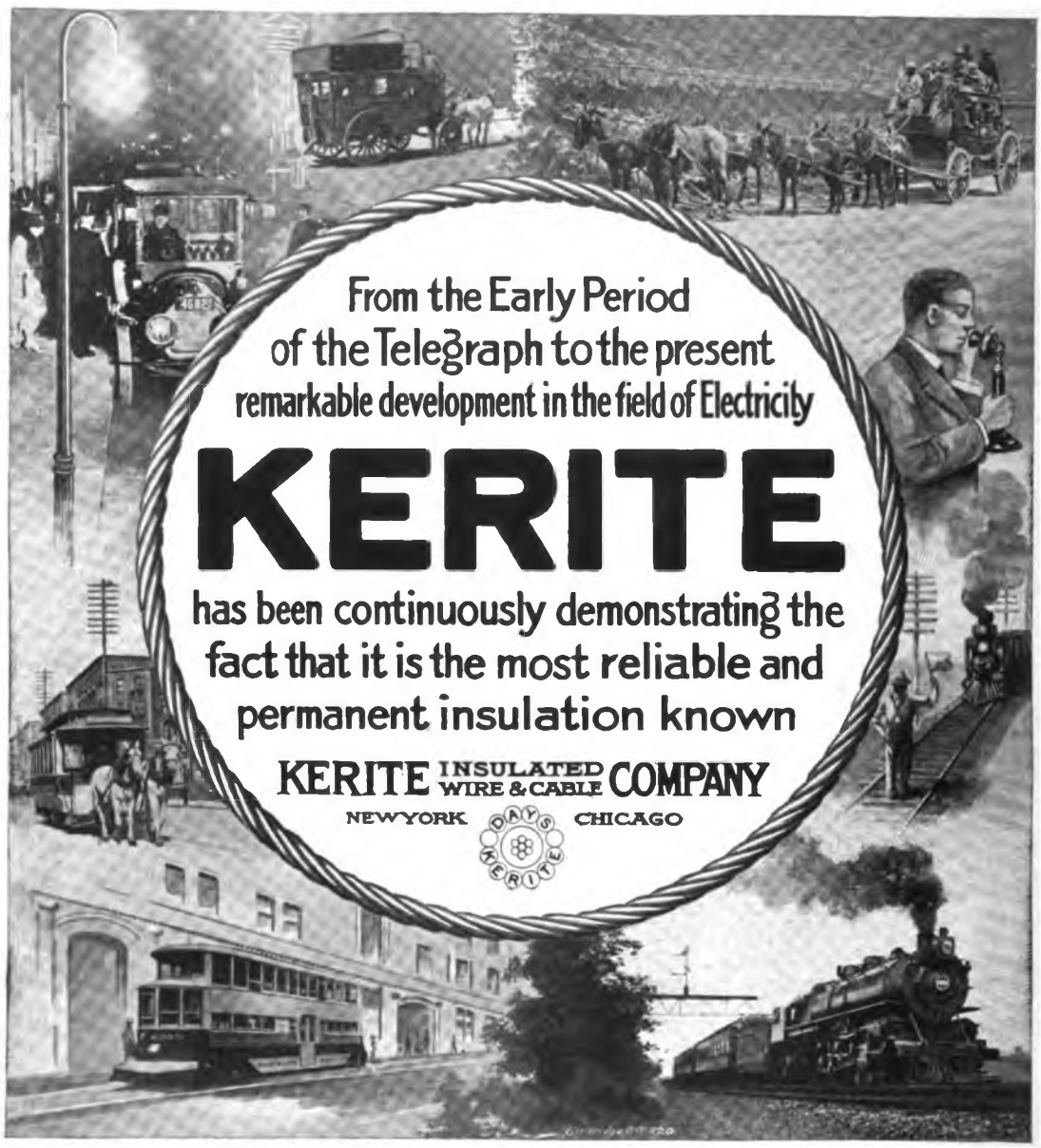
TRADE MARK Thomas A. Edison

THOMAS A. EDISON, INCORPORATED

247 LAKESIDE AVENUE, ORANGE, N. J.

EDISON-BSCO Complete Renewal showing the all-in-one assembled element.

18 50



19 14

EXHIBITS

(*Continued from page 332*).

in steel containing tray for way-station common-battery or transmitters was also shown.

The Gordon Primary Battery Company, New York, was represented by Mr. G. A. Nelson.

Mr. Charles K. Jones, Kansas City, Mo., exhibited a new polarized relay with double armatures.

The Morkrum Company, Chicago manufacturer of the Morkrum telegraph printer, was represented by Mr. J. O. Carr.

The Radio Telephone and Telegraph Company, New York represented by Mr. H. M. Horton, exhibited a De Forest audion detector. This company manufactures wireless equipment complete.

Hubbard and Company, Pittsburgh, Pa., manufacturers of pole-line hardware and pole reinforcement, were represented by Mr. Victor L. Crawford, who recently joined the company's forces.

The Edison Storage Battery Company, Orange, N. J., was represented by H. G. Thompson, vice-president of the company. Mr. Thompson was chairman of the entertainment committee and the success of the entertainment was largely due to his efforts.

The Brookfield Glass Company, New York, was represented by Mr. Arthur Lockwood, secretary, who distributed a pamphlet giving specifications and illustrations of the company's standard insulators. Mr. Lockwood states that the demand for glass insulators is constantly increasing.

Messrs. David Sarnoff and R. A. Wiegant, represented the Marconi Wireless Telegraph Company of America, New York, and rendered efficient service in behalf of that company. Mr. Sarnoff distributed a leaflet, entitled, "Safety First," in which were given two views, showing the effects of the March snowstorm upon railroad telegraph lines, contrasted with two views of the wireless equipment on the Lackawanna Railroad.

The Hall Switch and Signal Company was represented by Mr. W. E. Harkness, of the company's New York office, and by Mr. Edw. E. Backus, of the Chicago office. In addition to the manufacture of automatic electric block signals, which were originated by Mr. Hall, and of electric interlocking plants, the Hall Switch and Signal Company manufacture the Gill and Sandwich selective train-dispatching devices and associated railway telephone appliances, which are in such general use on the railways of the American states and Dominion of Canada.

Mr. G. H. Groce, representing the Union Switch and Signal Company, Swissvale, Pa., took several parties of superintendents to the Illinois Central station to witness the operation of his company's printing telegraph system working duplex between New Orleans and Memphis, Tenn., a distance of 400 miles. The performance of the apparatus elicited much favorable comment. At Memphis the transmission was by tape and the accuracy and speed of the received signals created a favorable impression. The transmission from New Orleans was direct from the typewriter keyboard.

The Automatic Electric Company, Chicago, exhibited its automatic switchboard and telephones. The telephone train-dispatching equipment attracted considerable attention, especially the new calling apparatus, which is very simple in operation, being merely a push-button device. The dispatcher pushes the button, and the operation is then all automatic until the distant station answers. The musolophone, or loud-speaking telephone, attracted considerable attention. The company was represented by Messrs. E. Keith and J. H. Finley, supply sales manager and assistant sales manager, respectively, and C. M. Sells, installer.

J. H. Bunnell & Company, New York, was represented by Mr. J. J. Ghegan, president. Mr. Ghegan exhibited his "Battery Kick-Off," a new device, which, when placed on leaky telegraph lines at terminal or battery stations, causes the ordinary instruments in way or intermediate offices to respond to every signal from any office on the line, provided the instruments at the terminal or battery stations are in adjustment. The device is very simple and does not add any resistance or complication to the main circuit. Its simplicity and effectiveness appealed strongly to the superintendents who examined it, and it received many favorable comments.

ENTERTAINMENT

On Monday evening, May 18, an informal reception was held in the Gold Room at the hotel, and was followed by dancing.

On Tuesday, May 19, a luncheon was given to the ladies, and at 5 p. m. the entire party took special trolley cars to Spanish Fort, where a supper and cabaret entertainment were given by the Jovian Order. Before the supper two photographs were taken of the party, one out of doors, and the other indoors. A unique souvenir was given to each person. The Jovians held a rejuvenation during the evening. After the supper there was dancing, and at 11 p. m. the party returned to the city.

On Wednesday the ladies spent a portion of the afternoon in a shopping tour, and later they were given an automobile ride through the resident and park sections of the city to the country club where a luncheon was served through the courtesy of the citizens of New Orleans. At 8 p. m. the entire party was entertained at a supper and dance on the roof-garden of the Grunewald.

At 2 p. m., Thursday, the ladies were conducted on a trip through the old French quarter of the city, and at 7 p. m. a banquet was given to the visitors at the St. Charles Hotel by the Cumberland Telephone and Telegraph Company and Southern Bell Telephone and Telegraph Company. Mr. C. A. Stair, general manager of the Cumberland Company, acted as toastmaster. Addresses were made by Messrs. G. A. Cellar, E. A. Chenery, Wm. Bennett, and others, all of whom kept the party in a constant state of merriment. Mr. Chenery, on behalf of the members of the Association of Railway Telegraph Superintendents, presented Mrs. W. A. Porteous, chairman of the Ladies' Reception Committee, with a pair of handsome silver flower vases. Mrs. Porteous, in a very graceful manner, expressed her appreciative thanks for the gift. The music at the banquet was furnished by

a colored orchestra, the members of which were dressed in Southern plantation garb. They sang several plantation songs, which revived the memories of the days of slavery, when negro melody was in its prime. After the dinner, moving pictures were shown by Mr. E. E. Hudson. One of the films showed the work of building a telephone line across the Rocky Mountains, running lines into cities and exchanges, and the different operations performed in effecting a connection between Denver and New York. The evening's entertainment was closed with a dance.

On Friday, May 22, the entire party spent the day on a boat trip on Lake Pontchartrain.

Mr. W. A. Porteous, manager of the Western Union New Orleans office, and chairman of the local entertainment committee, and Mrs. W. A. Porteous, chairman of the ladies' reception committee, received the hearty thanks of the Association and of the individual members thereof, for the excellent arrangements made for the comfort and enjoyment of the visitors. Both Mr. and Mrs. Porteous were untiring in the performance of their duties, and will be long remembered for their share of the work in dispensing true Southern hospitality.

Mr. N. E. Church, manager of the Postal New Orleans office, and Mrs. Church, ably assisted in the arduous work of entertaining the visitors and made many appreciative friends.

ATTENDANCE.

The following were in attendance:

Angelica, N. Y.—Mr. and Mrs. C. L. Lathrop.
Baltimore, Md.—C. Selden, B. F. Thompson.
Chicago, Ill.—E. E. Backus, W. F. Bauer, Mr. and Mrs. W. Bennett and daughter Margaret, Mr. and Mrs. E. A. Burkitt, W. E. Conrad, Mr. and Mrs. P. W. Drew, J. H. Finley, Mr. and Mrs. R. F. Finley, Mr. and Mrs. A. G. Francis, G. A. Graber, E. W. Jansen, E. C. Keenan, E. Keith, J. A. Kick, Mr. and Mrs. W. C. Lindsay and Miss Edna, C A. Luckey, L. C. Morris, G. O. Perkins, H. O. Rugh, L. R. Robinson, G. R. Stewart, Mr. and Mrs. F. H. Van Etten, Mr and Mrs. A. Wray.
Cincinnati, Ohio—M. A. McCarthy.
Cleveland, Ohio—F. F. Riefel.
Dallas, Tex.—Mr. and Mrs. M. B. Wyrick.
Danville, Ill.—Chas. McCormack.
Danville, Ky.—W. S. Melton.
Dennison, Tex.—Mr. and Mrs. W. H. Hall.
Denver, Colo.—Mr. and Mrs. J. M. Walker, W. J. Lloyd and son, Thos. D.
Detroit, Mich.—Mr. and Mrs. J. J. Ross.
Galveston, Tex.—Mr. and Mrs. J. Matthews.
Gibson, Ind.—Mr. and Mrs. W. L. Connelly.
Greenville, Pa.—Mr. and Mrs. F. W. Smith.
Indianapolis, Ind.—M. B. Overly, Mr. and Mrs. C. L. Rhoads.
Louisville, Ky.—R. R. Hobbs.
Memphis, Tenn.—Mr. and Mrs. Horace Johnson, D. J. Kavanaugh, B. Weeks.
Moncton, N. B., Can.—R. G. Gage.
Montreal, Que.—Mr. and Mrs. W. J. Camp, A. D. Smith, Mr and Mrs. Thomas Rodger.
Moosejaw, Sask.—D. Coons.
Nashville, Tenn.—Mr. and Mrs. J. A. Terhune.
New York—E. V. Adams, C. G. Baird, H. A. Emmons, J. J. Ghegan, W. E. Harkness, J. C. Hubbard, Mr. and Mrs. B. A. Kaiser, A. Lockwood, R. J. Meigs, G. A. Nelson, D. Sarnoff, R. F. Spamer, Mr. and Mrs. J. L. Spence, T. R. Taltavall, Mr. and Mrs. L. S. Wells, J. W. Young.
New Orleans, La.—W. Allen, Mr. and Mrs. T. B. Baird, C. S. Barnes, N. E. Church, Mrs. S. N. Church, W E. Clement, Mr. and Mrs. T. P. Cummings and daughter Nina B., R. Dean, Mr. and Mrs. J. G. Hilbert, P. Leloup, Mrs. E. H. McFall,, W. E. Pierce, Mr. and Mrs. W. A. Porteous, Mr. and Mrs. C. A. Posey, Mr. and Mrs. G. Saux, Mr. and Mrs. C. A. Stair, R. S. Stearnes, G. B. Straughn.
Orange, N. J.—E. E. Hudson, H. G. Thompson, Mr. and Mrs. A. D. Walters.
Passaic, N. J.—Mrs. E. P. Griffith, daughter and son F. Griffith.
Philadelphia, Pa.—Mr. and Mrs. I. C. Forshee.
Pittsburgh, Pa.—G. A. Cellar, Mr. and Mrs. L. A. Lee and daughter Dorothy, E J. Pietzcker.
Portsmouth, Va.—Mr. and Mrs. W. F. Williams.
Richmond, Va.—J. S. Calvert.
Roanoke, Va.—W. C. Walstrum.
Rochester, N. Y.—H. W. Lucia.
St. Louis, Mo.—Mr. and Mrs. E. A. Chenery, Miss Grace Franks.
St. Paul, Minn.—M. H. Clapp.
San Francisco, Cal.—Mr. and Mrs. E. F. Raymond.
South Bethlehem, Pa.—Mr. and Mrs. J. F. Caskey.
Springfield, Mo.—H. D. Teed.
Swissvale, Pa.—G. H. Groce, L. V. Lewis.
Tacoma, Wash.—E. E. Dildine.
Topeka, Kan.—Mr. and Mrs. L. M. Jones, C. Mutter.
Washington, D. C.—W. H. Potter.
Wilmington, Del.—W. Wilson.
Wilmington, N. C.—Mr. and Mrs. W. P. Cline and daughter Miss D. N. Cline.
Winnipeg, Man.—Mr. and Mrs. J. McMillan.
Yorba Linda, Cal.—G. C. Kinsman.

THE RAILROAD.

Miss Emma Williams, daughter of Mr. W. F. Williams, superintendent of telegraph, Seaboard Air Line, Portsmouth, Va., will be married on June 6 to Mr. W. A. Condit.

Mr. W. F. Williams, superintendent of telegraph, Seaboard Air Line, Portsmouth, Va., has moved his office to Nofolk, Va., which place will be his headquarters hereafter.

J. B. Smalley, assistant general manager of the Rock Island system, with headquarters at Topeka, Kans., died from the effects of a stroke of apoplexy on May 8. He began his career as a telegraph operator on the Chicago, Milwaukee and St. Paul Railroad.

Mr. E. A. Klippel, superintendent telegraph, Oregon-Washington Railroad and Navigation Company, Portland, Ore., reports that his system comprises 1,917 miles; number of miles on which the telephone is used for dispatching trains, 523; number of miles on which the telegraph is used for dispatching trains, 1356; number of miles on which trains are dispatched by yard and time-card rules, 37. This information was received too late to appear in our May 16 number.

On May 10 four commercial telegrams were transmitted by wireless telephone from the Scranton, Pa., station of the Delaware, Lackawanna and Western Railroad, to an operator on board train No. 3 for delivery to passengers on the train, distance transmission, varying from fifty to twenty miles. A five-horsepower steam turbine is being built by the Terry Turbine Company for use on train No. 3 to operate a motor-generator delivering 110 volts for a wireless telephone transmitted to be located in the baggage car of the train.

Organization of Forces for Restoring Wire Service Interrupted by Storms.*

BY J. C. HUBBARD, GENERAL SUPERVISOR OF LINES, WESTERN UNION TELEGRAPH COMPANY, NEW YORK.

In discussing this subject, Mr. Hubbard first described briefly the organization of the forces of the superintendent of telegraph and of the telegraph company that construct, reconstruct, and maintain the pole lines and are available for the emergency work of restoring service interrupted by storms, and then outlined the work to be done, and pointed out changes or additions that should be made to do the emergency work promptly and satisfactorily.

Charts showing three types of organization for a superintendent of telegraph's forces and one showing that of the telegraph company accompany the paper. It must be understood, he said, that it is not the intention to specify any particular type or organization for the superintendent of telegraph. Generally speaking, the superintendent of telegraph receives instructions from the railroad company to provide for it certain wire facilities and to arrange for their operation and maintenance. The railroad company also instructs him concerning right-of-way matters, transportation of men and materials, the expenditure of its proportion of the cost of performing work, and other matters concerning the telegraph system with which it is particularly concerned, and all matters specified in the contract. He receives instructions from the telegraph company regarding its wire facilities, their use and maintenance, its standard specifications for lines, cables, material, etc., the expenditure of its proportional cost of work and other matters, as may be prescribed in the particular contract under which he is working.

One thing that is clearly obvious is that the superintendent has two bosses, and while he should not receive conflicting instructions on one subject from both of them, that sometimes happens and then he shows whether or not he is in training for the diplomatic corps. This introduces the most difficult part of the entire organization scheme, namely, to find a man to fit into this difficult position who can be absolutely impartial and fair to both of his employers at all times.

However, this is a condition that must be met, and to make it easier for him an attempt should be made to outline the duties, so that there can be no mistake as to his responsibility to each party to the contract. The fact that the superintendent is a joint employe makes it all the more necessary that the duties shall be clearly defined, and while I do not believe that it is possible to formulate a set of rules which it is practicable for a superintendent of telegraph to follow exactly, I think the parties to the contract can give him a great deal of assistance by making some general rules defining the contract requirements which he can follow under ordinary or average day-to-day conditions.

In order that the organization charts may be clear and their purpose understood, Mr. Hubbard outlined briefly some of the principal duties of the superintendent of telegraph under each. The selection of the type is, of course, determined by the provisions of the contract with the particular railroad involved.

The organization diagram of the telegraph company was intended to show only a general outline of the forces that are normally used on construction, reconstruction and maintenance work. These forces are responsible for the condition of the lines when such responsibility is not placed on the joint superintendent of telegraph.

Mr. Hubbard then described the conditions that are frequently met and methods of handling the work. By combining the full organization of both the superintendent of telegraph's and the telegraph company's forces there could be assembled a large body of men, which could probably handle any work, however large, that might be necessary to recover service interrupted by storms. Therefore, it is merely a matter of deciding what part of the forces shall be called into action and how they shall be directed. Now, in order to decide these important questions, it is first necessary to get before us a complete description of the work to be done.

The first thing to do when a line fails is to find out where the failure is and the nature and extent of the damage.

Information on these points should be obtained from the forces who are responsible for the day-to-day maintenance of the lines and clearing of wire troubles; that is to say, from the linemen and wire chiefs who are always on the line, and are the first persons to know of wire troubles.

In cases where the lineman is located at a distant point from the wire chief, he should, in the absence of definite instructions, start at once after service is interrupted, and cover the line toward his headquarters or cover the most important trunk line in his section, if there is more than one, and find out its condition and report to his wire chief, general foreman, superintendent or other superior to whom he normally reports.

The lineman is, of course, experienced in line construction and maintenance work and is able to survey the line from a construction man's point of view and will make notes of conditions and report them accurately, and also furnish certain general information which will enable his superiors to form an opinion as to the size of the force, quantity of material, cable, etc., which should be provided to start the preliminary work. In the event that the extent of the damage is so great that the regular stationed linemen are unable to cover all of the lines quickly, extra men, such as inspectors, foremen, or general foremen should be sent over the lines to obtain the preliminary information desired. It is, of course, desirable to have men who have some knowledge of the line and local conditions, but there is no reason why any experienced, competent man cannot obtain the necessary data if he is furnished the general information as to location of the line and properly instructed as to what is required.

* Extracts from paper presented at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22

Preliminary reports of line conditions are often obtained from train crews or persons who are traveling over the road. Sometimes this information is reliable, but more often it is inaccurate and misleading, and it should not be used at its face value, unless the superintendent or other official to whom the information is given knows the person furnishing it and can vouch for its being correct. Such information should, of course, be used if it is found reliable, as a basis for taking at least the preliminary steps for starting the repair work.

The lineman should make a summary of his report as soon as possible, that is, at any stopping point, or as soon as he arrives at the end of his section. Such reports should preferably be made by the lineman, in person, to his superior. If it is impossible to do this, a brief summary of the notes, giving the number of poles down, the average number of wires broken in the damaged sections, and other essential information should be forwarded at once by telegraph. If the report cannot be made by telegraph, it should then be made by telephone, by special messenger, or by mail if there is no other way to transmit it. If the damage is slight and the work of restoring service can be performed by the section lineman and a few assistants, he should so advise his superior, who will instruct him to undertake the work in accordance with his regular organization. If the work is of such an extent that the use of gangs is necessary, the lineman's superior will so inform his superintendent, or other authority, who will make whatever arrangements may be necessary to obtain the additional forces, material, cable, etc., required.

Having obtained the necessary information as to the condition of the line or lines, the superintendent of telegraph will undertake the repair and reconstruction work with forces working under his immediate direction. This important work is assigned to the general foreman in charge of all gangs and having in his employ inspectors, material men, general workmen and a small clerical force sufficient to handle reports, expense accounts, etc. The general foreman, having been notified when the first warnings of storm are received, is therefore thoroughly familiar with all the facts and has made preliminary moves necessary to get his gangs at convenient points to take up the work and has material men preparing orders for cable and material, such as wire, sleeves, tie wire, cable and tools, that will be required at once for use in the temporary work.

As soon as detail reports from the lineman are received, the general foreman should examine the reports and have the information shown graphically on a map. He must do the work personally or supervise the clerical force which does it. A copy of such a map is made a part of this paper. Maps of this kind have been used in a number of cases by the writer and found to be very useful, in fact, something of this description is indispensable for efficient work. This particular map was made up with a view to having the symbols of such a nature that they would show clearly on a blue or white print. The aversion of the average general foreman and other men, whose experience has been principally on the outside field work, to the use of such maps is well known, but I believe that by a little missionary work the most of our general foremen will adopt this scheme of mapping the damage, and I am certain that after they have become accustomed to using it they will appreciate its advantages. After the information has been put on the map, the general foreman can readily determine the number of gangs which should be employed, the amount of cable required, the points at which gangs should be located and at which cable and material should be distributed. He will be able to estimate roughly the time required to make some wires good. He will consult with his superintendent who, after consulting with the district superintendent of the telegraph company, will advise the general foreman as to the number of wires that are to be made good in the first preliminary work. He will have arranged through the superintendent for work trains and other facilities for transporting men and material, and will then proceed with his gangs and staff, such as inspectors, material men and others who are required to take up the work.

A general foreman should be assigned only such mileage as he can personally cover each day and instruct the several foremen, inspectors and others and closely supervise the work of all. This means that he must be out in the field each day and in close personal touch with these forces.

In the event that the work is so extensive that the superintendent of telegraph's forces cannot restore service within a reasonable length of time, the superintendent of telegraph should call upon the telegraph company for assistance.

No fixed rules can be made for determining when a superintendent of telegraph should be assisted by the telegraph company, but each case should be decided according to the amount of damage and the character and importance of the service involved.

The remainder of Mr. Hubbard's paper was taken up with discussions of the forces of the telegraph company; stocks of material and cable; wires to be restored first; information gained in making storm repairs, and general organization of forces.

Charts were appended, showing the organization of the plant department of the telegraph company; three types of organization of superintendent of telegraph; specimen notes on the condition of a line after a sleet storm, and a graphical method of handling storm breaks.

MR. W. I. CAPEN, vice-president of the Postal Telegraph-Cable Company, New York, in renewing his subscription, writes: "Your action in renewing my subscription to the AGE, and then telling me to remit, is highly proper and appreciated. I shall expect you to do likewise each coming year 'Till Forbid.' Your paper is not a luxury but a necessity."

MUNICIPAL ELECTRICIANS.

NEW POLICE TELEGRAPH APPARATUS IN READING.—A new set of Gamewell police telegraph apparatus has been ordered for installation in the Reading, Pa., city hall.

The American-Siberian Telegraph Line.

Fifty years ago this summer, interest in the great project of connecting the American and European continents by land telegraph was at its height and consummation of the undertaking was regarded as practically assured. The plan was to connect New York and London by way of the Behring Strait.

Perceiving the wide demand for telegraphic communication between the two continents, Perry Macdonald Collins, an American engineer of note, conceived the idea of an overland route. His plan for a private company, backed by the United States Government, to build a telegraph line north from San Francisco, through British Columbia and Alaska, to a point on Behring Strait nearest Siberian land. Simultaneously the Russian Government was to build from St. Petersburg across Siberia to a point opposite the American terminal on Behring Strait.

Just how the wires were to be carried across the thirty or forty miles of water separating the two continents was never fully worked out, but a series of floating buoys, or small ships, firmly anchored, was thought to offer a solution of the problem.

The enterprise was advanced in due time to the point where representatives were sent to St. Petersburg to lay the plan before the Russian Government. Success attended the mission to the extent of a tentative agreement, whereby the Czar was to order the construction of the Siberian line whenever its practicability was demonstrated by the American promoters. Full permission was granted for an American engineering party to explore Eastern Russia and the great Siberian wilds for the purpose of locating a route and testing the feasibility of maintaining telegraph lines in that region.

Numerous surveys were made through British Columbia and Alaska, and a route was practically decided upon. Nearly all of the way it led through an uninhabited country, remote from sources of supply, and into a vast region locked in ice and snow during seven or eight months of the year. Throughout the region it was proposed to maintain relay stations at frequent points where operators and linemen would always be on duty.

From 1863 to 1865 many parties and expeditions were organized and sent out to explore and demonstrate. George Kennan, afterwards well known in the United States as a traveler and lecturer, joined one of the expeditions, when only eighteen years of age, and spent over two years in Siberia, building and operating experimental lines. Kennan was an expert telegrapher, and his mission was to prove to the satisfaction of governments and capitalists that telegraphic communication could be maintained constantly in the semi-polar regions.

In Siberia, the Kennan expedition traveled thousands of miles by dog-sledge and on horseback, investigating climatic conditions and making surveys. Its report to the Czar and to the American promoters was that the project was entirely feasible. It is said that the Trans-Siberian railway subsequently followed much of the line marked out by the Americans.

It was while engaged in making further surveys, believing fully that the American end of the line was already under construction that a message, by courier from St. Petersburg, reached Kennan, informing him that the enterprise had been abandoned and ordering the expedition to return to the United States for discharge.

The successful laying and operation of the second Atlantic cable in 1865 blasted the hopes of the promoters of the American-Siberian line. Governments and capitalists looked coldly upon the great outlay necessary, and refused to finance further experimentations. Thus, all of the expeditions were recalled and the promoting company dissolved. The irony of fate made it possible for Kennan, when he finally reached London, to send a message by cable to friends in America.

Viewed from the standpoint of fifty years ago, the project was one of the most gigantic ever considered by men. To-day, the undertaking is virtually accomplished, the only remaining link being the bridging of Behring Strait.

MR. D. A. SMITH, of Klamath Falls, Ore., in renewing his subscription, writes: "The benefits derived from careful study of your magazine are many."

A New Telegraph System.

BY D. B. GRANDY, ST. LOUIS, MO.

Referring again to the article in TELEGRAPH AND TELEPHONE AGE, of December 1, 1913, by Mr. G. E. Hines, describing a "New Telegraph System," the arrangement shown in Fig. 1 is an impossible one. A duplex could not be successfully worked with an ordinary key in the position shown. If Mr. Hines uses a continuity-preserving key (transmitter) in that position, with connections the same as in Fig. 2, I see no practical difference between the two methods, except that in Fig. 2 a separate battery or generator would be required for each duplex set, which would be a long step backward.

In this, and subsequent articles, Mr. Hines leaves us in doubt as to just what he is trying to accomplish. In a recent communication to TELEGRAPH AND TELEPHONE AGE, I pointed out that his method of using separate relay magnets in the main and artificial lines, acting in opposite directions on the same armature, was tried and abandoned by Mr. J. B. Stearns over forty years ago.

Mr. Hines is somewhat of a theorizer, and I am reminded of a correspondence I had with him in 1905, when he was employed in the New York office of the American Telephone and Telegraph Company. The late W. E. Athearn had just installed the first American Telephone and Telegraph duplex between New York and St. Louis. One of the subscribers' operators at St. Louis was an extremely light sender, and for several days there was continual complaint from the New York end. It occurred to me that a condenser connected to the sending loop at a point between the pole-changer and the sender's key ought to produce a lag in the pole-changer, and I tried it, using the "Morse leg" of an idle composite set with six microfarads capacity. The result was entirely satisfactory. When, the subscriber's key opened, the condenser was charged through the pole-changer, and the resulting lag caused the lightest sending to go out heavy. There was no more complaint from the New York end, but Mr. Athearn was curious to know just what was done, and I sent him a diagram and explanation. Mr. Hines wrote me at the time, criticising the arrangement, and claiming it would not, theoretically, do what, practically, it did.

Of course I saw the possibilities for a single-line repeater in the arrangement, and set up such a repeater in 1905, finding it worked very well; but as it was subject to the same limitations as the Toye repeater, in that it would repeat only from one wire into one other wire, I did not consider it of much use as a practical arrangement. Mr. Athearn, however, adopted the principle later in his duplex half repeater, which has been in use for several years. I refer to this merely to remind Mr. Hines that theory and practice do not always apparently "jibe," and that when a thing is demonstrated practically, any conflicting theory in regard to it must be modified to confirm to the facts.

Everyone in the telegraph and telephone services should read TELEGRAPH AND TELEPHONE AGE.

Postal Telegraph and Cable Company of Texas.

MR. H. E. SIMMS, for the past ten years manager of the Postal Telegraph and Cable Company of Texas at Austin, Tex., has been transferred to Dallas, where he becomes special agent of the company, with headquarters at that point. His territory will extend over Texas, Oklahoma, Arkansas and Louisiana.

DEFICIENCY IN ENGLISH CIVIL SERVICE BENEVOLENT FUNDS.—A recent actuarial report shows that there is a large deficiency in the funds of the United Kingdom Postal, Telegraph and General Civil Service Benevolent Society, England. There is no suggestion of fraud, however, the deficit being the result of the unsound methods adopted at the establishment of the society.

WE ARE INFORMED that a preliminary meeting of the local officials of the Western Union Telegraph and Postal Telegraph-Cable Companies at San Francisco has been called to make arrangements for a national telegraph tournament, to take place at San Francisco during the Pan-American Exposition in 1915.

MR. DAVID HOMER BATES, secretary of the Society of the United States Military Telegraph Corps, New York, has addressed an open letter to United States Senator Henry F. Ashurst defending Mr. Andrew Carnegie from certain attacks made by the Senator in the Senate on May 5. It is complete vindication for Mr. Carnegie.

T. AND T. L. I. A. ASSESSMENT.—Assessment 568 has been levied by the Telegraph and Telephone Life Insurance Association to meet the claims arising from the deaths of Elwyn F. Sawyer, at Steep Falls, Me.; Charles S. Brill, at New Orleans, La.; Benjamin F. Follett, at Chicago, Ill.; John W. Turner, at Maxton, N. C.; Francis W. Jones, at West Palm Beach, Fla.; Daniel J. Gallagher, at Amityville, N. Y.; Ernest W. Emery, at Washington, D. C.

We call the attention of our readers to the advertisement on another page announcing, until further notice, a special price to operators of the standard work "American Telegraphy and Encyclopedia of the Telegraph," by William Maver, Jr. This offer has been availed of by numerous operators, some of whom state they have the earlier editions of this book, but are glad to avail themselves of the opportunity to obtain a copy of the latest edition at the reduced price. This book is a telegraph library in itself. Orders should be sent direct to the publishers, whose name and address is given therein.

MR. H. A. TUTTLE, president and general manager, North American Telegraph Company, Minneapolis, Minn., writes: "I see you have taken the liberty of renewing my subscription for another year. You have been doing it for the past thirty years, and I hope you may continue the habit."

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. Martin Durivan of this office has gone to Long Branch, where he acts as chief operator during the summer. Mr. Durivan has had charge of the wires at this popular watering-place, each season for thirty years.

MR. J. RATHBONE, for many years identified with this office, is now representing TELEGRAPH AND TELEPHONE AGE as solicitor, covering New York, New Jersey and Connecticut. Mr. Rathbone also represents the Telegraph and Telephone Life Insurance Association and the Gold and Stock Life Insurance Association.

PHILADELPHIA POSTAL

The regular annual meeting of the Mutual Investment Association of the Philadelphia Postal Employes was held on May 4, in the office of superintendent C. E. Bagley, chairman of the finance committee. The report which follows shows the organization to be in a prosperous condition. Messrs. C. E. Bagley, E. W. Miller, F. P. McElroy and C. Moffet were elected to serve on the finance committee, with J. A. McNichol as treasurer and J. H. Wilson, secretary for the year 1914-1915.

BALANCE SHEET

MUTUAL INVESTMENT ASSOCIATION,

PHILADELPHIA, APRIL 30, 1914

ASSETS.

Cash in Bank	$1,068.26	
Investments	681.25	
Loans and Accounts Receivable	8,054.53	$9,804.04

LIABILITIES.

Members' Subscriptions	$7,440.00	
Accounts Payable	575.75	
Excess over Liabilities	1,788.29	$9,804.04

INCOME ACCOUNT.

RECEIPTS.

Interest, Discount, etc.	$1,274.74	
Sundry Earnings	843.25	$2,117.99

EXPENSES.

Clerical Assistance	$240.00	
Printing, Stationery, Postage, etc.	89.70	329.70
Net Profit		$1,788.29
Investment at $5.00 each	$120.00	
Profit $1,788.29 ÷ 63 members	28.38	
Value of Share, April 30, 1914	$148.38	

(Value of Share May 1, 1913, $73.68.)

Mr. Donald McNicol, of the electrical engineer's office, New York, was a recent visitor at this office.

Cupid has announced the engagement of Miss Nettie Wallenstein, of the Morkrum Printer, to Mr. Charles S. Almer, assistant wire chief.

Telegraph and Telephone Age

No. 12. NEW YORK, JUNE 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

Phantom Circuits.

A correspondent writes as follows:

"I am trying to learn the art of simultaneous telegraphy-telephony, but am confused by the apparently indiscriminate manner in which the terms phantom, composite, simplex, etc., are used in reference to the circuits. Can you explain their significance so that hereafter I may not get them mixed?"

Webster's dictionary defines the word "phantom" as a "spectre," "an apparition." In other words, as being something without a physical body. In simultaneous telegraphy-telephony an additional operative circuit is obtained without adding any more line wires or conductors to the circuit or circuits over which the "phantom" signals are to be transmitted. Of course, the phantom arrangement is based on physical conductors, but because there is a clear gain of one operating circuit without increasing the existing number of physical circuits the term "phantom" may be applied to any system which accomplishes that purpose, be it simplex, composite or otherwise arranged. The terms simplex, composite, etc., simply refer to different arrangements of phantom circuits and should be studied separately. Where the output is only one telegraph and one telephone message over a pair of wires the arrangement is usually called a simplex. "Composite" means the simultaneous transmission of telegraph and telephone messages over a common pair or combination of line conductors, while the additional apparatus in the way of coils and conductors required to make the operation possible is called a composite set.

Now, the first and most important thing our correspondent should bear in mind is that the successful transmission of two different kinds of signals simultaneously over conductors which are common to both, depends upon a means being devised for preventing one kind of signals interfering with those of another character. The apparatus employed to do this are condensers, impedance coils, and repeating coils.

USE OF CONDENSERS.

The purpose of condensers are two-fold. One is to prevent the direct current required for telegraph signals from reaching the coils of the telephone, and the other is to provide a bridge across an open key in the telegraph circuit which is capable of passing alternating or telephone currents to the receiver, despite the opening.

Obviously, the first requirement of a practical circuit is to equalize the potentials between the telephone terminals as nearly as possible. This is accomplished by using two wires of practically equal resistance instead of one between two points and connecting the telephones across the pair like rungs in a ladder. If, say 140 volts, is connected to each Morse wire, the potential of the Morse current will be practically identical in each conductor at all points along the line, hence if no other reason existed, no current would flow through the rungs, or telephone circuits, and the Morse signals would consequently not be heard.

Unfortunately, however, unless certain provision is made to prevent the Morse current from rising to full value and falling to zero too abruptly, noise will still continue to be heard in the receiver. The remedy for this is in a process called damping, or in other words in a method which retards and graduates the current's rise and fall to such an extent that the receiver is not appreciably affected. In electrical parlance this process is usually called rounding off the sharp peaks of a made or broken direct current. The rise and fall in values of telephone currents are gradual and therefore have no harmful peaks.

USE OF IMPEDANCE COILS.

The purpose of impedance or retardation coils is to round off the peaks of the Morse current and also to prevent cross-fire through the loop formed by the telephone circuits. An impedance coil is simply a coil of wire wound around an iron ring. The high magnetic inductance it offers retards but does not prevent Morse currents from flowing through it. By suitably combining condensers and impedance coils simultaneous telegraphy-telephony is thus made possible.

Van Rysselberghe was probably the first to make use of impedance coils for damping the waves. All

later methods are modifications of his system and embrace the same vital principles.

The principal improvement over Van Ryssel-berghe's arrangement, aside from better winding values of the different coils, lies in the bridging of two additional impedance coils, across the two Morse conductors. By this arrangement cross-fire through the telephone loop can be almost entirely eliminated where the Morse sides are well balanced.

In another system a composite simplex circuit is obtained by looping the two line conductors together at both ends and then utilizing the pair as a single line Morse circuit. The telephone is then connected through what is called a repeater coil. The Morse current divides equally between the two halves of one of the coils of the repeater and also between the two line wires, consequently there is no difference of potential at any two opposite points along the line where the two conductors are of identical uniform resistance. This system requires a close balancing of sides.

There are various methods of arranging composite circuits, especially on railroad lines where intermediate stations intervene and the available wires are not always suitably matched, but the difference lies principally in the addition of accessories and altered values required to meet special conditions.

Telegraph and Telephone Patents.

ISSUED MAY 19.

1,097,307. Telephone System. To A. H. Dyson, Chicago, Ill.

1,097,359. Desk Telephone. To N. Pedersen, Genoa, Ill.

ISSUED MAY 26.

1,097,760. Intercommunicating Telephone System. To S. A. Koltonski, Boston, Mass.

1,097,861. Toll-operating Circuits. To E. E. Hinrichsen, Alexander, Ill.

1,097,867. Selector Switch for Automatic Telephone Exchanges. To F. R. McBerty, New Rochelle, N. Y.

1,097,868. Automatic Telephone Exchange Selector. To F. R. McBerty, New Rochelle, N. Y.

1,097,927. Automatic Telephone-System Selector. To F. R. McBerty, New Rochelle, N. Y.

1,097,960. Telephone Repeating Device. To D. H. Wilson, New York, N. Y.

1,097,974. Receiver for Wireless Communication. To W. Harrison, Brooklyn, N. Y.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, June 12:

American Telephone and Telegraph Co.	123½
Mackay Companies	81
Mackay Companies, preferred	67½
Marconi Wireless Telegraph Co. of America (par value, $5.00)	3½
Western Union Telegraph Co.	61¾

PERSONAL.

MR. W. CRIGHTON HARRIS has resigned from the engineering firm of Crighton Harris and Company to become chief engineer of the Titan Storage Battery Company, Newark, N. J.

MISS M. E. PHRANER, for the past three years bookkeeper for TELEGRAPH AND TELEPHONE AGE, has resigned, and will, on June 23, be married to Mr. William J. McDowell, of Brooklyn, N. Y.

MR. P. V. DE GRAW, the well-known old-time telegrapher, and fourth assistant postmaster-general under the previous administration, is seriously ill at his home in Washington, D. C., from a stroke of paralysis.

MR. THOMAS A. EDISON is now giving his attention to the problem of obtaining electricity direct from coal, and he believes that the result will be accomplished commercially. He is also giving some attention to the application of electric power to flying machines, and hopes to get a storage battery of extremely light weight some day that will meet the needs.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager of this company, and Mr. C. E. Bagley, superintendent at Philadelphia, recently visited the principal offices in Mr. Bagley's district.

MR. F. W. DANFORTH, manager of the Lakewood, N. J., office, which closes June 15, will be employed at Asbury Park during the summer.

THE OFFICE at 1397 Broadway, New York, has been entirely remodelled, making it one of the handsomest in the city.

A NEW OFFICE was opened at Spring Lake, N. J., on June 1, under the management of Mr. J. R. Neafie.

THE OFFICES at Morristown, N. J., and Danbury, Conn., are being moved into larger quarters.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: L. D. Weiss, Lima, Ohio, vice C. B. Van Keuren, resigned; Miss G. H. Manley, Reed City, Mich.; R. C. Hall (recently of Mishawaka, Ind.), Pontiac, Mich.; J. O. Scott, Boca Grande, Fla.; Miss M. A. Morgan, Rawlins, Wyo.; W. W. Bourgoin, Lawrence, Mass.; Miss E. Mayberry (temporary), Elinwood, Kan.; J. M. Martin, Rome, Ga.; H. B. White, Hot Springs, Ark.; A. H. Braswell, Ft. Valley, Ga.; C. F. Carr, Camden, S. C.

New Postal Office at Indianapolis.

The Postal Telegraph-Cable Company has just completed the moving of its Indianapolis main office and operating room into the Merchants Bank Building, a new sixteen-story, fire-proof structure, on the southeast corner of Meridian and Washington streets.

The business office is on the ground floor, having entrance from Meridian street. This is prac-

tically the same location that was occupied by the company prior to temporary removal to South Meridian street during the time the new building was being erected. The office furnishings are of mahogany throughout; the massive counter and the desks of the manager, the manager's assistant and the cashier, together with the customer's lobby table and the built-in large stationery cabinet, present a striking appearance. The receiving and delivery departments are in this ground floor room.

The superintendent's office, operating room, telephone room and bookkeeper's room are on the fourth floor.

A private branch exchange switchboard in the telephone department brings the various departments and downtown branch offices into close contact at all times. The telephone department is equipped with Central Union and Indianapolis Telephone Company trunk lines, assuring ample facilities to take care of the telephone traffic.

The operating room has many new features which were made possible by Superintendent J. F. Looney, Division Electrical Engineer H. C. Shaw and their assistants. Twelve of the latest model repeater units were installed to provide space for the quadruplex, duplex and repeater instruments. These repeater units take much less room than the repeater tables formerly used and the instruments are now so placed that it is much easier to adjust them. Another new feature of the installation is the concentration cabinets. All wires that are regularly operated at Indianapolis, including city wires and way wires, are so grouped that an operator can cut in on any of these wires without leaving his chair. A call upon any wire is indicated by the glowing of a small lamp.

Sanitary metal lockers are provided for the use of employes. Pneumatic tubes connect the business office and the operating room, and Lamson carriers take messages back and forth between the operating room and the telephone department.

One feature noticed by everyone is the lighting system installed in the various departments. The lighting is semi-indirect and the reflected light gives excellent diffusion.

Superintendent Looney, Division Electrical Engineer Shaw and Manager G. F. Fuller deserve much credit for the planning of the new office. Every possible comfort has been provided for employes. They are also deserving of credit for the engineering skill with which the move from the old office to the new was made without a hitch.

Upon the day that the new office was opened many handsome flowers were sent to Mr. Looney and Mr. Fuller.

Sioux City Postal Office Destroyed by Fire.

On Sunday morning, May 24, the Grain Exchange Building, an old land mark of Sioux City, Iowa, and the location of the Postal Telegraph-Cable Company's office, was destroyed by fire. The company had just completely modernized the office. Manager W. T. Bush, his father and his brother were all overcome by smoke while removing apparatus from the office. Within a few hours the company had strung wires and established a temporary office on a near-by sidewalk, later moving to the new Davidson Building, which will become the permanent quarters. Mr. Bush and his assistants gained the admiration of the citizens by their prompt and efficient handling of the situation.

POSTAL OFFICE ON SIDEWALK, SIOUX CITY, IOWA.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Mr. W. A. Sawyer, district commercial superintendent, New York, delivered his lecture on "The Story of the Telegraph" at Rochester, N. Y., May 28, at Buffalo, N. Y., May 29, and at Albany, N. Y., June 4. He was assisted by Mr. T. J. Farrell, his chief clerk.

Mr. William J. Dealy, general superintendent of the Commercial News Department of this company, New York, who suffered a stroke of paralysis last February, has retired from active service. Mr. Dealy was for many years one of the most prominent and active figures in the American telegraph service. He began his telegraph career as a messenger in 1857. He served in the United States military telegraph service and was captured at

Harper's Ferry in 1862, but made his escape. In 1863 he entered the service at the War Department, in Washington. He was entrusted with the Government cipher and made manager at Fortress Monroe. After 1867 he served the commercial telegraph companies in various official capacities. Mr. Dealy has always taken an active part in the affairs of the various telegraph societies, military and social, and is secretary of the Gold and Stock Insurance Association.

MR. R. B. FERGUSON, district commercial manager at Buffalo, N. Y., has moved his headquarters to Syracuse, N. Y.

MR. WILLIS H. JONES, of the electrical engineer's office, New York, has been in Montreal for a week.

MR. O. C. FAUPEL, manager at New Britain, Conn., has been transferred to Hartford, Conn., as manager, vice Elisha Ryder, retired, and has been succeeded at New Britain by Mr. G. F. Groff, who was manager at Norwich, Conn. Mr. W. C. Perrigo, manager at Torrington, Conn., has been transferred to Norwich, Conn., as manager, to succeed Mr. G. F. Groff, transferred to New Britain, and Mr. T. J. Barry has been appointed acting manager at Torrington.

MR. M. H. KERNER, on Decoration Day, decorated the statue of Professor Morse in Central Park, New York, as has been his custom for several years.

MR. U. W. BOGGESS, of the Marion, Ohio, office, has been appointed manager of the independent office at Parkersburg, W. Va.

C. F. NORTON, aged thirty-six years, manager of the Western Union Telegraph office at Dickinson, N. D., died in that place on June 2.

INDEPENDENT OFFICE.—This company has opened an independent office at Red Bank, N. J., in pursuance of the separation plan, with Harvey Johnson, formerly of Lakewood, N. J., as manager. Mr. Arnold J. Turner succeeds Mr. Johnson at Lakewood. Ralph L. Turner, formerly manager of the joint office, has accepted a position in the commercial department of the American Telephone and Telegraph Company.

Western Union New Executive Offices.

The new building at 18 Dey street, which will eventually form a part of the modern structure to be erected on the site of the present headquarters at 195 Broadway, New York, will be ready for occupancy the latter part of June, when the executive offices of the company will be moved from the old building at 195 into the new quarters.

The various offices will be located as follows:

Twenty-sixth floor—President, Newcomb Carlton; assistant to the president, L. McKisick; chairman of executive committee.

Twenty-fifth floor—Vice-President, commercial department, Belvidere Brooks; assistant to vice-president, M. C. Rorty; leased wires; commercial news department; manager special services, H. G. Bates; messenger service inspection, J. C. Nelson; time service.

Twenty-fourth floor—Assistant secretary, F. W. Lienau; comptroller, E. Y. Gallaher; auditor, H. W. Ladd; distribution service; *Journal of the Telegraph;* tariff bureau.

Twenty-third floor—Contract department, vice-president, G. W. E. Atkins; United States manager cable system, J. C. Willever.

Twenty-second floor—Secretary, W. H. Baker; treasurer, A. R. Brewer; assistant treasurer, L. Dresdner; stock transfer office.

Twenty-first floor—General auditor's department.

Twentieth floor—Auditor of receipts, C. McKay; check bureau.

Nineteenth floor—Auditor of disbursements, G. K. Huntington.

Eighteenth floor—General superintendent of plant, G. M. Yorke; plant engineer, R. E. Chetwood; General supervisor of time service, C. H. Murphy.

Seventeenth and sixteenth floors—Plant department.

Fifteenth floor—General superintendent of traffic, W. N. Fashbaugh.

Fourteenth floor—Division traffic superintendent, S. B. Haig; city traffic superintendent, T. A. McCammon; claims department; tax attorney, F. N. Whitney.

Thirteenth floor—General attorney, G. H. Fearons; assistant general attorney, A. T. Benedict; general counsel, R. Taggert; law department.

Twelfth floor—Commercial superintendent, J. F. Nathan; district commercial superintendent, W. A. Sawyer; information bureau, special agent, M. W. Hamblin.

Eleventh floor—General manager Eastern Division, A. G. Saylor; superintendent of supplies, W. G. Higgins.

Tenth floor—Division auditor, M. Quinlan.

Ninth floor—Division plant superintendent, M. C. Allen.

Eighth floor—Agent of buildings; Employes' Benefit Fund committee; medical director; district plant superintendent, W. J. Higgins.

Seventh floor—General manager American District Telegraph Company of New York, J. McRobie; division superintendent American District Telegraph Company of New Jersey; patent attorney.

Sixth floor—American District Telegraph Company of New Jersey; assistant auditor American District Telegraph Companies; general manager American District Telegraph Company of New Jersey; vice-president American District Telegraph Company of New Jersey.

Fifth floor—Dillon, Thomson and Clay.

Fourth floor—Unassigned.

Third floor—Gold and Stock Life Insurance Association; Serial Building Loan and Savings Institution; Telegraph and Telephone Life Insurance Association; Telegraphers' Aid Society.

The floor space in the new building is approximately 95,000 square feet, while that in the old is about 100,000 square feet, but as the operating department will not occupy any space in the new

building there will be a corresponding gain in the new quarters for offices.

The operating department will, on June 21, be transferred from 195 Broadway to the new Walker-Lispenard Building, where entirely new and latest improved equipment has been installed.

Enlarging the Morse Electric Club.

A special meeting of the board of directors of the Morse Electric Club was held at 195 Broadway, New York, June 9, to plan for the summer outing, which will take place the latter part of July. It was also decided to amend the constitution, by eliminating the clause restricting the membership to 200, and open the membership to all male employes of the Western Union Telegraph Company, over twenty-one years of age, in any part of the country. A committee, consisting of Messrs. J. A. Hill, P. J. Casey, Gardner Irving, R. J. Murphy and W. C. Merly, was appointed to further the interests of the enlarged association, secure new members, etc. Applications for membership may be made to Mr. W. C. Merly, secretary, 195 Broadway, New York.

THE CABLE.

Mr. George Gray Ward, vice-president and general manager of the Commercial Cable Company, New York, accompanied by Mrs. Ward, sailed for Europe on the steamer "Olympic," May 30.

Mr. D. Morrison, superintendent of the Commercial Pacific Cable Company, Midway Island, is in New York on his vacation. Before returning to his station in the mid-Pacific Ocean, Mr. Morrison, together with his wife and son, will visit friends in Great Britain.

Mr. John Goldhammer, assistant secretary of the Commercial Cable Company, New York, is in England on business connected with the service.

Mr. F. H. Morris, of the Central Cable office, New York, formerly chief operator of the Seattle, Wash., office is visiting his father, Mr. J. L. Morris, a well-known member of the fraternity at Seattle. Before returning east Mr. Morris will spend some time on the ranch of his parents, located near White Salmon, Wash.

The Commercial Cable Company's Steamer "Mackay-Bennett" sailed from Halifax, June 6, to undertake some renewal work on the Commercial cables off the coast of Ireland.

Baseball Between Cable Teams.—For the second time this season the Mexican Telegraph Company's baseball team, on June 2, beat the Western Union Cable office team, with a score of 27 to 13. The batteries were: Western Union, Kruger and Regan; Mexican, Connery and Kenny. The game took place on the Parade Grounds, Brooklyn.

New Cable to Panama.

Mr. James A. Scrymser, president of the Mexican Telegraph Company, and of the Central and South American Telegraph Company, has announced that a second direct cable would be laid this summer from New York to Colon. Increase in Central and South American trade has over-taxed the existing cable, and with the opening of the Panama Canal the increased business will be of such volume that it could not be taken care of without an extension of the existing facilities. Work on the laying of the new cable will be started at once, and the work will be completed by the end of November.

It is also proposed by Mr. Scrymser to lay two additional cables from Buenos Aires, Argentina, to Rio de Janeiro and Santos, Brazil. These will give a much-needed improvement in the telegraph service to Brazil, which is now controlled by foreign companies.

The Commercial Cable Company has issued a pamphlet giving corrected and additional cable rates for ordinary service.

THE TELEPHONE.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, New York, is now devoting much of his time to the proposed toll-line feature of the contract with the independent telephone companies. Mr. H. B. Thayer, vice-president, is engaged with Mr. Kingsbury in this work, and a large staff of accountants, etc., is employed on the details.

Mr. Samuel G. McMeen, the well-known telephone expert, Columbus, Ohio, has accepted the presidency of the Ohio State Telephone Company, recently formed by the consolidation of the United States Telephone Company, the Cuyahoga Telephone Company and other independent companies.

Telephone Cables containing 900 pairs of wires are now put into about the same size of lead sheath originally used for 50-pair cables.

Municipal Telephones in Hull.—The corporation of Hull (England) has completed the purchase of the post-office telephone system in the borough area, the price being $962,100.

Seeing by Wire.—Dr. A. M. Low, an English scientific investigator, on May 28 gave a demonstration in London for the first time in public of a new invention whereby he claims that it is possible "for persons using a telephone to see each other at the same time." Selenium is the active agent in securing the results.

Boston Plant Chapter Election.—At the annual meeting of the Boston Plant Chapter Telephone and Telegraph Society of New England, held Tuesday evening, May 26, officers were elected as follows: President, James H. Flanagan; vice-president, Charles E. Ames; secretary, Gordon S. Wallace; treasurer, William J. Hadley, all being re-elected. The membership of this body is now 830. The majority of the members are employes of the New England Telephone and Telegraph Company. About one hundred are employes of the Western Electric Company and thirteen or fourteen are American Telephone and Telegraph Company men.

BABY DISORGANIZES TELEPHONE SERVICE.—In celebrating the arrival of a baby at his home an Italian, living in Merlonville, near Atlantic City, N. J., fired a shot gun into the air, the shots cutting many telephone wires and riddling the cross-arms. Two hundred telephones were put out of service for a day by the Italian's exuberances of joy.

NEW OFFICERS OF NEW YORK TELEPHONE SOCIETY.—At the meeting of the Telephone Society of New York, on the evening of May 26, officers were elected as follows: President, F. B. Jewett, of the Western Electric Company; vice-president, H. C. Carpenter, of the New York Telephone Company; secretary-treasurer, R. S. Scarburgh, of the New York Telephone Company. The subject for discussion at the meeting was "The Operation of the Greatest Long-Distance Telephone Central Office in the World."

The Telephone's Future.

In our issue dated May 16 we reprinted from the *Evening Post,* New York, an article by Mr. Frank H. Bethell, vice-president of the New York Telephone Company, entitled "The Telephone's Future." In revising the figures of the *Evening Post* article Mr. Bethell has found a few errors which are of sufficient magnitude to warrant correcting. On page 283, half way down the first column, where it reads "and this population will require 2,250,000 telephones," the figures should be "1,875,000."

A little lower down, "15,816,000 telephones in use in the world," should read "13,816,000 telephones," etc.

At the top of the second column "130 to 300 per cent" should read "30 to 300 per cent."

On page 284, half way down the remainder of the article, "thirty-eight central offices," should read "sixty-eight central offices."

RADIO TELEGRAPHY.

MEDAL FOR MR. MARCONI.—The Council of the Royal Society of Arts, London, England, has awarded the Albert medal for the current year to Mr. William Marconi "for services in the development and practical application of wireless telegraphy."

"JACK" BINNS MARRIED.—"Jack" Binns, of wireless fame, was married on June 3 to Miss Alice A. Macriff, of Flatbush, Brooklyn Borough, New York. The best man was Mr. Ernest T. Edwards, superintendent of the operating department of the Marconi Wireless Telegraph Company, New York.

WIRELESS TELEPHONE DEVELOPMENT.—Mr. William Marconi states that he has had wireless telephone conversations with Berlin, from London, a distance of 600 miles.

WIRELESS SUBMARINE TELEGRAPHY AND TELEPHONY.—Prof. R. A. Fessenden, on June 3, tested his wireless submarine telegraph and telephone system in Boston harbor. Spoken words were carried through the water a considerable distance and dispatches in Morse carried ten miles.

ECLIPSES AND WIRELESS.—The eclipse of the sun, August 21, is expected to present an exceptional opportunity for the study of the propagation of electric waves through air in sunlight and in darkness and across the boundaries of illuminated and unilluminated regions.

FRENCH WIRELESS TELEPHONE.—Wireless telephone conversations over a distance of 150 miles were held from Paris on June 4, according to a dispatch from that city. Two French naval officers are the inventors of the system. It is stated that the speakers' voices were clearly recognizable.

WIRELESS TELEGRAPHY AT 100 WORDS PER MINUTE.—The Marconi Wireless Telegraph Company of England recently gave a demonstration of wireless telegraphy at 100 words a minute between Chelmsford and Letterfrach, Galway County, Ireland, and the British Postmaster-General proposes to adopt this method of working between a new station near Stonehaven and a post-office station near Newcastle-on-Tyne, as a stand-by in the event of interruption of the overland wires.

TO STUDY WIRELESS.—A State organization to study in the public interest the science of wireless telegraphy, ordinary telegraphy and telephony is proposed by the British Postmaster-general and a committee of experts. The committee suggests the establishment of a national research laboratory and a national committee of research to conduct theoretical investigations and experiments, and to co-ordinate and supplement the work now being done in the Government departments.

Wireless and the Sinking of the "Empress of Ireland."

Early in the morning of May 29 the Canadian Pacific steamer "Empress of Ireland," while on her way from Quebec to Liverpool, was run into and sunk in the St. Lawrence River, off Father Point, Quebec, by the Norwegian collier "Storstad," causing a loss of 1,027 lives. Wireless distress signals were immediately sent out and were received by Mr. J. McWilliams, the wireless operator at Father Point, who at once had the pilot boat "Eureka" and the mail tender "Lady Evelyn" rushed to the scene of the disaster, ten miles away. When the two boats reached the place, however, the "Empress of Ireland" had sunk, but they succeeded in rescuing over two hundred persons from the water. The wireless operator on the "Empress of Ireland" had little time in which to send out the "S O S" signal before the ship sank, but those calls that were sent were immediately effective and brought to the scene of the collision all of the aid that was available in the vicinity. The "Empress of Ireland" had two wireless operators, as required by law. Ronald Ferguson was the senior operator and Edward Bomford the junior.

While the accident occurred not far from Father Point, on account of railway connections the survivors, and all rescued bodies were taken to Rimouski. The first news was received in Quebec through the Great North Western Telegraph office at 3.20 a. m., Friday. A bulletin was immediately sent to all the morning papers in Quebec, Montreal and Toronto and by them placed on the Canadian and Associated Press wires.

Early that morning through the courtesy of the *Montreal Daily Mail,* Operators G. Patry, D. Miller and Manager F. D. Boomer, of the Great North Western Quebec office, boarded the newspapers' special train at Levis and were hurried to Rimouski, where they were joined by Operators P. Gorman and D. R. Sheehan, of Montreal, who had arrived on the *Montreal Star* special. Assisted by Operators Fiset and Cote, of Rimouski, the entire staff worked through Friday night, Saturday and until late Saturday night, when they returned to Quebec, the survivors and bodies recovered having preceded them. The Great North Western Company's wires being the ones to touch Rimouski, were taxed to their utmost capacity. The Associated Press and the United Press both having leased wires there it was necessary to cut out through wires and work them west through Quebec, and east through Halifax to New York. The waiting-room in the Intercolonial Railway station was turned into a temporary telegraph office. Box relays were placed upon tables and benches and operators worked as best they could, with boxes and anything available as seats. An enormous amount of press was handled, all of the Canadian papers being represented as well as the majority of the New York, Boston and London (Eng.) papers.

At Quebec, the already large force of newspaper men was reinforced by representatives from practically every paper of importance in the United States. Mr. S. B. McMichael, of the general manager's office, Toronto, hurried to Quebec to assist in looking after the newspaper file, and the entire Quebec staff, including the lady clerks and messenger staff, were on duty practically without rest until late Saturday night.

Mr. J. McWilliams and his staff at Father Point rendered very valuable services, handling a considerable amount of newspaper matter from Father Point.

Ronald Ferguson, the senior operator on the "Empress of Ireland," who sent the distress signal, was carried down with the ship and swam about until almost exhausted before being rescued..

"Between the time of the collision and the time that the dynamos went out of commission," he said, "we had only eight minutes, and in that time we were able to summon two boats. My cabin was on the top deck, and immediately after the shock I saw lights passing. I ran to the wireless room and called to stations: 'Stand by for distress signals; have struck something.'

"Then the chief officer told me to call 'S O S,' so I sent out the message: 'S O S. Have struck something; sinking fast; send help.'

"The station at Father Point replied immediately, asking where we were. I replied we were twenty miles past Rimouski, and I was trying to confirm this in answer to a request from Father Point when the power was cut off. The water had got into the stokehold, cut off the steam and put the dynamos out of commission. Before, however, the apparatus was useless, I got from Father Point the following message:

"'O. K. Am sending out "Eureka" and "Lady Evelyn" to your assistance.'"

On being rescued and taken to the "Storstad," Ferguson immediately made his way to the "Lady Evelyn," which had wireless apparatus on board but no operator. The room was locked, but he broke a window, climbed through, geared up the apparatus with Father Point, and gave a brief story of the wreck, asking for clothes, supplies and a train to be sent to Rimouski wharf.

"I do not think it has been realized," said Mr. Ferguson, "what a part wireless played in the affair. Only eight minutes was I able to work, but without that the only boats available for the passengers would have been those on the starboard side of the 'Empress,' and it is not likely that more than forty or fifty would have been saved."

Institute of Radio Engineers.

The June meeting of the Institute of Radio Engineers was held at the Engineering Societies Building, New York, on June 3.

Mr. Melville Eastham presented a paper illustrated by lantern slides on the "Hytone" sets of the Clapp-Eastham Company. He described instruments for measuring radiated energy and the energy of received signals in terms of audibility. A new method recently developed for generating maintained waves at high efficiencies was also explained.

There will be no further meetings of the institute until September.

An Excellent Book on Telephony..

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the best books of its kind on the market. As its title implies, it deals with electricity and magnetism as applied to telephony, and the subject is presented in such a clear manner that an understanding of it comes with little effort. The author, Mr. Cummings, is a practical telephone man, and in his daily work he has encountered many difficulties and problems. He analyzed and investigated them to find the causes and has, based upon this valuable experience, written a book that every telegrapher and telephonist should study. This is an excellent book for beginners, and for advanced students as well, as it keeps the principles clearly before them, and so long as the road is clear their progress will be easy. This book is now being used as the basis for the "Questions and Answers," which are now appearing regularly in these columns. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, New York, at $1.50 per copy.

JAMES A. GRISWOLD, aged fifty-two years, a New York broker telegrapher, died at his home in Brooklyn, on June 11. For many years Mr. Griswold was identified with the Associated Press service and was one of the best-known telegraphers in New York.

Utility of Wires on the Pennsylvania Railroad.

(*Continued from page 328, June 1.*)

DESCRIPTION OF DIFFERENT SYSTEMS

Telephone circuits are either grounded lines or metallic circuits. The latter are much more satisfactory and are exclusively used for long-distance work. A grounded line, however, is considerably cheaper to install and can be used with fair results for short distances.

The arrangement of circuits used by the commercial telephone companies is very complex. We shall

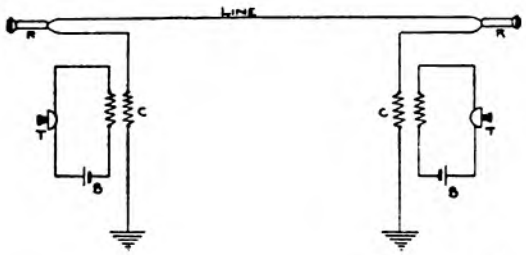


FIG. 16—GROUNDED LINE TELEPHONE CIRCUIT

illustrate a few of the simpler forms only, such as are used in connection with railroad lines.

The local battery grounded line is arranged as follows (Fig. 16):

The current from the local battery B flows through the transmitter T, which renders the current variable. This variable current passes through the primary of the induction coil C and back to the local battery, inducing an alternating current of

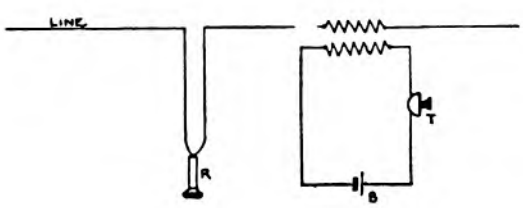


FIG. 17—SERIES CONNECTION FOR INTERMEDIATE STATION ON GROUNDED LINE CIRCUIT

high frequency in the secondary and the line. The secondary of C is connected on one side to earth and on the other through the receiver R to the line. A similar arrangement obtains at the other end.

Intermediate stations may be introduced either in series (Fig. 17) or by bridging (Fig. 18), also called multiple.

Signaling is effected by means of an alternating current furnished by a small hand magneto, which for grounded lines will furnish from seventy to seventy-five volts, operating upon a bell with a polarized armature at each station.

Each station is called by a certain number of rings, and each station, whether series or bridging, hears all the rings for the other stations.

On grounded lines the bells should have about eighty ohms resistance for the series arrangement, and in bridging from 1,000 to 2,500 ohms.

Grounded lines are usually very noisy, partly on account of stray earth currents finding their way into the lines, and partly on account of the induction from neighboring telephone, telegraph or power circuits. Some of this noise can be eliminated by placing a condenser in series in the line, but complete quiet can be obtained only on metallic circuits.

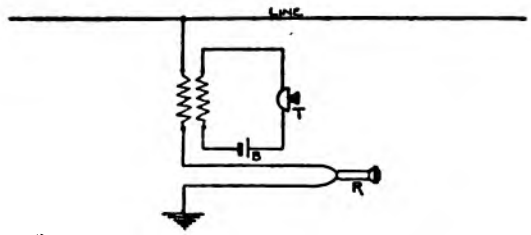


FIG. 18—BRIDGING OR MULTIPLE CONNECTION FOR INTERMEDIATE STATION ON GROUNDED LINE CIRCUIT.

In the metallic circuit the grounded return for the current is replaced by a second wire. The local battery metallic circuit is illustrated in Fig. 19.

In this type of circuit it is customary to insert intermediate stations by bridging only, as in Fig. 20.

It is very necessary for the proper working of the

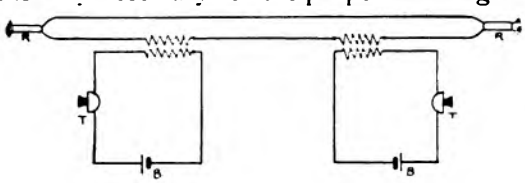


FIG. 19—METALLIC TELEPHONE CIRCUIT.

metallic circuit that the line be balanced in resistance, capacity, leakage and inductance. This applies to phantom circuits as well as to metallic circuits. In case the two lines of the metallic circuit are of different gauge or material, thus rendering them of different resistance, proper balancing may be effected by suitable transposition or transferring.

To eliminate inductive noise and cross talk from a metallic circuit, transposition is resorted to. When a number of such circuits are parallel to one

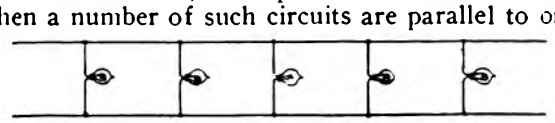


FIG. 20—BRIDGING OR MULTIPLE CONNECTIONS.

another, all circuits should not be transposed on the same pole.

The current supplied to the transmitters is obtained either from a primary battery or from a secondary or storage battery. In telephone exchange work it is a common practice to supply many transmitters from the same storage battery. In this case cross talk may occur from the battery being overworked or from the solution getting too low in specific gravity.

(*To be Continued*)

UNIVERSAL CODE ADOPTED BY SAN SALVADOR.—The government of San Salvador has adopted the Continental telegraph code on its lines. As was done in Mexico, the San Salvador operators were allowed four months' time in which to prepare for the change.

Mr. S. L. Robinson, of Petoskey, Mich., an old-time and military telegrapher, in renewing his subscription for another year writes: "The AGE improves with age and is a welcome visitor."

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REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, JUNE 16, 1914.

Wireless in the "Empress of Ireland" Disaster.

Once more the inestimable value of wireless in times of disaster at sea has been demonstrated under most remarkable circumstances.

The Canadian Pacific steamer "Empress of Ireland" was sunk by a collier in the St. Lawrence river early in the morning of May 29, within sight of land, and carried to their death over 1,000 of the passengers and crew. So swift was the awful consequence of the collision that the wireless operator on duty had very little time in which to send out the wireless distress signal, but he improved to the full the little opportunity he had and his calls for help promptly reached the ears of the watchful operator at Father Point, who lost no time in dispatching aid to the distressed vessel. The steamer sank in a very few minutes after having been run into—not exceeding twenty minutes; one report says ten—and there was no opportunity to organize effective action on board, so sudden and complete was the deadly work. In a very few minutes the generating apparatus for the lighting of the ship and for the wireless were submerged as the steamer sank.

The fact that stands out most clearly in this accident is the vigilance of the wireless operators on ship and on shore. Little has been said of their prompt and effective action in the awful emergency, but that they were quick to perform their duty during the few precious moments they had at their disposal is evident from the results. These men deserve the greatest of credit, and had it not been for them the comparatively few that were saved by the rescuing boats would in all probability have perished also.

China's Government Telegraphs.

Several prominent American newspapers point with much seriousness to the fact that the Chinese Government, which owns the country's telegraph system, has extended it until more than 36,000 miles of land lines and about 1,000 miles of cables are now in use in that country. The way these articles are worded it is evident that they are intended to create a sentiment in favor of government control of the telegraph in America. To those who understand the meaning of figures there need be no particular importance attached to such statements. In New York we have in one small district more than 36,000 miles of telegraph wire. In the United States our telegraph and telephone facilities are figured by the millions of miles not by the thousands. The average citizen of the United States does not know whether 36,000 miles of telegraph wires in China means a great deal or means nothing. Many single buildings in New York City can boast of more telegraph and telephone facilities than the entire Chinese Empire.

The Universal Telegraph Alphabet.

We hear much about co-operation these days, and its practical benefits are generally known and appreciated. Co-operation and independent action are in one sense contradictory, and no man or body of men can be absolutely independent of all other men; there must be agreement between them on some points, at least, or there can be no harmony in their relations.

The United States and Canada, both of which countries may be regarded as one for the present purpose, stand alone in the world to-day in the practice of an antiquated telegraph alphabet. We will not be bold enough to say that this is due to the belief that because it is of American origin it must necessarily be the best, but rather to inaction and a lack of appreciation of the practical advantages of the Universal alphabet. The situation expressed in a sentence is that, on the North American continent an alphabet is used that was years ago discarded by European countries as unreliable and unsafe on account of its spaced letters. How long the United States and Canada will hold out against the inevitable no one can say, but it certainly is time seriously to take up the proposition of substituting the more scientifically designed alphabet for the Morse alphabet with its spaced letters. The danger of using spaced letters is generally recognized and has been lately effectively empha-

sized by an eminent authority. When Morse devised his alphabet it fully met the necessities of the time. There were no ciphers and code words those days and it is not at all likely that Morse ever thought of such expedients, because there was then no need for them and they were yet unborn.

The time has come when the telegraph companies of the United States must act in order to bring themselves into harmony with the rest of the world, and with their own government, as regards the telegraph alphabet. We have frequently pointed out the advantages of the use of the Universal code. The absence of spaced letters makes it a much safer medium for the transmission of business, and while speed is an important consideration in telegraphy, accuracy is more important. As American operators become thoroughly familiar with the Universal alphabet they acquire a speed that in most cases equals the Morse.

We do not assert that the Continental, or Universal, alphabet is perfect and that errors are impossible by its use; we do know, however, that it is a safer alphabet than the Morse and that it is the cause of very few errors.

There is no doubt that the change from Morse to Universal could be accomplished with little or no trouble and with safety to business. The use of the Continental alphabet is compulsory in wireless practice, and Morse operators on shore and on ship stations had no difficulty in taking up the Universal when the time arrived for such action. Three years ago wireless operators at coast stations heard nothing but Morse, but now they hear nothing but Continental. The United States Government, having jurisdiction along the sea coast, compelled this change in order to conform with the international requirements, and the operators experienced no trouble whatever in changing from one to the other.

It has been stated that some operators, handling international business, can work equally well in Morse or Continental. This does not speak well for the conditions that render such a thing necessary. It is a case of the tail trying to wag the dog, because there is not the remotest likelihood that we will convert the world to using the Morse alphabet.

The United States Government has adopted the Universal alphabet in its service and on practically all government lines the Morse alphabet is never heard. Therefore is it not time for the two great American telegraph companies to take action? We think this is the opportune moment to "turn the switch," as all conditions are favorable for success.

Truth About Losses in English Telegraph Service.

Hon. C. Hobhouse, postmaster-general of Great Britain, in addressing the House of Commons on April 30, in explanation of the post-office budget, stated in plain language why the British Government telegraphs are conducted at a loss, and showed clearly that management by legislation means failure. The following is an extract from his remarks:

"I wish to say a word about the telegraph department, because it is the least satisfactory of the departments of the post-office. It has been carried on at a loss for a great number of years. In the last forty years the excess expenditures upon telegraphs has amounted to the very large sum of £22,000,000 ($110,000,000). The greater portion of that excess expenditure is due entirely to the action of the House of Commons. In 1885 or 1886 the House of Commons insisted upon having a sixpenny (12 cents) telegram. Of course, it was a very great convenience to the individual, but inasmuch as the ordinary sixpenny (12 cents) telegram cost on the average 11d. (22 cents) to transmit and deliver, it is quite clear that the House of Commons was inflicting a great loss on the postal service for the convenience of the individual sender of telegrams. I do not say that it is not a justifiable course, but the result has been that, whereas the telegraph service was at that time struggling into solvency, it has been involved ever since in hopeless bankruptcy. It is carried on at a loss of £350,000 ($1,750,000 a year; a deficiency which does not include the interest on the original purchase money, liability for pensions of the employes, or amortization of the original purchase money.

"It seems to me that an inquiry into the organization of telegraphs would do something to make good the loss to the exchequer which is involved by the present service, and might increase the efficiency of the service. The establishment of a postal laboratory on a much larger scale than anything we have at present would admit of much more extensive and close research into telegraphic problems. I hope the Committee of Organization, plus closer research into the problems of high speed and other telegraphy, may enable us to set this department on a much more satisfactory footing than at present exists." (An honorable member: "What is the loss on press telegrams?") "Undoubtedly it is a very serious loss."

In commenting on the statement the *London Daily Mail* says the actual loss is very much greater. "The £22,000,000," it states, "does not include the original purchase money, or the interest on it, or any provision for its amortization, or the payment of pensions to the telegraph employes. If these and similar items were included it would be found that State ownership of the telegraphs has resulted in a loss of nearer £40,000,000 ($200,000,000) than £20,000,000 ($100,000,000). And even that would not be telling the whole story. Supposing the post-office had left the telegraphs in private hands, exacting a moderate royalty on the gross profits or receipts. It is probable that in such a case the State to-day would be in receipt of royalties of at least £250,000 ($1,250,000) a year, and that since 1870 it would have received between £5,000,000 ($25,000,000) and £6,000,000 ($30,000,000). Instead of that the State has lost nearly £40,000,000 ($200,000,000)."

TELEGRAPH WIRE FOR CORSETS.—The Dykas, of Sarawak, North Borneo, steal telegraph wire for the purpose of constructing corsets for the dusky belles. The corsets are spirally wound from the waist up.

Former Telegraphers Members of Ohio Society.

The Ohio Society of New York, organized over twenty-five years ago, is the strongest and best society of the kind in the city. It maintains spacious rooms on an upper floor of the Hotel Waldorf-Astoria, being the only state society in New York that maintains club-rooms. It has over eight hundred resident and non-resident members, including a considerable number of well-known men who are now or were formerly telegraphers, among them being Millard G. Anderson, David Homer Bates, Frank N. Dowler, Thomas A. Edison, Ralph H. Wallace, Theo. N. Vail, Harry B. Logan and Charles P. Bruch.

At a recent meeting, Mr. Bruch, as chairman of the governing committee, made a report and added some remarks. The society has paid him the compliment of ordering his report and speech printed and distributed to the members. We quote parts of his remarks that apply with equal force to social and mutual benefit organizations in the telegraph and telephone service:

"I believe it is our duty to enthusiastically support this society, not only for what we get out of it for ourselves, but also as an expression of our appreciation of the work that is being done by our officers and committeemen. They work hard for us and the least we can do is to return the courtesy by showing interest in the organization.

"The society doesn't run itself. There is a lot of work involved in managing its affairs, taking care of its funds and 'promoting the best interests of its members.'

"The officers and committee members get nothing out of it except the satisfaction that comes from being helpful to others.

"I think, sometimes, that we don't realize how much they do for us.

"They are busy men who have little spare time, but they devote many hours—sometimes whole days—to the society's business and freely give us the benefit of wise counsel and good judgment that could not be bought with money.

"If we paid for the time they give us at the rate of their regular earnings our treasury would soon be empty.

"Let us show our appreciation in practical fashion by taking advantage of the privileges and comforts that they are providing and maintaining for us, and let each of us strive to do what he can to make their work easy.

"One way in which every individual can help is to invite Ohio men to join us.

"Our membership committee is efficient, but five men can't do it all.

"The society should constitute a membership 'committee of the whole.' It is our duty in this world to share our blessings, and when it comes to sharing the blessings of the Ohio Society, we must let no Ohio man escape.

"If this society is to truly succeed it must measure up to its opportunities for usefulness, and when it has done that it must make more opportunities.

"To succeed we must go ahead and keep on going.

"There is no success without progress. If we stand still the world goes by us—and soon forgets that we are on earth at all.

"'Get together!' Keep this a live organization! Make it—more than ever—helpful and useful to ourselves, to our friends back home, and to this great, wonderful city that is our city."

Rapid Hand Telegraphy.

BY AN EAGLE PASS, TEX., OBSERVER.

Recently there have been several references in TELEGRAPH AND TELEPHONE AGE to the fast averages made by some of the eastern operators, mostly of the Postal Telegraph-Cable Company.

In this country we are not after fast averages, but we make them, coupled with good service. In reply to urgent calls for more facilities to move our business an official recently visited this office, and almost the first thing he said was: "Your averages do not show any necessity for more facilities. Your principal wire does not average twenty per hour." The files for the preceding three hours were placed before him and showed forty-three messages sent. His attention was then called to the character of the messages and he was invited to total the number of words and divide by the number of messages. The result was an average of 152 words of the most difficult Spanish cipher per message. We got the increased facilities.

Business on the Mexican border amounts to something, and when an operator proves himself competent to handle this traffic from original copy, do it correctly, and make the average twenty to twenty-five an hour, he need not be jealous of the "down Easter," for the fast man from Chicago arriving here from time to time cannot do it, at least not until he has practiced for some time.

New Book.

TELEPHONE CONSTRUCTION, INSTALLATION, WIRING, OPERATION AND MAINTENANCE. By W. H. RADCLIFFE AND H. C. CUSHING, JR.

This is the second revised edition of this well-known and useful book, which has been brought up to date. The book gives the principles of construction and operation of both the Bell and Independent instruments; approved methods of installing and wiring them; the means of protecting them from lightning and abnormal currents; their connection together for operation as series or bridging stations; and rules for their inspection and maintenance. Line wiring and the wiring and operation of special telephone systems are also treated.

Intricate mathematics are avoided, and all apparatus, circuits and systems are thoroughly described. The appendix contains definitions of units and terms used in the text. Selected wiring tables, which are very helpful, are also included.

The book, which contains 180 pages and 125 illustrations, is intended for electricians, wiremen, engineers, contractors, architects and others interested in the installation of telephone exchanges in accordance with standard practice.

The price is $1.00 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Branch Line Switchboard.

BY A. J. EAVES, ENGINEERING DEPARTMENT, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The accompanying sketch shows a type of branch line switchboard used by the Postal Telegraph-Cable Company.

The units are made of porcelain, each holding six jacks, and are mounted on angle iron. The usual assembly comprises two test bars to five line bars, ten lines.

Under normal conditions there are no cords or plugs inserted in any of the jacks and the board appears as shown in the illustration when all lines are in use.

D and E of the test bar are open jacks with positive and negative current respectively. Jack F is also open with one side grounded. G and H are closed jacks and I is open.

A of line bar is a looping closed jack that can be used to cut in the test set shown. B and C are patching jacks that open the screw contact side when a plug is inserted.

A line is permanently wired to one side of jack C of line bar and the other side of C is wired to one side of B. The table loop is wired to one side of A and one side of B. The circuit starts at the generator and goes through the table set and grounds through the line at the branch office.

If it is desired to remove the battery from the line a hard rubber plug is inserted at A.

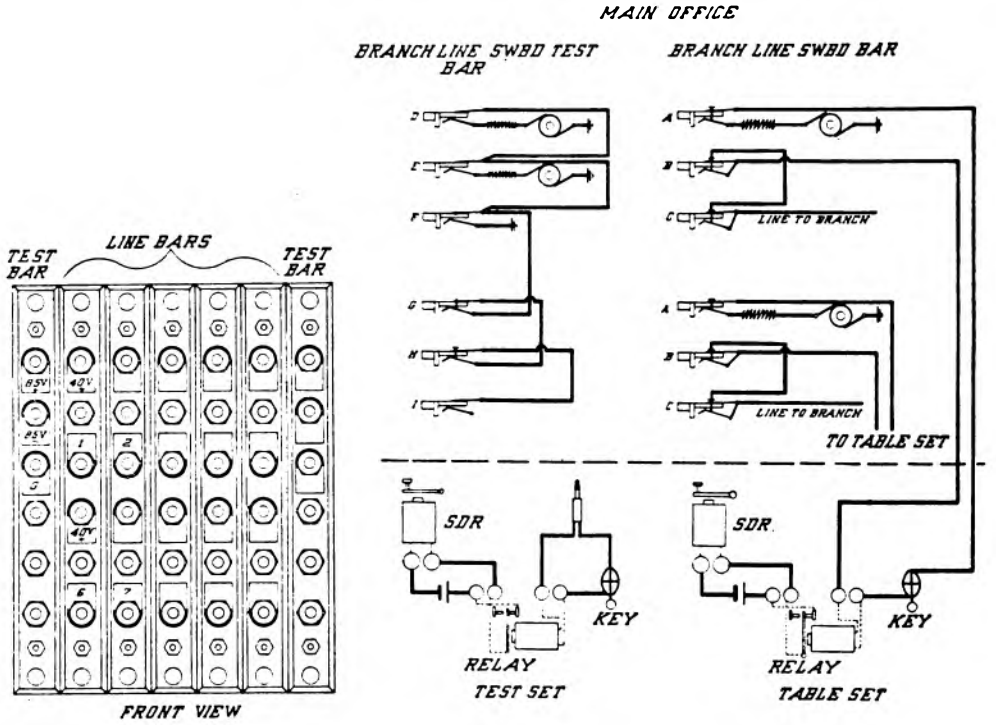
To move a table from one line to another a single conductor cord, equipped with plugs at both ends, is inserted at B of one line and C of the other. The plugs connect with the springs of the jacks, picking up one side of the table set loop at B and transferring it to the line at C. The other side of the table loop remains connected to the battery.

It will be noticed that after this operation the table and line left open are free to be either connected in a like manner or otherwise transferred.

In the event of trouble on a line, the line is transferred to a test bar by inserting the plug of one end of a single conductor cord in C of line bar and the other end of the cord in I of test bar. The double contact plug of the two conductor cord connected to the test set is inserted either in jack D or E to put positive or negative battery to line and to cut in the test set. If it is desired to earth the line and listen in, the test set plug is inserted at F.

When it is necessary to increase the line potential or to reverse the polarity, or to ground the line, one end of a cord with a plug that will pick up the body of the jack and leave the spring open is inserted at A of line bar and the other end of the cord is inserted at I of test bar. A solid brass plug is then inserted at D, E or F as desired.

This board is well adapted to city line use and is very flexible.



BRANCH LINE SWITCHBOARD.

OPERATORS TO TRANSMIT ESPERANTO.—The chief of the Postal Department of France has arranged a course of instruction in Esperanto for the telegraph operators who will have to transmit large numbers of telegrams in the universal language during the approaching Esperanto congress. The operators do not take kindly to the proposition, however.

DIRECT TELEGRAPH BETWEEN RUSSIA AND JAPAN.—It is proposed to establish direct telegraphic communication between Russia and Japan.

The Military Telegraphers.*

BY WM. H. WOODRING, GREAT NECK STATION, N. Y.

The military telegraph and its great usefulness to the army during the Civil War has received very little mention in history. Writers of personal recollections ignore the subject almost entirely. A more ready writer than myself could fill many pages with graphic accounts of heroic deeds, devotion to duty, etc., by those engaged in the military telegraph and the great value of the telegraph as a factor in conducting the war.

The electric telegraph was comparatively new at that time, having never been used for military purposes by the armies of any nation, except Germany. The Union army depended almost entirely on the signal corps and on mounted couriers for quickly transmitting orders or for obtaining important information from distant points during the first few months of the war.

Gradually, however, the importance of the telegraph as being superior to the old methods became a recognized fact, and the telegraph wires soon began to follow the army nearly as fast as the army advanced, the line builders often working all night for that purpose, thus keeping the commander in close touch with the War Department at Washington and also with the different commands under him.

They constructed over 15,000 miles of telegraph lines during the war. Many of these wires were of portable material, to be taken down at the close of a campaign and used elsewhere. Expert telegraphers were supplied for service in the field as fast as they could be secured. They came from all parts of the United States and a few from Canada.

It will seem strange, no doubt, to many to hear that the military telegraph corps was never recognized by the Government as an integral part of the army; that it was not mustered in as a military organization, and at the close of the service its members properly mustered out and pensioned as were the soldiers.

Generals of the army endeavored to obtain commissions and staff appointments for their operators. General Fremont, while in command of the Department of Missouri, approved a plan to organize a corps of telegraph operators, builders and line repairers of experience, under military discipline, armed and equipped for defense, and the organization was so formed, but all these plans on being presented to Secretary of War Stanton were disapproved. He stated that he was well satisfied with the present efficiency of the service, and that he did not want the operators commissioned because that would only give every superior officer power to command them—a result he was most anxious to avoid. His views prevailed.

Near the end of November, 1861, the War Department appointed Anson Stager, of Ohio, General Manager of Military Telegraphs in the United States, with the rank of Captain A. Q. M. In accordance with the wishes of the Secretary of War Captain Stager then proceeded to the formation of the United States Military Telegraph Corps by naming the following staff, for whom he obtained commissions: Major Thomas T. Eckert to be assistant manager and an experienced man as superintendent of telegraph for each of the military districts, ten in number, with the rank of Captain A. Q. M.

Captain Stager, in anticipation of this, was commissioned colonel in February, 1862, and attached as aide-de-camp to the Secretary of War.

Thus organized, the operators and line builders, who braved nearly all the dangers incident to the service, were left mere citizens. They were, however, sworn to secrecy, loyalty to their country and the strict performance of their duty, responsible at all times to their superintendent.

At the close of the war the meritorious services of the military telegraph corps seems to have been forgotten by the Government. The men were paid to date, and in most cases given transportation to their homes, but with nothing to show for their devotion to their country, except, in some cases, wounds or enfeebled bodies from disease and hardships.

Not being furnished with certificates of discharge, like to those given to their former soldier companions, they were and are still deprived of any pension from the Government. Had Stanton and President Lincoln lived there is no doubt ample honors would have been accorded those operators on retiring to private life.

Many telegraphers, before the organization of the military telegraph corps, enlisted as soldiers, the writer being of that number. These men were sought out, and by order of the Secretary of War, were detached from their commands and ordered to report for duty in the military telegraph corps, showing how great was the need for experienced men for that service.

The failure to give the telegraphers commissions and rank was the cause of considerable complaint among the operators, as it placed them in an anomalous position and its consequent evils in the service. He was surrounded by all the trappings of war; was located at or near the commander's headquarters, a virtual member of the commander's staff, but only a citizen, and in most cases without a soldier's uniform.

Plum, in his "History of the Military Telegraph During the Civil War," says: "Intellectually, at his age he had few superiors. His bravery was so splendid that the rare exceptions were overwhelmed by the multitude of heroic acts he performed. It is unnecessary to compare the importance of his work with the grand service of brave officers, for they concede it. No other service was so confided in."

Most of the important telegraphic communications between the War Department and commanding generals were transmitted in code or cypher to prevent the enemy, who often tapped our wires, from benefiting thereby, should they succeed in copying any of these important dispatches. The operators at headquarters

* Reprinted from *The National Tribune*, Washington, D. C.

had these cypher keys in charge almost exclusively, and they were held strictly accountable for their inviolate safety. They were required to put into cypher all important telegrams, from which the enemy could derive any information as to the location or movement of troops, etc., also translate cypher messages that were received.

Thus they were the trusted custodians of the innermost secrets of the army. Time has proven that these operators were faithful to this great trust so confided in them. If, by any cause, one of these cypher keys was lost, then the system was at once changed in all the departments where it was used.

The necessity for using a cypher system in the transmission of important orders is well illustrated in the following incident, as related in Plum's history:

"Lee had been exhausting his resources to ascertain the purposes of Grant, when the idea of tapping the Fort Monroe line was suggested. He sent his operator, named Gaston, to perform the hazardous work. Gaston, accompanied by several scouts, all dressed as peaceable citizens, engaged as woodchoppers, made their way to the vicinity of Dr. Richards's, near Surry Court House. Before leaving Richmond, Gaston caused an insulator to be prepared to hold the two ends of the main line in place on the pole, so as not to attract attention. To these he connected his fine silk-covered wire, and, running that under the bark to the bottom, it was extended a considerable distance along the ground into the adjoining woods and well covered with dry leaves. Thus Gaston opened his office on the military line connecting City Point with the War Department. Two men were on guard along the woods all the time. Thus for six whole weeks this Confederate operator was on Grant's wire. While that illustrates what a brave operator may accomplish under perilous circumstances, the fact that but one message received by Gaston during all that time proved of any value to the Confederates reflects infinite credit upon the corps for its telegraph cypher system. Gaston copied a great many cryptographic dispatches which were sent to Richmond, but were never translated."

There can be no question as to the fact that the military telegraph was of immense value to the army. General Sherman in his "Memoirs" writes:

"The value of the magnetic telegraph in war cannot be exaggerated, as was illustrated by the perfect concert of action between the armies in Virginia and in Georgia in all 1864. Hardly a day intervened when General Grant did not know the exact facts with me, more than 1,500 miles off, as the wires ran."

The Secretary of War, in his report to President Lincoln, December 5, 1863, and by him submitted to the thirty-eighth Congress, has this to say of the value of the service: "The military telegraph has been of inestimable value to the service, and no corps has surpassed, few have equaled, the telegraph operators in diligence and devotion to their duties."

Comte De Paris, a French historian of the Civil War, thus speaks of the telegraph service:

"A single example will show the importance of the military telegraph. Sufferings and dangers were not spared those men whose merit was the greater, in that it was less conspicuous. More than one among them, shivering with fever in an unhealthy station, lay down with his ear against the telegraph instrument to write with a trembling hand under dictation some important dispatches whose secret he would confide to no one. Many paid with their lives for their boldness in setting up their instruments under the very fire of the enemy, and one fact, almost incredible, bears testimony to the dangers to which they were exposed. During the siege of Charleston the wire which connected the besieging batteries ran so close to the rifle pits of the Confederate skirmishers that it was frequently cut by their bullets."

To prevent wire tapping at exposed points during Grant's Petersburg campaign, after several of these attempts had been discovered, submarine cables were laid in the bed of James River at the most exposed points between Fort Monroe and City Point, to Grant's headquarters, and from that office portable field wires were extended to each division headquarters of troops operating around Petersburg, thus keeping the whole army in constant communication with their commander, and the latter connected directly with the War Department via Fort Monroe.

I was stationed at the Fort Monroe office as operator during October and November, 1864, having charge of the automatic telegraph repeaters from 2 a. m. until 2 p. m. My duty was to keep them properly adjusted. They connected the Washington wire with the City Point wires. When weather conditions interfered, so that the repeaters failed to work properly, it became my duty to copy the dispatches and retransmit them to their destination.

The transports and gunboats anchoring in the James River frequently caught their anchors on the submarine cable and broke it. On one of those occasions I was hurriedly sent in charge of a repair boat from Fort Monroe to Jamestown Island, to underrun the cable and find the break. We found it broken within two miles of that point and repaired it. We could hear the occasional boom of a large gun at Petersburg from the island in the quiet hours of the night.

My services, however, were mostly in southwest Missouri and northwestern Arkansas; a country infested by lawless bands of bushrangers, commonly called bushwackers, or "guerrillas." These bands frequently cut the telegraph wires and waylaid the repair men and mail carriers, unless guarded by cavalry escorts.

In June, 1862, I was ordered from St. Louis to Springfield, Mo., as manager of the headquarters office. From Rolla the journey had to be made on horseback, a distance of 122 miles. Rebel raiders had been active on the road for several days, and were being pursued by our cavalry, consequently there was no escort available for my safety, and I started on this perilous journey alone.

Twenty miles from Rolla I passed the smoulder-

ing remains of a Government wagon-train, which the rebels had burned. There was only two towns and one guarded stage station between Rolla and Springfield. These afforded safe shelter at night. The road was mostly through hilly timber land, excellent places for the operations of murderous bushrangers; fortunately, I was not molested until within twenty miles from Springfield, where I had a very narrow escape from capture by a band of about a dozen bushwackers. I had overtaken three line repair men, who had mended a cut or broken wire, and were returning to Springfield, and as they rode along leisurely, the alarm was given of the enemy's presence. They speeded their horses and got to their destinations safely. These nomadic bands seldom took any prisoners; they usually escorted them into the woods away from the road and shot them.

In January, 1863, General Marmaduke made a quick raid from Arkansas into Missouri with about 4,000 troops, and made an unsuccessful attempt to capture Springfield on the way, at a time when it was garrisoned by only about 2,000 troops, mostly State militia. General E. B. Brown, in command, quickly armed all the convalescents from the Government hospitals and such patriotic citizens as would serve for the defense.

My assistant operator, Henry G. Briggs (a member of the 94th Illinois) and I armed ourselves and helped defend the town. The battle opened about 2 p. m. and lasted until dark. One shell penetrated the telegraph office at headquarters and it rolled at my feet, not exploding, however. I made an hourly report of the battle to Department headquarters at St. Louis by telegraph, and had several close calls while on the firing line. Briggs was not so fortunate; a short time before the end of the battle, while on the skirmish line, acting as sharpshooter, he was hit and instantly killed.

The enemy that night withdrew and continued the raid east, cutting the telegraph wires and using them for entanglements across the road in the rear. Next afternoon the commander furnished me with an escort of twenty-one men to open communication with St. Louis, and send report of the battle. I took a field instrument and a repair man and started that evening. The wire entanglement soon stopped us. By noon next day we had gone thirty miles without opening communication. Here the escort refused to proceed any farther, but I insisted on going on and called for volunteers. One soldier and the repair man responded, the rest returned to Springfield, where the sergeant in command was arrested, tried by court-martial later for cowardice and disobedience of orders and reduced to the ranks. We three continued to Lebanon, thirty-five miles distant, before we could get in communication with St. Louis, causing great rejoicing at headquarters, as it dispelled rumors of disaster at Springfield.

In March, 1864, General Thayer began organizing a large army at Fort Smith, Ark., to co-operate with General Banks in the Red River campaign. I was sent as his cypher operator, having left St. Louis April 5, and making the long trip on horseback from Rolla, in company with some troops and supply trains, destined also for Thayer's army.

We were on the way about four weeks, the line from Fort Smith was seriously interrupted by Confederates. We sent out a party of linemen under heavy escort of cavalry the last of May.

The Confederates surprised the party while at work, scattered the escort and then wantonly murdered the three unarmed line men, and badly mutilated their bodies.

According to the official rolls of the military telegraphs there were employed about 1,200 operators and expert line builders during the war; of this number about twenty-five were killed or died of disease. The remainder, some with wounds, some with impaired health, returned to their homes at the close of the service, most of them resuming work in the offices abandoned on enlistment for field service. These survivors of the corps, feeling that they were unjustly discriminated against by the Government, appealed to Congress about thirty-five years ago, endeavoring to gain a status similar to that held by the soldiers.

Year after year bills have been introduced, which at each session were favorably reported, but were always side-tracked by various delays until too late for final action. Congress should act, without further delay, on the bill that is now pending for pensioning the few "citizen" operators of the corps, of whom only about 175 remain. A few years at most and such recognition will come too late. One of their number, who, since the war, has amassed a vast fortune in successful business enterprises, has, for some years, voluntarily, but privately, paid a monthly pension to a number of these veteran members of the corps. Their names are known by none but their benefactor. The Government should pay these pensions and make it unnecessary for a generous private citizen to assume such a burden.

That the War Department did appreciate the value of the military telegraph corps is shown by the honors accorded the retiring officers who commanded the corps. They performed their duties excellently and deserved all the honors that came to them, but being housed in comfortable offices, far way from the strife of battle, they did not share in the dangers, hardships and privations, such as came to the men under their command.

The United States Military Telegraph Corps was disbanded by the muster-out of its officers, May 28, 1866, by order of the Secretary of War, who, in that order, stated: "I have the gratification and honor to state that all of the officers of the United States Military Telegraph during the fiscal year received from the President of the United States for meritorious service, promotions of two or more grades, of brevet rank, as follows: Colonel Anson Stager, A. D. C., A. Q. M. and Major T. T. Eckert, A. D. C., A. Q. M. to Brevet Brigadier-General, Captains Lynch, Gross, Van Duzer, Clowry and Gilman, A. Q. M. (the superintendents), to Brevet Lieutenant-Colonels.

Unit Cost of Railroad Pole Line Construction and Repairs.*

BY V. T. KISSINGER, SUPERINTENDENT OF TELEGRAPH, CHICAGO, BURLINGTON AND QUINCY RAILROAD, CHICAGO, ILL.

When the idea of applying piecework rates of pay to the construction, reconstruction and repair of railroad pole lines first presented itself, it seemed to offer great possibilities in lessening the cost of labor and in getting more work done within the good working months, if we could overcome the great obstacles which were immediately suggested.

It was finally decided that some labor units were needed for making a schedule; by a series of field observations and simple tests made with different workmen on different pieces of work, a list of some of the more important units was made, and an idea gained of the time consumed in various operations, such as the time used in digging an ordinary four-foot hole, the extra time digging an additional foot, and digging anchor holes of various depths. We figured the cost of holes by labor paid by the day and the number of holes which could be put down in ten hours, without great effort but by steady work on the part of the workmen. Similar figures were made in much the same manner for placing single and double crossarms; also for framing a pole complete, fitting with arm braces, pins and glass. The time used moving from one operation to another was also taken into consideration, as well as the time of the framer distributing his own hardware and glass from handcar or speeder.

At this stage the matter rested until we realized that the only way to handle it was to start actual work, and gain the necessary experience to meet the many problems that arose with intelligent and practical solutions, always keeping in mind the primary object—that this change in method was to lessen the cost of labor without lowering the standard of the work. To get started, an experienced foreman and assistant foreman, with a gang of about twelve men, were selected and a timekeeper was added to keep track of the labor units. It was explained to the men that it would be a benefit to them, as well as the company, giving them a chance to earn more wages by extra efforts. It would put the good, lively worker ahead of the drone and shirk, and make him a fast and efficient worker. They were asked to co-operate in every way possible to make it a success. However, every man connected with the work was given to understand that any slighting of the work to accomplish greater speed would not be tolerated, and when a hole was found to be short of the required depth, a crossarm not properly placed, or a pole not solidly tamped or sufficiently banked, the man or men responsible for that work would be sent back promptly to correct the defects. It looked full of possibilities to the men and they took a lively interest in the proceedings from the start.

A job rebuilding a pole line with class "D" poles carrying one six-wire arm was the first to be tried by piecework. A schedule of prices was made covering digging holes, setting poles and anchors and framing; the pole setting being pooled. Because of the fact that no one set of figures will apply to more than one estimate, or piece of work, and the necessity at times of making two or more schedules for one section, it would not seem advisable to mention any schedule of general unit prices, because any one schedule of units would not apply generally. It was not expected that the first prices fixed upon would be unchanged throughout the work upon the entire estimate. The intention was to make close and careful observations of every part of the work, get an accurate determination of the labor units, and adjust the prices until they were correct. However, very few changes were found necessary in the first schedule.

It was the duty of the timekeeper to inspect every hole, keep a check upon the number of different operations completed each day, and record each man's earnings for the day. After the work was well started the ingenuity displayed by the men in making plans and devices to save time and to make every move count was remarkable. Shovels and other tools were voluntarily kept sharp and brightened, and everything kept in the best condition possible, to help shorten the operations.

In the earlier estimates it was found that a great deal of "day work" was necessary to take care of the little odd jobs; the cost of the work could not be kept at a minimum until this "day work" was eliminated, and all operations that could possibly be paid for at piecework prices under any conditions, were put under some classified part and covered by a price. Thus additional labor units in connection with setting a pole line were prepared and a fair working knowledge gained of the piecework system as applied to that part of the work.

The next move was to apply the system to transferring wires. It will of course be understood that the difference in position of the wires on the new poles from that on the old poles, or setting the new pole in, or too near to, the old pole line, causes a difficult transfer and makes the determination of labor units more complicated. More labor units were found in transferring than in pole setting; some of the less important units were merged into one larger and broader, and the number covered by one price unit. The labor of transferring, levelling up and tying in the wires was pooled, the total earnings pro-rated and the men paid according to class.

Every piece of work handled under the system has been completed at a considerable saving under the cost of the same kind of work performed by labor paid by the day, yet with an increase in earnings of the men of about twenty-five per cent. Groundmen rated at $2.00 per day have earned a grand average of 26 to 28 cents per hour. Linemen rated at $2.50 per day have averaged 30 to 32 cents per hour.

Through the use of the unit price method we have been able to reconstruct a section of line 134 miles long, class "E" 20-foot poles, 35 per mile, carrying two bracket wires 110 miles and 3 wires

* Paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

on a six-pin arm 24 miles, at a cost of $26.86 per pole mile for the gang, not including the foreman's salary and expense.

The application of piecework to pole line construction and repairs has not resulted in an inferior standard of work and has not brought about any unfavorable conditions under which the men are asked to work.

We have had no occasion to string wire at piecework prices until the system had been fairly established in general construction; consequently there was little difficulty in making up a satisfactory schedule for stringing it. Practically, there is but one labor unit represented in this branch of the work, but the conditions which must regulate the prices are as numerous and as complex as are those in transferring, and the same steps were taken in arriving at a satisfactory price.

In order to get the best results the work must be completed as gone over. There must be no going back over the line to complete some unfinished task (as is often done on day work), with no account of the extra time consumed and expense involved. The extra supervision necessary to attain this end has been given the work and rigid inspection has brought to light almost every defect. As a result of this, instead of lowering the standard, the quality of the workmanship actually has been improved.

In general, the possibilities of piecework are more far-reaching than was at first imagined; while it is not claimed that the piecework system so far as we have worked it out is perfect, we know it is a practical method. The success of the plan as applied to pole lines, as in all other cases in which it has long been used, is dependent upon the care with which the prices for each unit of work are prepared, close supervision, fairness, and exactness in doing the work.

When a section of line is to be reconstructed a careful inspection of the soil is made to determine the price to be paid for digging holes, all local conditions affecting the work are carefully noted and a detailed report made covering them. From this report the schedule is made up, and a letter of instruction is issued explaining how to handle any unusual conditions. Copies of this letter of instruction are given to the foreman in charge, timekeeper and each field inspector. In thus settling details and mapping out a line of action in handling the work under a predetermined schedule, we found a distinct advantage over our old method.

To sum up, piecework, as we have found it, is a peculiar problem, governed largely by exigencies, and success depends to a large degree upon supervision and loyal co-operation; it has more than fulfilled our expectations.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

Cite two instances of the use of static electricity of high and low potentials.

What is the approximate voltage required to produce an electric spark one inch long?

(Page 25). What is the cause of an electric current?

(Make the experiment described on page 25.)

In setting up a charge, do we produce electricity with one polarity alone?

If we rub certain substances, electricity is manifested; was the electricity present before the action, or was it produced by the friction?

(Page 26). If a current is caused by a difference of potential between two points, is it necessary to have opposite polarities to produce it?

If two points are connected, both of which are positive, but one at a higher potential than the other, will a current flow?

In charging storage batteries in branch stations, how is it possible for earth currents to complicate the operation?

What poles of central-office and branch-exchange batteries are always grounded?

Study the paragraph relating to the grounding of batteries.

(Page 27). How can the charging trouble due to earth currents be remedied?

Are earth currents steady in value and is there any effective way of compensating for them?

What is "counter e. m. f."?

Is there any "counter e. m. f." in telephone talking circuits?

Cite cases where "counter e. m. f." is met with.

(Page 28). Upon what does the difference of potential between the terminals of a cell of battery depend?

Does the size of the cell affect the potential?

What is meant by "boosting" common-battery lines, and how it is accomplished?

Should dry or storage cells be used for a "boosting" battery?

Where dry cells are used, how are they connected to the line?

What is the effect of "boosting" batteries upon the current in the circuit? When there is a large number of lines to be "boosted," what is the disadvantage of using dry cells?

(Page 30). Why are the advantages of a storage battery as regards its delivery of current?

What is the character of the current in a telephone circuit; is it continuous or fluctuating?

What causes the fluctuation of the current?

Does a condenser impede an alternating current?

What is the effect of a retardation coil in a continuous current circuit and what is its effect in an alternating-current circuit?

Under what conditions does the current from the storage battery divide into its two component parts, that is, continuous currents and alternating currents?

(To be Continued)

Recent Installations of Telephone Train Dispatching Equipment.

The increasing use of the telephone system of train dispatching by leading railroads of this country and Canada is conclusive proof of its worth. Quickness, the personal relationship factor, and absolute dependability have, for the most part, been responsible for the adoption of the telephone for use in dispatching trains. The past five years have witnessed a gradual but steady change—abandonment of the time-honored telegraph and the adoption of telephone equipment.

The telephone greatly simplifies the complex business of the train dispatcher. As a servant the telephone is always ready; as a saver of time and energy it has no equal. Experts agree that it makes for safer, more reliable and more efficient railroading.

Through the agency of the telephone discipline is enforced and efficiency increased. When a towerman comes under direct personal supervision of his chief by telephone he is more apt to carry out his orders with care and dispatch than if they are conveyed to him by the more or less impersonal telegraph sounder. Incidentally, the dispatcher can increase his range of operation by as much as 50 per cent.

In fact, the entire work of train dispatching has been reduced to a simple but definite conversation over the telephone. For example, there is the eighty-mile circuit on the Western Maryland Railroad, between Hagerstown and Cumberland. While this road does not handle many first-class passenger trains a day the dispatcher has his hands full manœuvering loose engines and freight trains. A thousand minutes out of the 1,440 in a day his wire is busy with orders governing the movement of approximately 200 trains, which come in and go out over one track. An average train order is given in two or three minutes, then he must answer about 1,600 reports of trains passing way-stations, and by the time has has attended to the miscellaneous calls that are bound to come up each day, he has done about all that it is possible for one man to do. With fifteen Western Electric way-station equipments and thirty siding telephones in use, the entire line is in constant touch with the dispatcher at the terminal.

The Butte, Anaconda and Pacific Railroad Company, an ore-carrying road, operating between Butte and Anaconda. Mont., has installed a telephone dispatching system to cover seventy-six miles of its line. While the trains, for the most part, are used to haul copper ore from the mines at Butte to the smelter at Anaconda, this railroad company operates several passenger trains each day over the same tracks. The trains are run by electric locomotives entirely, a large water-power plant at Great Falls being utilized to generate electric current. The dispatcher is located at Anaconda, and is in communication with thirteen stations on the system. Thirteen locomotives are equipped with telephones, with jack boxes so placed on the outside of the engine cab that connections can be easily made to the overhead wires by line poles. This road has an unusually fine system of overhead construction in its electrical plant, using a No. 10 B. & S. gauge copper circuit for the telephone lines, although it is only forty miles in length.

Twenty-nine way-stations of the Chicago and Alton, between Bloomington and Chicago, and thirty-two way-stations from Bloomington and St. Louis, will be connected by the latest type of Western Electric selector equipment. The dispatchers for both circuits will be located at Bloomington, Ill.

In addition to these the same interest reports the following installations:

The Monroe, N. C., division of the Seaboard Air Line has put into commission within the past few months a system of telephone dispatching to extend over 282 miles. Selectors have been installed at thirty-eight way-stations. About the same number of siding sets have been placed at various points along the line for the use of trainmen.

On the St. Louis Southwestern, from Illmo, Mo., to Jonesboro, Ark., about 136 miles have been equipped with twenty-four selectors and telephone equipment. The dispatcher is located at Illmo.

The Pittsburgh, Shawmut and Northern has extended the forty-seven-mile circuit between St. Mary's and Brookville fifty-three miles by the equipping of twelve additional way-stations. The telephone line is now complete to Kittaning.

The Chicago, Milwaukee and St. Paul Railroad Company is preparing for the installation of selectors on a circuit to cover a new division now in the process of construction between Great Falls, Mont., and Lewiston, a distance of 137 miles. The number of way-stations to be equipped at present with selectors is fifteen.

The Southern Electric Development Company of Saginaw, Mich., is installing a train-dispatching circuit consisting of a dispatcher's equipment and nine way-stations. The circuit is exclusively for the control of train movements. There is also to be a commercial circuit, consisting of thirty-eight No. 1,317 type telephones. This is for the handling of commercial business from various offices along the line. Both circuits are fifty-seven miles in length, with the dispatcher's office located about midway in the circuit, at Saginaw. The commercial circuit goes into a No. 1800 section unit type switchboard at Saginaw, being divided there at the north and south ends of the circuit. A notable feature of this installation is the use of 3,000 feet of submarine cable in Saginaw, the city ordinance not permitting the erection of poles. This submarine cable will run along the bed of the Saginaw River within the town proper, forming the north end of the train-dispatching circuit.

The Cedar Rapids and Iowa City Railway Company has installed a telephone train-dispatching circuit between Marion and Iowa City, with the train dispatcher's office at Cedar Rapids. The circuit has fourteen selectors; eight distributed on the south end, two in Cedar Rapids in the general office and four between Cedar Rapids and Marion.

The New York, New Haven and Hartford is using a telephone train-dispatching equipment on a line between New Haven, Conn., and Springfield, Mass. The distance covered is sixty miles, with the dispatcher located at New Haven.

The Northern Pacific has equipped the line between St. Paul and Staples, a distance of 142 miles, with train and message circuits. Both lines are arranged for simplex telegraph service. The dispatcher is located at St. Paul. No. 386 telephone jack boxes have also been installed by the road.

The Denver and Rio Grande is now using two circuits, one from Salt Lake City to Helper, 152 miles, and another from Helper to Grand Junction, 177 miles. Dispatching stations are at Salt Lake City and Helper. Both a train and a message wire run from Salt Lake City to Helper, but only a train wire is in operation from Helper to Grand Junction. On the last-mentioned circuit forty-two No. 102 type selectors and the necessary telephone apparatus are in commission. Fifteen selectors of the same type are used on the circuit to Grand Junction.

The Cleveland, Cincinnati, Chicago and St. Louis (Big Four) will install No. 102-C selectors and equipment over two dispatching circuits. One line is to extend from Kankakee to Indianapolis, covering 144 miles, while the other, from Indianapolis to Springfield, is of about the same length. The dispatcher is to be located at Indianapolis.

The main line of the Alabama, Tennessee and Northern will, within a short time, put into operation nine No. 102-B selectors over the line between York and Reform. Seventy-three miles of road will be included in the circuit, with the dispatcher at York, Ala.

The Phantom Train.

BY THOMAS M. RAGEN, NEW YORK.

Our story takes us back to railroading in the early seventies, when it was the aim of the railroads to move as much of their traffic by daylight as was possible, and the running of Sunday trains at this time was practically unknown.

One of the Eastern railroads had been having some trouble with the night operators sleeping at their posts, which, to some extent, was due to the intense heat of the summer. After giving the matter much consideration a plan was decided upon by the officials, *i. e.*, the adoption of a system known as "The Sixes." Every half hour between 12 midnight and 6 a. m. each office in its regular turn would make either the figure 6 or spell out "six" and sign its office call, thus: "Six 'CP,'" to be followed immediately by the next office in turn.

How to beat the new system now became the study of the operators, for it had become unpopular on account of some drastic discipline having been meted out to some delinquents, and genius soon triumphed when the "owls" perfected a system of their own to beat the "sixes." Each night one of the number was tipped off that he was "it," which meant that he was the "sentinel" for that night. It was the duty of the sentinel to keep awake above all things, and, in the event of any hesitation on the part of any office in responding to the registering of the six, the sentinel would immediately fill in.

To the telegraphers their system was a success, so much, in fact, that it was not long before the sentinel would register the sixes for the entire division, and thereby laid the foundation for the so-called phenomena which later developed. There is hardly a doubt that the train dispatcher could easily have detected the fraud, had he been so inclined, but there were also times when he, too, was lax, and he hesitated about stirring up trouble.

Right here was where the telegraphers' system completely failed. One night the sentinel was decidedly out of form, and after fighting nature for some time, he lost. Awakening from his troubled slumbers he imagined he saw the rear lights of a train vanish around the curve a short distance from his office. Realizing that the burden of recording the train's progress over the division rested entirely on himself he began reporting "extra north." The train dispatcher, too, had been snatching "forty winks" while there was not a moving train on his division, and he was afraid to challenge the reports of the "phantom train" that was still flying over his division, so far as the telegraphic reports were concerned. At last, in a half-hearted way, he began to get his bearings. The sentinel was sure he was right, and any operator who might have been awake dared not expose "The System." In the course of an hour or so the entire telegraph force on the division was fully awake and all had been tipped off as to the time the "extra north" had passed their offices, and each was ready to stand or fall by that record.

It only took a few days for the story of the "phantom train" to pass all along the line, minus the real truth as to how it really did so. As the ghostly story spread, it, like a snowball starting down the mountainside, grew in momentum, size and force. There were those along the line who now came forth to say they had actually seen it. One man saw the train enveloped in fire speeding along with a headless and gory engineer at the throttle. Another saw a lank spectre standing on the pilot whose face bore a strong resemblance to that of our martyred President, Abraham Lincoln, and the story of the "phantom train" took on different forms. Village scandals were entirely forgotten in the discussion of the ghostly messenger, while babies were frightened by their mothers into going to bed early at night. But the telegraph operators "sat tight," and the railroad officials were not anxious to start a probe just then, so that when the excitement had subsided any disposition by the railroad to investigate the affair also subsided. Thus came to an end the system of recording sixes each half hour.

Annual Meeting of the A. I. E. E.

The thirty-first annual convention of the American Institute of Electrical Engineers will be held in Detroit, Mich., June 22 to June 26. Among the papers to be presented will be the following: "Voltage Test of Cables," by W. I. Middleton and C. L. Dawes; "Toll Telephone Traffic," by Frank F. Fowle; "A High-Speed Printing Telegraph System," by Carl Kingsley.

The Printing Telegraph.*

BY ARCHIBALD WRAY, ASSISTANT SUPERINTENDENT TELEGRAPH, CHICAGO, ROCK ISLAND AND PACIFIC RAILWAY, CHICAGO.

Owing to the gradual increase in operating expenses as related to gross earnings, caused by increased cost of labor and reduction of the revenue per passenger and ton mile, it behooves all railroad officials to try to find cheaper, quicker and better means of communication for handling railroad wire work, to co-operate with other efforts to effect operating economies.

We have found the telephone to be a good substitute for the telegraph on message circuits up to 125 miles on metallic iron circuits, and over a greater distance on copper metallic circuits.

In this paper I will endeavor to show that the printing telegraph machine is not only a good substitute for the Morse telegraph, but faster and better, over circuits where the volume of business will warrant, and will try to show some of the advantages of the printer as I see them.

The general conditions justifying the use of a printer are:

A large volume of business between two given points which either originates at or is relayed between these two points, difference in the cost of labor and increased facilities obtained.

Most of the printer systems use a code similar to the Morse and have devices at each end of the line which have synchronous revolving commutators or stationary commutators on which brushes revolve. These devices act as distributors for the impulses to and from the line wire, each segment representing a letter or character. If, at the time the line brush goes over a segment, an impulse is received from the distant end, the letter or character is printed. For example, we will suppose one system has a segment for each letter or character and other systems, to shorten what is known as the line wave, use combinations of impulses to select a character through the medium of relays in local circuits at the receiving end. The Kick-Cummings system has a commutator with eight segments, with negative current normally to line, and to make selection positive current is sent on any of three segments. This arrangement of three impulses in one direction and five in the opposite gives a total of fifty-six combinations, or, in other words, makes it possible to select any one of fifty-six characters with never more than eight impulses, which is equivalent to four cycles on the line. It can readily be seen that the success of a printer depends first of all on the line current required for selection.

One of the oldest systems of printing telegraphy is the one invented by M. Baudot and presented to the French Government by him. It has been in use in France and on the continent of Europe for about thirty-five years.

The system is a synchronous one; the selection is effected by commutators at the two ends of the line and brushes which revolve on these commutators exactly in step with each other. A five unit alphabet is used; that is, there are five segments in the commutator which control the letter and the different letters are selected by sending out different permutations of positive impulses from these segments.

The transmitting apparatus is very simple, consisting of five keys similar to piano keys, but requires considerable training and skill to operate it. The operator must press a different combination of these keys for every letter and must do it at a uniform rate of speed, once for every revolution of the brushes on the commutator.

The receiving apparatus prints the message on a narrow tape, which is then pasted on a form for delivery.

By Baudot's method it is possible to multiplex, or operate several channels over the same wire simultaneously.

The five-unit code designed by him is the shortest known and requires the fewest reversals of the current per letter.

The Hughes system has been used to a considerable extent in England. It also is a synchronous system, depending for its action upon the mechanisms at the two ends of the line being exactly in step.

The Hughes instrument, in its receiving portion, consists essentially of a revolving wheel, having the letters of the alphabet raised on its periphery, and a paper tape just clear of the wheel. When a current is received the tape is raised in momentary contact with the wheel and the letter is printed which is opposite the paper at the time. By the rotation of the type-wheel each letter of the alphabet may be brought opposite the printing point; the currents sent over the line must, therefore, be timed so as to raise the paper when the required letter is opposite. This is done by means of a keyboard similar to that of a piano and having a key for each letter.

The line capacity for traffic of the Hughes device is not very great, the maximum speed being about thirty words a minute in each direction. The message is printed on a tape which must be pasted on a form for delivery.

The Creed system is founded on the Wheatstone system and uses the Continental code of impulses for signaling.

The Wheatstone tape for transmission may be prepared either by a Wheatstone three mallet punch or by a special keyboard perforator. The message is transmitted to the line by means of a Wheatstone transmitter.

At the receiving end a receiving perforator punches a tape which is a duplicate of that at the transmitting end. The duplicate tape is then put into an automatic printer, which prints the message on a tape. This tape is pasted upon a form for delivery. By this means very high line capacities for traffic can be obtained.

The high-speed system invented by Mr. Donald Murray uses a perforated tape similar to the Wheatstone for transmission, but uses the Baudot code instead of the Morse. The message is sent from the tape by a transmitter similar to a Wheatstone. At the receiving end a duplicate tape is punched

*Paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

and this is used to operate a page printer which prepares the message ready for delivery.

The Murray multiplex is an adaptation of the Baudot multiplex in principle to tape transmission and a page printer.

The Barclay printer, which has been used by the Western Union Telegraph Company for a number of years, uses Wheatstone transmission. A special tape is prepared by a keyboard perforator and transmitted by means of a Wheatstone transmitter. At the receiving end the message is printed direct on a page printer ready for delivery.

The Cardwell printer is used on the Delaware, Lackawanna and Western Railway, between Scranton and New York, on a simplex telephone circuit, on which from 350 to 400 messages are handled per day.

The Morkrum Company manufactures two types of printing telegraph machines:

First: The direct-acting keyboard system, which is not a synchronous system in the ordinary sense of the word, but is roughly isochronous; that is, the receiving apparatus is adjusted to run approximately at the same speed as the transmitting mechanism.

Second: The tape transmitter, which is a synchronous device.

The capacity to handle traffic of the direct-acting keyboard machine is governed by the speed of the operator, whereas the capacity of the tape transmission depends on the speed of the machine, length and character of the line.

The Lake Shore and Michigan Southern Railway, the Chicago, Burlington and Quincy Railroad and the Chicago, Rock Island and Pacific Railway, all have tried what is known as the Morkrum printer direct keyboard machine.

The line circuit of this printer is not unlike that of an ordinary duplex, it being possible to double when the line is workable for a good Morse duplex.

With this system the line signal for each character sent is never more than the equivalent to four cycles.

The keyboards used with both types are similar to the standard Oliver typewriter keyboard; the printer is a page printer, using a roll of paper of the same width as that of the standard typewriter.

With the Morkrum keyboard machine the sending operator depresses the keys, and in so doing, operates mechanisms which send out combinations of impulses on the line wire, which impulses operate the receiving relays and printer at the distant end of circuit, and, at the same time, operate the home recording printer (above the sending keyboard) at the home station, so that the sending operator has a visible copy of what has been sent. With this machine the sending operator, being able to see what has been sent, soon learns to tabulate and to fill out almost any blank spaces in a printed form that will go in the machine.

The receiving operator at the home end attends upon the sending operator at the distant end, placing ordinary message paper or printed forms in the machine as the sending operator may direct.

The Burlington and Lake Shore railroads are now using this type of printer, the Burlington operating a circuit from Chicago to Galesburg, Ill., a distance of 163 miles, on which circuit one operator is employed at each end. From January 1 to January 26 they averaged, sent and received combined, 343 messages per day, the printer being in service eight hours each day.

The Lake Shore operates its printer on a single iron-wire circuit between Cleveland and Toledo, a distance of 112 miles, and handles an average of 450 to 500 messages per day of nine hours. Both the Burlington and Lake Shore operate these printers single—that is, with one operator at each end, and could, no doubt, handle more business if it were offered. Each of these railroads reports that weather conditions have very little effect on the operation of the printer, or little more than weather conditions affect a Morse duplex.

The Chicago, Rock Island and Pacific Railway is using what is known as the Morkrum tape-transmitting machine. These machines differ from those used by the Lake Shore and Michigan Southern and the Chicago, Burlington and Quincy railways, in that the messages sent are first punched in paper tape. The punch that perforates the tape is electrically operated and has a keyboard very much like that of a standard typewriter. When the tapes are punched they are run through a distributor. The distributor has a small electric motor which revolves brushes on two commutator discs and drives a feed wheel which feeds the perforated tape under five-finger contact points, the contacts operating the main line pole-changer.

On the Chicago, Rock Island and Pacific Railway there are three printer circuits:

One from Chicago to Des Moines, Iowa, a distance of 358 miles. This circuit is operated on the simplex of two copper train-dispatching circuits, one from Chicago to Davenport, Iowa, a distance of 183 miles, the other from Davenport to Des Moines, 175 miles in length.

One from Chicago to Topeka, Kan., a distance of 586 miles. This circuit is composed of a simplex on a copper telephone circuit from Chicago to Davenport, Iowa, thence on a single copper wire to Topeka.

One from Chicago to El Reno, Okla., a distance of 899 wire miles. This circuit is composed of No. 8 B. W. G. iron wire, some of which, in certain places, at switching yards, is not in the best condition.

The last-mentioned circuit, from Chicago to El Reno, is repeated at Davenport, Iowa, and Topeka, Kan. The repeater used is a special direct point duplex, in which Morkrum type Wheatstone polar relays are used.

From February 16 to February 21, inclusive, there were handled on each of these printer circuits average numbers of messages per day as follows:

Chicago-Des Moines, 492 messages and forms, sent and received, combined; Chicago-Topeka, 816 messages and forms, sent and received, combined; Chicago-El Reno, 766 messages and forms, sent and received, combined. Total, 2,074.

The printers operated by the Lake Shore, Burlington and Rock Island railroads are rented. A printer complete, with table and extra parts, is furnished with each printer set. For an installation it is necessary to furnish a 110-volt direct-current power circuit for local current supply, a ground connection, and positive and negative battery leads of sufficient voltage to cause a current flow of fifty milli-amperes over the line.

On the Rock Island Railroad, girls, formerly employed as messengers, were promoted to positions as printer operators; only two out of a total of twenty girls so promoted had previous experience as stenographers or typists.

On the Rock Island a great number of printed forms with blank spaces to be filled are used.

The number of messages handled per hour on a printer, of course, depends on the type of printer, condition and length of the line circuit and character of the messages. For instance, on December 1, 1913, with a Morkrum printer, transmitting commercial business between Chicago and Milwaukee, distance, 85 miles, from 9:00 a. m. to 5:00 p. m., there were handled 2,059 messages, both ways, or an average of 229 per hour.

When possible, without delaying service, we try to select the business so that we will have several of a given kind of form to send at one time. The printed forms are fed into the printer, one after another, and are very little more troublesome to handle than the ordinary messages; in fact, they are handled almost as rapidly.

As to the number of messages that can be handled per hour or day on these printers, I know we have not reached the capacity of the machines, as our business does not come to us steadily enough.

We have found that the distance limitation of printer transmission, without repeating, on a 210-lb. copper wire, at a speed of sixty words per minute, is about 600 or 700 miles; with iron wire, No. 8 B. W. G., is 300 to 400 miles. These figures are based on a potential of 350 to 400 volts being used on the circuit.

As to the effect of weather conditions, we had one very foggy day in December, the fog extending all the way from Chicago to Topeka. The printer was worked both ways, or doubled at a reduced speed, with a 750-ohm balance at the Chicago end, the normal balance on this circuit being about 4,000 ohms.

Some of the disadvantages of the printer are:

1. Necessity of supervision and care of the apparatus by a competent attendant.

2. Necessity of having to provide a current supply for printer local circuits at a potential other than that readily obtained from ordinary telegraph generator plants.

The advantages are:

1. Higher average number of messages transmitted per operator per hour.

2. Lower cost per message.

3. Greater volume of business handled over a circuit.

4. Rapidity with which business may be transacted.

5. In case of temporary line failure, messages may be punched in tapes and when the circuit is restored be transmitted with greater rapidity than is possible by Morse.

New Book.

The correspondence-school lessons in elementary telegraphy which were published in serial form in the columns of TELEGRAPH AND TELEPHONE AGE from October 16, 1911, until April 1, 1914, have been published in book form and the volume is now on sale. The book contains 197 pages and is of a convenient size to carry in the pocket, thus enabling the student to have it constantly with him, whether he be at home, at the office or shop or traveling.

It is a valuable addition to telegraph literature and no other work covers the field as it does. As its name implies, it is a course of instruction in the elements of practical and technical telegraphy and during the course of its publication in the columns of this journal great and wide interest in the subject was manifested. Its instruction has started many ambitious telegraph and telephone employes on careers of greater usefulness to the companies employing them as well as to themselves.

The contents are arranged in systematic order, and the student is led from the beginning to the next higher steps and so on all the way through the course, and when he has finished he finds that he has acquired a great deal of valuable technical knowledge with little effort on his part because of this easy and natural gradation of development.

The first chapter begins with the simple mathematics applicable to telegraph engineering and then follow chapters on potential current and resistance, gravity, battery, circuits, Ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement magnetism, electro-magnetism, self-induction, the induction coil, the relay, the local circuit, the key, Morse circuit, earths, switches and switchboards, single circuits in bad weather, line leakage in bad weather, static induction, testing at terminal stations, wire testing at intermediate offices, the detector, the milli-ammeter, the voltmeter, automatic repeaters, the condenser, the polarized relay, the rheostat, Stearn's differential duplex, the polar duplex, the quadruplex, neutral relays, relay and circuit relationship.

From this list of subjects the worth of the book may be easily appreciated. Test questions are given throughout the book for review purposes. Taken altogether, this work is as unique as it is important and really constitutes a class in itself. Every telegrapher and telephonist should possess a copy, as in numberless cases it will mean the beginning of a larger life of usefulness.

The price of the book is $2.00 per copy. Remit by post-office or express money-order to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

P. D. Wade, of the Western Union Telegraph Company, Memphis, Tenn., writes: "I surely can keep up 'My AGE.' The most important of all my reading matter and the less expensive. I spend from $4.00 to $5.00 per month for other reading matter. Why not $2.00 per year for the best and most instructive?"

THE RAILROAD.

MR. G. A. CELLAR, superintendent of telegraph, Pennsylvania Lines West, Pittsburgh, Pa., was a recent New York visitor.

MR. R. G. RICH, formerly of the engineering department of the Western Electric Company, in charge of the development and investigation of railway equipment, including selectors, has severed his connection with that company and entered the service of the Hall Switch and Signal Company, New York.

EIGHT-HOUR LAW INVALID.—The United States Supreme Court, in an opinion delivered by Justice McKenna on May 25, holds that the New York State law limiting the hours of service for employes operating railway trains to eight is invalid, and that it had been superseded by the Federal law on the subject. The suit was brought by the Erie Railroad to test the validity of the statutes.

INDICTMENT DISMISSED.—The Erie Railroad Company was indicted recently by the Federal grand jury, charged with carrying on an illicit mail service. The indictment concerned itself with two letters written by E. P. Griffith, joint superintendent of telegraph of the Erie Railroad and the Western Union Telegraph Company, to G. A. Osborne, agent of the Erie, and manager of the Western Union Telegraph Company, at Montgomery, N. Y., on June 27, 1912. The letters were carried on a railway mail car and did not relate to the traffic on the train. The indictment was dismissed on the hearing, the court holding that the letters were properly sent.

Wireless Telephony in Railroad Service.

At the recent convention of the Association of Railway Telegraph Superintendents in New Orleans, La., Mr. H. M. Horton, of the Radio Telephone and Telegraph Company, New York, made some interesting references to the wireless telephone in his discussion of Mr. Foley's paper on "Wireless Telegraphy in Railroad Service."

He exhibited a De Forest audion detector. By turning a switch, the detector's most sensitive condition was indicated by the burning of the electric lamps. The De Forest wireless telegraph circuit, he said, when once tuned needs no adjustment. The operator can be stopped at will. If he wishes to transmit he turns off the instrument, and if he wishes to receive he turns the switch and the instrument is properly adjusted—he does not have to find the proper point on a crystal detector.

Mr. Horton then referred to the amplifier which, he said, boosts or amplifies the signals. It will give an amplification of 500 times. He then dwelt directly on the wireless telephone and read a clipping from the New York *Times* describing the recent tests of the wireless telephone on a Lackawanna railroad train. Referring to Dr. De Forest's use of the arc in his early experiments, he stated that the present De Forest telephone is not an arc in any way. It is constructed on the principle that a human ear has its limitations as a sound receiver. Working upon this theory, wave trains are sent out at such a rate of frequency that the human ear cannot hear them, but can detect with perfect clearness the fluctuations of the voice, notwithstanding.

Neither wireless telegraphy nor wireless telephony, he said, required any particular skill in their operation. The transmission of dots and dashes by the silent, "breaking" system of wireless telegraphy and of the voice by arcless wireless telephone being in clearness quite the equal of land-line telegraph and telephone.

Mr. Horton predicted that before another three years have passed locomotives equipped with a small wireless telephone, capable of permitting any signal-tower man to talk direct with the engineer while he is in his block, would be in practical use.

But, aside from these applications to moving trains, he continued, the radio telephone can, in time of storms, assist the present wire telephone for railroad work to as great advantage as the wireless telegraph has already so strikingly demonstrated its usefulness. He did not advocate that railroads should throw away their land-line equipment and substitute wireless—the radio telephone has come into its own as an auxiliary.

In closing, he said, that the wireless telephone is more simple than the wireless telegraph.

OBITUARY.

WILLIAM M. SHEEHAN, aged forty-seven years, a well-known New York electrical contractor, died at his home in Newark, N. J., May 23. He was favorably known to the telegraph fraternity.

BISHOP W. D. VAN DYKE, JR., aged thirty-eight years, a prominent member of the Mormon church, and a former telegrapher on the Denver and Rio Grande Railroad, died in Ogden, Utah, May 22.

NELSON D. PRATT, aged seventy years, general manager of the Grand Crossing Tack Company, Chicago, Ill., and a former telegrapher, died in that city May 23. During the Civil War he was a newspaper operator.

SIR JOSEPH WILSON SWAN, aged eighty-six years, one of the earliest inventors of the incandescent electric lamp, died in London, England, May 27. He was a past-president of the British Institution of Electric Engineers and vice-president of the Royal Photographic Society. Many decorations were bestowed upon him by foreign governments for his scientific and practical achievements.

COL. J. R. GILMORE, aged seventy-three years, a member of the Society of the United States Military Telegraph Corps, and of the Old-Time Telegraphers' and Historical Association, died in Atlantic City, N. J., on May 29. Col. Gilmore entered the United States Military Telegraph Service in 1861 and assisted in building lines, and in July of the same year became superintendent of the corps. In 1862 he enlisted in a Pennsylvania volunteer regiment and served through the Rebellion, taking part in many of the prominent campaigns. He was brevetted major and lieutenant-colonel for meritorious service. Col. Gilmore was a leading citizen of Chambersburg, Pa., where he had resided since 1892.

Ghegan "Battery Kick-Off."

Mr. J. J. Ghegan, president of J. H. Bunnell and Company, New York, exhibited an interesting device at the recent convention of the Association of Railway Telegraph Superintendents at New Orleans. It is an auxiliary instrument intended to be placed on leaky lines at terminal or battery stations and causes the ordinary way or intermediate offices to respond to every signal from any office on the line, provided the instruments at the terminal or battery stations are in adjustment.

The device is very simple and does not add any resistance or complication to the main circuit. It consists of a special "inductorium sounder" which may be used in place of or in multiple with the regular sounder, and a relay having its magnet winding connected to the secondary or inductorium coil of the sounder. The armature lever and back contact of the extra relay are placed in series in the main line so that when an induced impulse from the second coil of the sounder energizes the magnets of the extra relay, the main line circuit is momentarily broken by the "kick" of the relay armature from its back stop, therefore the opening of any key on the line kicks all battery off, consequently every relay armature responds. The duration of the "kick" is so short that it has no effect on the regular working of the line.

Ordinarily, an impulse and "kick" would also follow the closing of the circuit, but as this would be an interference causing false dots, it is nullified by a sounder contact which permits the break impulse only to be operative.

The instrument has been named a "Battery Kick-off," and the one on exhibition demonstrated its effectiveness to the satisfaction of the superintendents who examined it.

The Morkrum Printer.

Considerable interest was manifested in the subject of printing telegraphy at the recent meeting of the Association of Railway Telegraph Superintendents at New Orleans, and there were many references to the work done by the Morkrum printing telegraph.

The Morkrum system is becoming very well known through its use by the Western Union and the Postal Telegraph-Cable companies in the United States, and the Canadian Pacific and the Great North Western Telegraph companies in Canada. It is proving its worth to these companies by handling large volumes of business and by operating satisfactorily over long and difficult lines, some of which had heretofore been thought unfit for automatic work. The Morkrum system is also operating on the lines of the Chicago, Burlington and Quincy, the Lake Shore, the New York Central, the Baltimore and Ohio and the Rock Island railroads.

Mr. A. Wray, assistant superintendent of telegraph, of the Rock Island Lines, read a paper on the use of the Morkrum printer on the Rock Island Lines, where the three heaviest circuits out of Chicago are being operated by Morkrum printers. One of these circuits, that from Chicago to El Reno, is nine hundred miles long and is operated with a repeater at Topeka. This circuit is made up of a simplex telephone circuit from Chicago to Davenport, a straight copper wire from Davenport to Topeka, and an iron wire from Topeka to El Reno. Mr. Wray brought out a number of points on the adaptability of printers to railroad work.

In the discussion which followed the paper, Mr. W. J. Camp, assistant manager, Canadian Pacific Railway's telegraph, Montreal, Que., whose company has been using Morkrum printers for several years, told of the good service they were giving, and the fact that on two Montreal-Toronto circuits they were able to save five thousand dollars a year over Morse operation.

Mr. H. A. Emmons, traffic engineer of the Western Union, gave a very comprehensive talk on the subject of printing telegraphy, and on the traffic problems involved in the use of automatic systems in telegraph work. In the course of his remarks he described the good work done by the Morkrum printing telegraph in the Western Union service. He especially mentioned its operation during the recent storms which crippled the service between New York and Philadelphia. At this time the Morkrum system operated over a number of difficult circuits over circuitous routes between New York and Philadelphia, some of them containing forty miles of rubber cable.

Printing telegraphy is a very live issue at the present time and the Morkrum Company is steadily proving its practicability.

Book on Telephone Ills.

Such a sensitive instrument as the telephone is naturally subject to troubles, and how to cure them is an important thing for every telephone man to know. An excellent book on this subject is "Manual of Telephone Troubles," by W. A. Gibson.

The subject-matter covers every phase of telephone work, starting with a description of the simplest case of trouble, then taking up all other disorders that the telephone and telephone circuits are liable, at any time, to become afflicted with. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.75. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

MUNICIPAL ELECTRICIANS.

SALARIES IN UTICA.—The salary of the superintendent of fire alarm in Utica, N. Y., has been fixed at $1,495 per year, and that for linemen at $1,092.50.

CAMBRIA CITY, PA.—The wires of the fire alarm and police telegraph systems in Cambria City, Pa., are to be placed underground and the boxes placed on pedestals. Mr. Noah P. Swank is city electrician.

CITY-OWNED FIRE-ALARM SYSTEM IN NEW YORK.—In the opinion of Fire Commissioner Adamson, New York fire alarm system should be in the hands of the city. He is opposed to granting a private concern a twenty-four year franchise to run a public service as a commercial enterprise. The Manhattan Fire Alarm Company has asked for a franchise.

TELEPHONE FIRE ALARM SYSTEM.—The city commission of Springfield, Ill., has approved a new fire alarm system, proposed by E. R. Cogswell, manager of the Central Union Telephone Company at Springfield. The company will install wires connecting all engine houses directly with the fire board at the police station. When a fire is reported the person giving the alarm will be immediately connected with the station and the indicators there will at once set the gongs going in the engine house.

ELEAZER E. SELLEW, aged seventy years, an old-time New York telegrapher, since 1874 identified with the fire alarm telegraph department of the City of New York, died on May 21 at his home in Brooklyn. It was the infention of the city government to have retired Mr. Sellew in October next on a substantial pension after an unbroken and perfect record of forty years' service. Mr. Sellew was well known to the older members of the telegraph profession, with which he had been identified previous to 1874. He was a native of New York City.

Loyalty.

If the concern where you are employed is all wrong, and the Old Man a curmudgeon, it may be well for you to go to the Old Man and confidentially, quietly and kindly tell him that he is a curmudgeon. Explain to him that his policy is absurd and preposterous. Then show him how to reform his ways, and you might offer to take charge of the concern and cleanse it of all its secret faults.

Do this, or if for any reason you should prefer not, then take your choice of these: Get out, or get in line. You have got to do one or the other—now make your choice.

If you work for a man, in heaven's name, work for him!

If he pays you wages that supply you bread and butter, work for him—speak well of him, think well of him, stand by him and stand by the institution he represents.

I think if I worked for a man I would work for him. I would not work for him a part of the time and then the rest of the time work against him. I would give an undivided service or none.

If put to the pinch, an ounce of loyalty is worth a pound of cleverness.

If you must vilify, condemn and eternally disparage, why, resign your position, and when you are outside, damn to your heart's content. But, I pray you, so long as you are a part of an institution, do not condemn it. Not that you will injure the institution—not that—but when you disparage the concern of which you are a part, you disparage yourself.—*Elbert Hubbard, in the Cosmopolitan.*

NEW OFFICERS OF THE INSTITUTE.—Following are the officers of the American Institute of Electrical Engineers elected for the year beginning August 1: President, Paul M. Lincoln; vice-presidents, Messrs. H. H. Barnes, F. S. Hunting, J. A. Lighthipe, Farley Osgood, C. E. Scribner and N. W. Storer; managers, Messrs. Comfort A. Adams, Frederick Bedell, B. A. Behrend, J. H. Finney, Bancroft Gherardi, William B. Jackson, Peter Junkersfeld, H. A. Lardner, A. S. McAllister, William McClellan, Lewis T. Robinson and H. Franklin Stevens; treasurer, Mr. George A. Hamilton; secretary, Mr. F. L. Hutchinson. According to the report of the board of directors, the membership on April 30 consisted of five honorary members, 439 fellows, 1,027 members and 6,405 associates; total, 7,876, a net increase of 222 since April 30, 1913.

Mr. C. W. L. Mickley, superintendent of telegraph, International and Great Northern Railway Company, Houston, Tex., writes: "Herewith $2.00 covering my subscription for another year. Thank you for re-enrolling my name."

CONVENTION OF TELEGRAPHERS' UNION.—The Commercial Telegraphers' Union of America held its fourth biennial convention at Detroit, Mich., June 8, 9 and 10, with an attendance of one hundred delegates and visitors. Mr. S. J. Konenkamp, president of the union, reported the organization in healthy financial condition. The Canadian branch of the order was well represented, delegates being present from Toronto, Winnipeg, Montreal and other cities.

INVESTIGATING STRUCTURE OF EARTH BY WIRELESS.—The Society for Investigating the Internal Structure of the Earth, Göttingen, Germany, reports that by means of wireless telegraphy it has discovered subterranean springs and ore deposits and has ascertained their depth by use of electric waves applied according to the method invented by Prof. Leimbach, of that city. Prof. Leimbach has sent wireless messages over a mile at a level of 1,000 feet below the surface of the earth.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

MR. W. D. WILBOURN, of Baltimore, spent May 26 in Boston on personal business and visiting friends, of which he made many during his three years' residence in Boston, while acting as traffic superintendent of this district.

NEW YORK WESTERN UNION

Messrs. T. M. Ragen, Maxwell Green, C. A. Meyer, G. F. Stainton, R. Mattison, and F. H. Muddell, chiefs in this office, have returned from Buffalo, where they were sent by the company to study the new telegraph plant at that point.

Mr. F. C. Dowd, of the commercial department, while working as an operator studied law and was admitted to the bar three years ago. He is now an active worker for additional revenue in the territory south of Wall street to the Battery, and he has made many friends among concerns representing some of the largest financial and commercial interests in New York. His success is due largely to his experience as an operator and his legal knowledge. He is a convincing talker and well qualified for the work.

RICHMOND WESTERN UNION.

Mr. W. N. Reveley has resigned as chief operator of this office, Mr. Charles Smith, of Augusta, Ga., succeeding him. Mr. Reveley retires after sixteen years of railroad and telegraph service. He entered the service of the Southern Railway Company at Chase City, Va., as messenger, at the age of eleven years, in the spring of 1898. While employed in that capacity he studied telegraphy at night from a blind boy. After becoming proficient in that art, two years later, he was appointed operator and assistant agent. Mr. Reveley continued in the railroad work until February 5, 1904, when he was given a position at the key with the Western Union in the Richmond office, which was at that time in charge of Chief Operator L. D. Beall, now in Vice-President Brooks' office. He remained at the key until the fall of 1906, when he was transferred to the position of ticker chief. From that time until April, 1910, he held the position of ticker chief, repeater chief, switchboard chief, acting all-night chief and assistant chief operator.

After the "marriage" of 1910 of the telegraph and the telephone, Mr. Reveley was assigned to district and division duties in the plant department and in Superintendent Calvert's office. On October 1, 1912, he was appointed chief operator of the Richmond office, where he served in that capacity until June 1, 1914.

Mr. Reveley leaves the telegraph service to enter the plumbing and heating business, having been made vice-president of the S. H. Guza Plumbing and Heating Company, Richmond, Va.

On June 14, 1911, Mr. Reveley was married to Miss Sallie Cole, of Oxford, N. C.

In recognition of his services, and as an expression of the regret prevailing among the Richmond employes at Mr. Reveley's termination of his service with the telegraph company, he was presented with a handsome gold watch.

Mr. Reveley's successor, Mr. Charles Smith, has been in the service of the company since 1889, when he was appointed from the railroad by Mr. J. W. Brown, chief operator, Augusta, Ga. Mr. Smith was sent as operator to Americus, Ga., where he remained until August 1, 1902, when he was transferred to Augusta, Ga., which was at that time one of the largest southern relay offices of the company. During the summers of 1896, 1900 and 1901 he was granted an extended leave of absence from Augusta, having worked during that time in the New York office at 195 Broadway.

In 1902 he was married to Miss Marie A. Carr, of Augusta.

Mr. Smith was appointed assistant night chief in 1906, traffic chief in 1909, and chief operator in 1911 of the Augusta office, which latter position he held until his transfer to Richmond.

Mr. Smith has the wishes of the entire Richmond force for a most successful administration.

PHILADELPHIA POSTAL.

The first of a series of moonlight boat trips, under the auspices of the Mutual Investment Association of Philadelphia, was held Monday, June 8, on the power yacht "Robert C." The boat was comfortably filled and left Race street wharf at 8:15 p. m. It cruised up the Delaware river to Burlington, lunch being served in the cabin en route, and returning, reached the landing at 11:30 o'clock. The trip was enjoyed by all. By special arrangement with the boat owner, exclusive trips will be made as often as enough reservations are handed to Mr. C. F. Meyers, chairman of the committee.

INDIANAPOLIS, IND., WESTERN UNION.

The following offices of the sixth district, Western Division, in Indiana, have reverted to independent operation, the names of the managers also being given: Auburn, R. C. Dausman; Culver, Miss Frances Walser; Gary, A. E. Simpson; Greenwood, Miss M. A. Smith; Frankfort, O. L. Bridges and Washington, W. L. Adamson.

Mr. H. A. Gossett has been appointed manager at Attica, Ind., vice Mr. Ray Hurlbut, transferred.

Mr. C. H. Lacey has been appointed manager at Wabash, Ind., vice J. H. Adams, resigned.

At the fourth annual 500-mile automobile race, held in Indianapolis, Ind., the telegraph companies occupied the entire ground floor apartment of the "Pagoda," and with leased wire service on the second floor, many newspapers were furnished with special dispatches. The Western Union Company had thirteen circuits direct to the principal cities of the country and had an ample force to meet the emergency.

CHICAGO WESTERN UNION.

GEORGE N. WILLIS, formerly late night chief operator, died suddenly May 27. His remains were buried at Madison, Wis.

SIOUX CITY WESTERN UNION.

A new branch office has been opened in the new Davidson Building, with Mr. K. C. Corrigan as manager.

Miss Ada Briggs, of the telephone department, is visiting in England.

Departures: R. W. Emerson, F. M. Darby, W. H. Bolton, G. E. Maynard, Ed. Landy, A. C. Gibson.

Arrivals: J. E. Bryan, Miss Florence Saunders, Mr. and Mrs. Mark Seavy, I. W. Miller, C. E. Lindholm, C. C. Cox, T. V. Garry, A. H. McAhrens, J. Miles, J. E. Creithon, Leo G. Hallisey.

Mr. A. Jenkinson has left this office and Mr. G. E. Maynard has arrived.

SAN FRANCISCO WESTERN UNION.

The Pacific Division executive officials, headed by Mr. C. H. Gaunt, general manager, who were recently in New York attending a conference, have returned to their respective offices.

Mr. D. F. Ingold, chief operator, with the assistance of his able staff, is making preparations to meet all demands that will be made on the facilities of the company growing out of the Panama-Pacific Exposition next year.

Mr. Dave Lewis wire chief, Fresno, Cal., will recover the sight of his eye. His glasses were accidentally broken, cutting the eye-ball, and for some time the sight was despaired of.

Owing to the reduction in the plant force, Repeater Chief L. A. Dickinson has been transferred to the operating department.

Mr. Fred A. Sweat is now traffic chief in charge of Chicago and Seattle Wheatstones.

Mr. R. C. Jackson, printer mechanic, has resigned to accept a similar position at Dallas, Tex.

A son has been born to Mr. C. E. Payne, chief clerk to Chief Operator Ingold.

Rubber Telegraph Key Knobs.

No operator who has had to use a hard key knob continuously should fail to possess one of these flexible rubber key caps, which fits snugly over the hard rubber key knob, forming an air cushion. They render the touch smooth and the manipulation of the key much easier. Price, fifteen cents. J. B. Taltavall, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Telegraph and Telephone Age

No. 13. NEW YORK, JULY 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Peg Switchboards and Their Operation.

Wherever one or more than one telegraph wire is cut into an office, a suitable apparatus must also be installed for its proper connection. Such a device is called a switchboard. The type of switchboard in general use at intermediate stations and at some other places is the peg switchboard.

It is hardly necessary to explain that at the intermediate stations the current must pass through the office instruments without touching the earth at any point. At such stations the wire must be cut and the ends fastened to separate binding posts attached to two strips of brass in the switchboard.

Fig. 1 shows this arrangement in its simplest form. Two parallel strips of brass are placed ver-

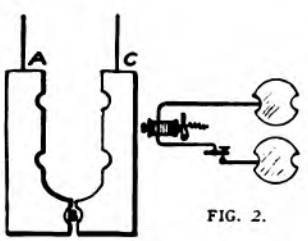


FIG. 1.

FIG. 2.

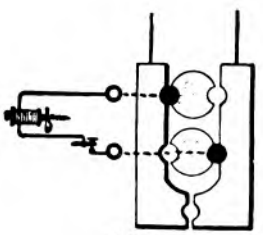


FIG. 3.

tically on a wooden frame. The lower extremities of the strips are bent toward each other, and shaped in such a manner that a metallic plug will fit snugly into the orifice thus made. When an office "cuts out" upon closing for the night, the conditions are such as obtain in this simple illustration, when a plug is inserted at B; viz., the current, entering at A or C, according to the direction in which it is traveling, passes through the two strips by means of the metallic plug at B, and out at the other binding post without traversing the instruments or touching at any other point. In order to cause the current to flow through the coils of the relay when an office is opened, a step further must be made in the construction of the switchboard.

Fig. 2 shows two small brass discs to which are attached the respective office wires running to and from the key and relay of one set of instruments. Now, if these discs are placed be-

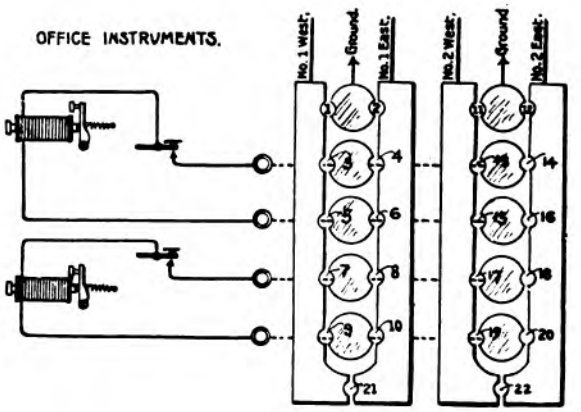


FIG. 4.

tween the vertical brass strips attached to the main circuit and metallic plugs are inserted as shown in Fig. 3, the current entering at the top of one strip finding an opening at the bottom of the switch (that plug having just been removed) will be compelled to travel through the peg connecting the first disc, thence through the key and relay, and out via the other connection similarly made. For every additional wire and instrument a duplicate of this arrangement must be added. In order to make all sets interchangeable for any circuit desired, the discs extending horizontally across the board are all connected together, as shown by the dotted lines, and the vertical main line strips proportionately lengthened to the height of the board.

Great care should be taken that the two plugs for each set of instruments are inserted in their proper places, otherwise the main wires are liable to become crossed or to be left open.

Fig. 4 represents a four-strap, five-disc switchboard showing the actual connections with the pegs omitted. For the purpose of demonstrating the manner in which an operator "cuts in," "cuts out," or makes cross-connections when so ordered, the holes for the insertion of the plugs are each numbered.

To "cut in" the instruments for No. 1 wire, remove the plug in 21 and insert a plug in 3 and another in 6.

To cut in No. 2 wire, remove the plug in 22 and insert plugs in 17 and 20.

To cut out either set, insert a plug in 21 or 22, according to which wire the set is on.

Some times the chief operator at the main office may wish to make cross connections at the intermediate office. If he requests that the west end of wire No. 1 be put to the east end of wire No. 2, the process would be as follows:

First, when the instrument is not to be cut in, insert plugs in 3 and 14, or 5 and 16. It is immaterial which of the two are used so long as they are both on the same row.

Second, when the instrument is to be cut in, insert plugs in 3 and 16.

In the same manner and at the same time, if so desired, the east end of wire No. 1 may be connected to the west end of wire No. 2, by inserting plugs in 8 and 17, without instruments, or 8 and 19, with the set of instruments cut in.

It will be seen that when both plugs are on the same row of discs, the current cannot pass through the relay, because that route is "open" at 4 or 20, where the return wire is attached.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED JUNE 2, 1914.

1,098,372. Telephone Apparatus. To A. H. Dyson, Chicago, Ill.

1,098,528. Telephony and Telegraphy for Mining Cages. To J. H. Reineke, Bochum, Germany.

1,098,529. Multiple-brush Selector. To J. N. Reynolds, Greenwich, Conn.

13,742. (Re-issue). Automatic Telephone Exchange System. To J. W. Lattig, Glenside, Pa., and C. L. Goodrum, Urbana, Ohio.

ISSUED JUNE 9, 1914.

1,099,164. Party-line Ringing Key. To A. J. Carter, Chicago, Ill.

1,099,338. Combined Signaling and Telephone System. To M. J. Carney, Chicago, Ill.

1,099,406. Relay for Telephones. To C. Stille, Berlin, Germany.

1,099,550. Telephone Set. To P. L. Jensen and E. S. Pridham, Napa, Cal.

1,099,865. Wireless Receiving System. To E. G. Stainaker, Minor, Chicago, Ill.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, June 27:

American Telephone and Telegraph Co.	122
Mackay Companies	80
Mackay Companies, preferred	67½
Marconi Wireless Telegraph Co. of America (par value $5.00)	3½
Western Union Telegraph Co.	57

IN EVERY field of action the result achieved depends directly upon the intensity of the effort, and the greater the difficulties to be overcome the less the result unless a correspondingly greater effort is made.

PERSONAL.

MR. F. A. SCHEFFLER has been elected president of the New York Electrical Society.

MR. JOHN A. TOWNSEND, now retired, formerly and for fifty years manager of the Western Union Telegraph Company at Dunkirk, N. Y., will spend the summer on the east bank of Seneca Lake before returning to Rochester, N. Y., in which city he now resides.

MR. BELA GATI, engineer in chief of the Hungarian Telegraph Administration, Budapest, Hungary, has issued in pamphlet form his paper on the "Measurement of Constants on Telephone Lines." The subject embraces measurement of resistance, self-induction, capacity and insulation.

MR. GERARD SWOPE, vice-president and general sales manager of the Western Electric Company, sailed for Europe on the steamer "Imperator," for a business trip, in the course of which he will visit the company's various allied interests abroad. Mr. Swope will be gone for two months.

MR. JAMES MERRIHEW, former general superintendent of the Western Union Telegraph Company, New York, who retired from active telegraph service ten years ago, has located at his home at Claverack, N. Y., for the summer, and Mr. W. C. Humstone, formerly superintendent of the same interests, who also retired ten years ago, will spend the summer at Pittsfield, Mass., as is his custom.

MR. CHARLES E. SCRIBNER, chief engineer of the Western Electric Company, New York, arrived on the new Cunard steamer "Aquitania." Mr. Scribner, who had been abroad for two months, went to Europe primarily to appear in London before a Parliamentary commission to present data regarding the new long distance, high speed printing telegraph developed under his supervision. His presentation resulted in an order for a trial installation, for which the equipment is already in process of manufacture. During his stay in Europe, Mr. Scribner also inspected and tested the new duplex cable installed by the German Reichspost between Berlin and Madgeburg. These tests indicated that in this important branch of telephone work the United States is substantially ahead of Europe.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary, Society of the United States Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

TELEPHONE PIONEERS OF AMERICA, at Richmond, Va., October 29 and 30. Secretary, Henry W. Pope, 26 Cortlandt street, New York.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, is absent on an inspection trip through the Middle West. He was accompanied from New York as far as Scranton and Wilkes-Barre, Pa., by Superintendent C. F. Leonard. At Binghamton, N. Y., he was joined by Superintendent H. D. Reynolds, Buffalo, N. Y., and visited a number of offices in the latter's district. Mr. Reynolds will visit Chicago, going by way of Cleveland, Toledo and Detroit, and will return by way of Indianapolis, Ind., visiting such offices that he can conveniently reach.

MR. C. C. ADAMS, vice-president of this company, has been elected president of the village of Lawrence, L. I., where he resides.

MR. W. I. CAPEN, vice-president, New York, is on an inspection trip through the south.

Seeing Is Believing.

Mr. Edward Reynolds, vice-president and general manager of this company, recently announced his intention of visiting the principal Postal offices throughout the country in order to get acquainted with the managers and their staffs. There was one man in the country, however, who had positive doubts as to the possibility of accomplishing such a task, but he has been converted.

During Mr. Reynolds' recent "get acquainted" trip through the South he stopped off at Hagerstown, Md. As he walked into the office he took Manager C. W. Harmon by surprise, but after Mr. Harmon had recovered his composure he remarked to Mr. Reynolds: "I have just been reading in TELEGRAPH AND TELEPHONE AGE that you were going to visit every Postal telegraph office in the country in order to get acquainted, and I said to myself, 'he can't do it; it is a physical impossibility' —and here you are."

BRANCH MANAGERS' OUTING.—The Branch Managers' Association of the Postal Telegraph-Cable Company, New York, held its seventh annual outing at Witzel's Point View Island, College Point, Long Island, Saturday, June 27, as the guests of President Clarence H. Mackay. Athletic events took place and handsome and useful prizes were awarded. Dinner was served at 6:30 p. m., after which the guest of honor, Superintendent C. F. Leonard, delivered an address on organization.

W. W. Morrison, Manager Mackay Telegraph-Cable Company, Oklahoma City, Okla.

Mr. Walter W. Morrison, manager Mackay Telegraph-Cable Company, Oklahoma City, Okla., was born at Peotone, Ill., January 3, 1883, and entered the telegraph service as a messenger for the Postal Telegraph-Cable Company in Beatrice, Neb., in October, 1898. He became manager of the Beatrice office May 25, 1901, and held that position until March 8, 1903, when he went to Davenport, Iowa, with the same company as press operator, later being transferred to the Chicago main office. From July 16, 1903, to November the same year, he was manager of the Postal at Lincoln, Neb., and then chief clerk to Superintendent Fox at Des Moines, Iowa, until December 31, 1908. Between January 1, and September 16, 1909, he was manager of the Des Moines Postal office. On account of his health

W. W. MORRISON, MANAGER, OKLAHOMA CITY, OKLA.

he was transferred to the managership at Salt Lake City, but on July 10, 1910, he returned to Lincoln as manager. On February 4, 1912, he was appointed manager of the Mackay Company's office, which position he still fills.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president of this company, is the subject of an interesting article in the *New York Times* of June 21. The article gives Mr. Carlton's views of the mental forces which win in business. "Business," he says, "needs to pedigree its forces." An excellent portrait of Mr. Carlton accompanies the article.

MR. BELVIDERE BROOKS, vice-president of the company, on June 23 attended the graduating exercises of Colgate University, Hamilton, N. Y., where his youngest son, Joseph, graduated.

MR. J. L. ORD has been appointed division plant superintendent of the Pacific Division, at San Francisco, Cal., vice R. W. Gray, resigned.

MR. W. A. PORTEOUS, manager at New Orleans, La., on June 12, addressed the graduating class of McDonough School in that city.

MR. CHARLES M. HOLMES, formerly identified with the executive offices of this company, will spend the summer at Shohola, Pa.

MR. G. M. DODGE, manager of the Valparaiso, Ind., office, accompanied by his mother, Mrs. G. A. Dodge, of the same city, were recent New York visitors and called on many of their old friends.

MR. C. M. MARRON has been appointed acting manager of the American District Telegraph Company's burglar alarm, night watchman supervision and fire alarm services at Portland, Ore. These

systems have been moved into new quarters in the Lumbermen's Building. Entire new equipment of the latest improved type has been installed in the company's new central operating office. Mr. J. M. Maddox is superintendent of the company, with headquarters in San Francisco, Cal.

MR. B. I. GABLE, of the Pittsburgh office, accompanied by his wife, is visiting Niagara Falls and other New York State points.

AN INDEPENDENT OFFICE has been opened in Montclair, N. J.

INDEPENDENT OFFICES IN MASSACHUSETTS.—The Public Service Commission of the State of Massachusetts requested that all changes in the present method of conducting joint telephone-telegraph offices be submitted to it for approval. At a conference held in Boston, Mass., on June 18, between the commission and representatives of the New England Telephone and Telegraph Company and the Western Union Telegraph Company, the former company being represented by Mr. E. K. Hall, vice-president, and Mr. L. J. Shay, and the latter by Mr. A. G. Saylor, general manager, Eastern Division, Mr. M. C. Rorty, assistant to the vice-president, and Mr. C. F. Ames, district commercial superintendent, Boston, the commission, after consideration of the facts, as set forth, announced that it had no objection to the Western Union Company making any changes in the location of its telegraph stations provided that such changes shall not result in any impairment of existing service or facilities independently furnished or furnished under any traffic or operating agreement with the New England Telephone and Telegraph Company.

Mr. Gardner Irving, General Superintendent, Commercial News Division, Western Union Telegraph Company.

Mr. Gardner Irving, the newly appointed general superintendent, commercial news division, Western Union Telegraph Company, New York, was born in Greenport, N. Y., in May, 1855. He began his telegraphic career as a messenger for the Atlantic and Pacific Telegraph Company at Hudson, N. Y., in 1868, and afterwards became engaged in other lines of business, but returned to the telegraph service March 21, 1871, at Hudson, N. Y. On the opening of the Grand Central Depot in New York, November 1, 1871, he was promoted to a position in the superintendent's office. He soon afterward entered the service of the Western Union Telegraph Company at its Thirtieth street office, and later at 145 Broadway, and after some years' experience in the cable department he was, in 1882, appointed traffic chief of the Southwestern Division. In 1885 he was appointed chief operator of the Commercial News Department. In 1905 he was made manager, and in 1911 superintendent of that department. Mr. Irving has been largely instrumental in the development of the quotation service. He is a charter member of the New York Telegraphers' Aid Society and was its president for six years. He is also one of the original members of the Magnetic Club and is a member of the Morse Club. Mr. Irving is also president of the Gold and Stock Life Insurance Association.

G. IRVING, GENERAL SUPERINTENDENT, COMMERCIAL NEWS DIVISION, NEW YORK.

STOCK QUOTATION TELEGRAPH COMPANY IN CHICAGO.—Mr. G. H. Fearons, general attorney of this company, has succeeded, after a year's effort, in securing an ordinance in Chicago permitting the Stock Quotation Telegraph Company to do business in that city.

THE CABLE.

NEW CABLES.—The Eastern Telegraph Company will lay a cable between Ostend, Belgium, and its chief cable station in England, and another cable between Loanda, Angola and Boma.

WEEK-END SERVICE BETWEEN CANADA AND AUSTRALASIA.—The Pacific Cable Board has introduced a week-end cable service between Canada and Australasia, the charges being $3 for twenty words and fifteen cents for each additional word.

REDUCING CABLE RATES.—Under the title, "It Makes a Difference Whose Ox is Gored," the *Postal Telegraph* says: "The Postmaster-general of Great Britain is very keen about reducing cable rates across the Atlantic, and frankly says that such a reduction would be at the expense of the cable companies. When it comes, however, to the British Government reducing its own cable rates across the English Channel, where it owns cables in connection with the French Government, the Postmaster-general talks very differently."

GERMAN WIRELESS INTERESTS.—The Universal Wireless Telegraph and Telephone Company of Paris has acquired the foreign (extra German) Goldschmidt patents from the General High Frequency Machine Company together with an option on the Eilvese station near Hanover, Germany. It has also bought the American station at Tuckerton, N. J.

RADIO-TELEGRAPHY.

WIRELESS 7,000 MILES.—Wireless messages were exchanged on June 18 between Nauen, Germany, and Windhoek, German Southwest Africa, a distance of 7,000 miles.

THE HARTFORD (CONN.) RADIO CLUB, an organization of amateur wireless operators, proposes to carry on a free wireless service among its members, which are scattered all over the country.

WIRELESS STATIONS IN CHINA.—Negotiations are progressing between the Chinese Government and the English Marconi Company for the conclusion of a $10,000,000 contract under which the company will construct a number of stations.

ARRESTED AT SEA ON WIRELESS WARRANT.—Jacob Dreesen, charged with stealing $25,000, was arrested on June 11 at sea on the steamer "Kronprinzessen Cecilie" bound for New York, on a warrant sent by wireless from Berlin, Germany.

WIRELESS MUSIC AT SEA.—The third officer of the steamer "Highland Scot" heard on the wireless strains of music from a gramophone on a private yacht 200 miles away while the steamer was passing Vigo, Spain, on her voyage from London to Buenos Aires.

WIRELESS DIRECTION AND POSITION FINDER.—A Marconi-Belloni-Tosi direction finder has been installed on the Canadian Northern Steamer "Royal George." By the finder the wireless operator on board can determine the direction of the source of a message to him, and find the vessel's position in a fog.

WIRELESS BETWEEN AMERICA AND GERMANY.—President Wilson and the German Emperor exchanged messages on June 19 through the wireless stations at Tuckerton, N. J., and Eilese, near Hanover, Germany. The distance traveled by each wireless message was 4,062½ miles. This was the first interchange of messages between the two countries by the Goldschmidt Company.

MR. G. HAROLD PORTER, recently appointed purchasing agent of the Marconi Wireless Telegraph Company of America, is another telegraph operator who has won his place through consistent effort and steady application to the task in hand. At the age of twelve years he became a telegraph operator in Carbondale, Pa., and was nineteen when he came to New York. He filled positions in New York for various telegraph and railroad interests up to the time of his recent appointment.

LOOK-OUT STATION ON A WIRELESS MAST.—As a means of precaution, the United States Army signal corps maintains a look-out on one of the two wireless telegraph towers located on the banks of the Rio Grande in Washington Park, El Paso, Tex. These towers, which are of iron-lattice construction, are 300 feet high, and the signal corps look-out is located a little over 200 feet from the ground. From this point of vantage the look-out, with powerful field-glasses, has an excellent view of the Rio Grande Valley and can easily detect any military activity in Mexico.

SQUIER'S RADIO TELEGRAPHIC AND TELEPHONIC RECEIVER.—Lieutenant-Colonel George O. Squier, military attaché of the American Embassy, London, England, gave a demonstration of his new radio-telegraphic and telephonic receiver at a meeting of the Royal Society in London on June 16. The invention embodies the use of the ordinary telephone wires as antennæ, requiring no mast. Messages were received over long distances during the demonstration and were heard distinctly.

EXAMINATION FOR ASSISTANT RADIO INSPECTOR.—The United States Civil Service Commission will hold an open competitive examination for assistant radio inspector, for men only, on July 8, at various places in each state and territory, including Hawaii and Porto Rico. From the eligibles resulting from this examination selections will be made to fill vacancies in this position at $1,200 per year in the offices of the radio inspectors at New York, San Francisco and Cleveland, and to fill vacancies as they occur.

WIRELESS INTERFERENCE.—A circular letter has been issued by the Department of Commerce, Washington, D. C., to owners and operators of radio stations in reference to interference caused, especially in the vicinities of New York and San Francisco, by wireless stations carrying on tests without due regard to traffic which is being conducted simultaneously. Stations desiring to conduct tests, the circular reads, should communicate with the radio inspector by letter or telephone, stating the probable length of time that will be required. Stations conducting such tests or temporary experiments should "listen in," to determine that no interference is being caused, and during the test should "listen in" frequently for the interference signal, "Q R M." Stations conducting tests should transmit their official call signal frequently. The department holds that interference caused by tests of the character described above is "wilful" when no "listening in" precautions are taken and the call signal of the station sending is not repeated at intervals. Mr. W. D. Terrell is the radio inspector in charge at New York.

Wireless and the "Empress of Ireland" Inquiry.

On June 19, during the inquiry into the "Empress of Ireland" disaster, now being held at Quebec, Lord Mersey, who is conducting the official investigation, complimented the wireless operators concerned. Further testimony of the prompt and efficient aid rendered to the "Empress of Ireland" through the agency of the Marconi wireless system was given by William J. Whiteside, chief wireless operator at Father Point, and his assistant, Crawford Leslie. The latter was on duty at the time of the first distress signal from the "Empress." This signal came at 1:45 a. m., saying the "Empress" had struck something and was a general call to stand by for further signals. He replied "O. K.," and immediately called his chief, Mr. Whiteside. The latter said that he got to the instrument at 1:48 o'clock in time to hear the last of the "Empress" SOS signals. Leslie telephoned to the "Lady

Evelyn," which, together with the "Eureka," made ready to start to the scene of the disaster.

At 1:50 o'clock the message came that the "Empress" was listing terribly. The operator on the "Empress" then proceeded to describe the position of the "Empress," but the message stopped just before it was completed, and from this Mr. Whiteside concluded that the vessel was sinking. He rushed his assistant to the wharf to inform the "Lady Evelyn" of his fears and begging them not to lose a moment. He also sent information to Mr. McWilliams, the local manager of the Great North Western Telegraph Company, to enable him to send out the news over the land lines.

Lord Mersey complimented the operators, saying that like those on the "Empress" they performed their duty well.

The telegraph work following the disaster taxed to their utmost the telegraph facilities of the Canadian Pacific Railway, as well as those of the Great North Western Telegraph Company from Quebec west.

THE TELEPHONE.

MR. H. B. THAYER, vice-president American Telephone and Telegraph Company, New York, is absent on a vacation.

MR. N. C. KINGSBURY, vice-president American Telephone and Telegraph Company, New York, has returned from a business trip in the west.

LOUD SPEAKING TELEPHONE.—Mr. Nathan A. Kurman gave a demonstration in New York, June 14, of the "Callophone," a modified telephone of his invention. It is a loud speaking telephone and is said to work on six cells of battery.

TO STOP FREE TELEPHONE SERVICE.—The New York Public Service Commission has issued an order directing all telephone companies in the State to immediately terminate, where the terms of contracts are terminable, all free telephone service, and to cease all discriminations, and to report all contracts for free service which the companies contend are not terminable.

AERIAL TELEPHONE LINE.—A recent flood in the Salinas River district in California had washed away pole after pole and the problem of keeping up the telephone wires until the waters should recede presented almost insurmountable difficulties. The familiar box kite provided the solution. The telephone company's men carried a bridle wire across the river by means of a number of large box kites and then used this strand as a messenger for drawing the telephone wires across. Talking was carried on successfully over this kite line until the recession of the waters permitted the laying of a permanent cable.—*Western Electric News.*

THE NEW YORK-SAN FRANCISCO TELEPHONE LINE.—It was reported a few days ago that the last pole of the New York-San Francisco telephone line was set in position in Nevada, and that the event was celebrated by a public demonstration. This report seems to have been premature. It is explained by Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company, that the affair was a local event and had no bearing upon the coast-to-coast line. He said, with reference to the through line, that there was still a great deal of field work of the most difficult kind to be done west of Denver and that after all the intricate equipment had been installed there would have to be months of electrical measurements. The line would be ready early in 1915, he said. Rates have not yet been determined upon.

Convention of Telephone Pioneers.

The fourth annual meeting of the Telephone Pioneers of America will be held at Richmond, Va., October 29 and 30. The headquarters will be at the Jefferson Hotel. Mr. Henry W. Pope, New York, is secretary.

Mr. M. O. T. Welch Retires from Telegraph Business.

Mr. Martin O. T. Welch, who for many years has been associated with the Western Union Telegraph Company in various positions and places, during the last four years as manager at Lincoln, Neb., has left the telegraph business and retired to a farm one mile from Fairview, the country estate of Hon. W. J. Bryan, Secretary of State.

Mr. Welch, unlike many telegraph people, has managed to come into possession of enough property to make him independent of office duties if he

M. O. T. WELCH, LINCOLN, NEB.

so chose. Besides a very fine residence in Lincoln he owns an acre in the heart of University Place, called "The house by the side of the road," and an acreage tract adjoining Normal, Neb., a beautiful country place, well improved with a cottage. On this place is a delightful spring. He has named the place Kennebunk Springs.

During the government land openings some years ago Mr. Welch represented the Western Union at these places, and in the Shoshone drawing he was one of the lucky ones. He left the service then and went to Wyoming on the homestead, acting as station agent five miles from his claim, riding back and forth on a broncho.

Government Ownership of Public Utilities.

BY CHARLES P. BRUCH, VICE-PRESIDENT, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

Government ownership of telegraphs and telephones is of immediate interest because it has recently been urged by the postmaster-general, and vigorously advocated in Congress. What follows is mainly a discussion of government ownership of the telegraph, from the standpoint of a practical operating man, although much of it applies with equal force to government ownership of any public utility.

In this country, the government should control its citizens but should not serve its citizens. In other words, the government should not undertake to carry on the business of operating public utilities or to carry on any other business which can be carried on by its citizens themselves.

The practical operation of public utilities cannot be as efficiently and economically carried on by the government as by corporate and individual enterprise.

Are the business methods of the Post-Office Department so much more efficient than those of great corporations as to compel admiration? Are the methods of the government departments the most economical that can be adopted? Judging from experience and observation, and the reports of the government departments themselves, the answer is, No.

The results obtained by department methods are ridiculously small when considered in relation to the cost of the work. Federal, state and municipal government methods are wasteful, tortuous and slow as compared with the economical, direct and prompt business methods of private concerns.

Turning to the specific question of government ownership of the telegraph. This question is almost as old as the telegraph itself. The first telegraph line was successfully operated between Baltimore and Washington in May, 1844, and in 1845 the Honorable Cave Johnson, then postmaster-general, reported that the electro-magnetic telegraph in operation between Washington and Baltimore had been placed under his supervision, that he had endeavored to bring it into constant service as a means of transmitting intelligence and had "adopted one-half of the rates suggested by Professor Morse, under the hope that it would greatly increase its revenues"; but that for six months—April to September, inclusive—the expenditures had been $3,245.00 and the revenues $413.00. He then went on to sound the key-note to which many succeeding postmaster-generals appear to have tuned their reports. He asked: "How far will the government allow individuals to divide with it the business of transmitting intelligence?" and expressed his fear that the public would suffer if so powerful an instrument for good or evil were left in the hands of private individuals. A year later he said that those evils could not be over-estimated, and expressed the opinion that the post-office department "must necessarily be superseded in much of its most important business in a few years if the telegraph be permitted to remain under the control of individuals," which is perhaps the real reason why he was worried.

Later postmaster-generals have made various reports and recommendations upon the subject and an examination of these reports in an effort to discover some good reason for government ownership discloses the fact that all the reasons advanced may be summed up in the statement that the postmaster-generals thought it would be a good thing, because foreign countries owned their telegraphs and also because it would be good for the public and for the party. Most of them complacently ignored all practical considerations, such as the cost of the service and the extent to which it would actually be utilized by the general public.

A comparison of editorial and individual opinions expressed twenty-four years ago, when Postmaster-General Wanamaker advocated government ownership of the telegraph, with opinions expressed recently, is interesting. One newspaper (the *Buffalo Times*) said at that time: If Postmaster-General Wanamaker would pay more attention to the postal service and put aside his hobby of a postal telegraph, the country would be better served." This is a comment that might fairly be made, and, indeed, has been made, in regard to present-day conditions. In fact, most of the former opinions have been repeated in recent publications and utterances, but nobody seems able to advance any new reasons for government ownership.

Postmaster-General Burleson recently expressed the opinion that the Post-Office Department should have control over all means of communication of intelligence and said that the *successful operation of the parcels post has demonstrated the capacity of the government to conduct public utilities.* It is suspected, however, that the railway companies who have paid the freight, and the people whose packages have been delayed, smashed or lost altogether, and the express companies, which have almost been put out of business, may not be inclined to accept Mr. Burleson's statement as final.

If the government ought to own and operate the telegraphs and telephones, why not the railroads? If the railroads, why not the trolley lines? If the trolley lines, why not the taxicabs? Means of communication and transportation are not the only things necessary to the public. Why should not the government raise cattle and grow wheat and furnish all the food to the people? Why not grow cotton and raise sheep and run the cloth mills and provide clothes? Why not make all doctors and dentists and lawyers (all of whom might properly be classed among public utilities) government employes and save the people the excessive fees that it is said they are sometimes compelled to pay for professional services? Why stop anywhere? Why not put everything under government ownership and management and make everybody employes of the government?

To attempt to review the entire mass of arguments, opinion and reports and proposed legislation on the subject within the limited space of this article would be like trying to run the Niagara River

through a half-inch pipe. Simply a list of them would completely fill the columns of an average newspaper.

The latest word on the subject (or, rather, "words"—because it occupies thirty-five pages of the Congressional Record) is a speech made in the House last December by the most conspicuous advocate of government ownership of public utilities now in Congress. It is a most exhaustive—and exhausting—production. An immense amount of labor must have been expended in compiling it. It is probably the best and most comprehensive argument in favor of government ownership of the telegraphs that has ever been presented—and that is not saying much. It is a mass of good theories which would be bad in practice, of bad theories that are absolutely unpractical, of whole truths and half truths, and sophistries and misstatements, of complete figures from which more or less wrong conclusions have been drawn, and incomplete figures from which correct conclusions cannot be drawn, of unrelated facts and obsolete statistics, of comparisons more or less unfair—all very cleverly strung together in such fashion that no one but an experienced telegraph or telephone man can discover and point out its fallacies and speciousness. In the whole thirty-five pages nothing is advanced to show that the Post-Office Department could or would render so fast and accurate service to the public, at the same cost or less, as the service now rendered by the telegraph and telephone corporations. Great stress is laid on the "economic waste" of the present competition, which is alleged to have resulted in unnecessary duplication of lines, offices, employes, etc. Congress and the public are informed that the Postal Telegraph Company has offices in the same cities as the Western Union, and it is stated that if one of these companies were instantly withdrawn from the field the remaining company could handle the business without substantial increase of men or material.

The fact is that the plants of both companies are, under existing conditions, worked practically to full capacity. Neither plant could possibly handle the total volume of business.

It is stated that the telegraph companies maintain wires running through 50,000 small points where there are no telegraph offices and that if the post-office department handled the matter these wires could be connected into these small towns and that no additional expense would be incurred in furnishing telegraph service; that where the traffic did not justify the employment of a Morse operator, at the fourth, or even the third-class offices, an automatic receiver, or sender, or telephone might be employed, with only such additional expense as would be needed for the extra compensation to the local postmasters; and that the post-office system is completely adapted to readily absorb this secondary form of communication without any of the costs which now attend telegraphy, except for maintenance and the wages of its operators, linemen, messengers and necessary technical engineers.

These statements are so absurd as to be almost unworthy of notice.

It is notorious that to a very considerable extent postmasterships are the reward of political service. As a rule, the local postmaster knows nothing about the business and frequently pays little or no attention to it except to draw his salary. He leaves technical matters and the hard work to be handled by underpaid, or at least, lower paid, subordinates. Is it wise, and for the best interests of the people, to increase political patronage so largely as it would be increased if the telegraphs were under the control of the government?

Moreover, in the smaller towns and in the villages, the postmaster is usually the owner of the grocery, the drug store or the general store. The post-office boxes are tucked over in one corner and the clerk of the store sorts out the mail, reads the postal cards and guesses who the letters are from, in the intervals between selling candy, drawing soda water and weighing out sugar and tea. People like these could not successfully handle and operate delicate and complex automatic telegraph apparatus, as Congress has been told that they could; nor could they even learn to handle the comparatively simple Morse apparatus commonly in use. It takes an intelligent and fairly well educated young man or woman at least two years of steady practice and work to become competent to conduct even a small telegraph office, which involves not only the sending and receiving of messages, but the adjusting of instruments, the manipulation of switchboards, the proper care of batteries and other equipment and apparatus, the safeguarding of cash, the keeping of accounts, the making of reports, and, not the least difficult duty, the "bossing" of the messenger.

The telegraph business is a technical business and it requires technical training to make competent linemen, accountants, operators, business managers, engineers, superintendents and general managers. It is very doubtful whether a sufficient number of such trained telegraphers could be found among applicants for political appointments.

Congress has been told that cutting rates in half will double the traffic. This is applying the business principles of the merchant who explained that he was able to sell his goods below cost because he did such a tremendous business. Possibly the traffic would be doubled, but the owner, whether the government or a citizen, would be ruined, if only the revenue from tolls were depended upon to pay the cost of operation.

(To be Continued.)

Mr. Edgar W. Collins, general superintendent of the Postal Telegraph-Cable Company, Chicago, in renewing his subscription for the thirty-second year, writes: "Since you started on your journalistic career, in 1883, you have had my humble support, regardless of the name under which you edited, or published. Sometimes I smiled and sometimes I frowned, but I have kept on reading and renewing my subscription, which is proof conclusive that, in the main, I have found your periodical very satisfying, and since I have acquired the renewal habit, I take pleasure in handing you herewith my check for $2.00, to carry me along for another year."

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NEW YORK, JULY 1, 1914.

Government Ownership of Telegraphs.

The statement recently made by the British postmaster-general before the House of Commons, with reference to the financial losses in the English telegraph service, has attracted wide attention. It is a powerful argument against government ownership of the telegraphs even in that country, where the state has controlled the telegraph and operated it at a great loss for over forty years. If a majority of the people availed themselves of the so-called cheap service, as now conducted, government control might be accepted with good grace, but in reality a very small percentage use it. It has been shown that in Great Britain only between ten and fifteen per cent of the population use the telegraph, notwithstanding the low rates. The other eighty-five or ninety per cent therefore are taxed to furnish this utility for the benefit of the few. This fact is never referred to in any of the reports. Its publicity might be too painful and the taxpayers might object. The people have been deluded in the belief that they have a fine and efficient service at a low cost, but how the service is paid for the taxpayer can best answer. In the United States it is stated that only five per cent of the population use the telegraph, and yet the advocates of government ownership would tax ninety-five per cent of the people to maintain a utility that is used by so few.

It has been pointed out time and again that the government cannot operate the telegraph service in this country as well as do the private companies. If it did control the telegraph and reduced the rates it is not at all likely that many more people would use the service. The government nor any other power could enforce a more extended use of it. The people are not clamoring for government ownership; they are reasonably satisfied with the service under present conditions, and do not wish government control, because they know that it would result in a heavy additional burden on the taxpayer and they would get no adequate return for the expenditure.

If the few who have a leaning toward the government ownership fallacy would read the statement referred to, and which was published in our issue dated June 16, they will learn some facts that will astonish them—that is, if they are looking for first-hand information.

Education in Railroad and Commercial Telegraphy.

The high development of the methods of conducting business on a more systematic and economical basis has led to the necessity of developing individual skill and ability in a corresponding degree. The more intricate and exacting do the duties of a position become the more necessary are intelligence and training to properly fill them.

Under present business methods more skill and intelligence are demanded for positions that were a few years ago regarded as outside of the pale of scientific organization. In these later days, however, everything is being organized, and hardly the common day laborer is overlooked.

The necessity of skill and education in the railway telegraph service was well brought out in the paper of Mr. J. B. Sheldon, of the Union Pacific Railroad, presented at the recent convention in New Orleans of the Association of Railway Telegraph Superintendents. The fitting of applicants for telegraph and telephone service on railroads, he points out, is becoming more and more important, not only on account of the increasing difficulty of securing the necessary help to fill telegraph positions, but also on account of the desire that the intelligence and ability of such help may be equal to the constantly increasing demands of the service. Under modern conditions, better educated and more intelligent help is required to secure the desired results.

The education of the average telegrapher after he has left school and entered upon his business career, up to within recent times, has been a sort of a go-as-you-please affair, with no thought of the possibility of training him along special lines to perform his duties efficiently. But now all this is changed. Education is necessary before he is given a position and it must continue after he is in harness,

in order to keep up with modern progress. The spirit of the times requires education in all lines of work, and the person who fails to recognize this fact realizes it when he finds himself out of touch and out of the line when promotions to higher positions are being made.

A few years ago when telegraph officials were asked why they did not educate their employes, their reply was: "What is the use? We educate them for other companies to hire." This excuse is never now advanced. Everyone appears to be in line for education. The result is a great increase in the opportunities to secure a practical, technical education whether a man is employed by a railroad, a commercial telegraph or a telephone company.

Mr. Sheldon gives a great deal of wholesome information on the subject of fitting applicants for railroad work, and it is well worth the time of every ambitious employe in all kinds of telegraph or telephone service to carefully study what he has to say.

New High Speed Printing Telegraph System.

At the annual convention of the American Institute of Electrical Engineers, at Detroit, Mich., June 26. Mr. Carl Kinsley described in a paper a new high-speed printing telegraph system devised by him.

The system is operated in connection with a commercial typewriter, to which a punch is connected, which perforates a half-inch strip of paper with groups of holes spaced in five rows, each group representing a letter. The punched strip of paper is then sent through the transmitter so that the holes pass under five wire brushes. Batteries of either polarity are thus connected between the earth and either one of a pair of conductors, or batteries of different potential can also be used. At the receiver there are five elements which are separately controlled and these elements make an autographic record by means of a local battery on a moving sensitized paper whenever they touch the surface. On the basis of duplex working and the use of two wires the operating speed is 650 words per minute over a 375-mile line.

The system does not employ synchronism between transmitter and receiver, there are no relays used in the operation at either end of the line, only one instrument is employed, and the message is received ready for distribution. The whole receiving and printing part of the mechanism, the author states, can be easily held in the hand or carried in one's pocket. Aside from the paper drive and the power circuits there are only five moving parts and there is no possibility of their getting out of order or needing adjustment. A message could be received without the necessity of an attendant ever being present. The receiver, due to its extreme simplicity and entire absence of delicate parts, would have its first cost considerably less than that of a single sensitive relay. The cost of maintenance and operation will obviously be reduced to a minimum, since on account of its simplicity and speed the number of attendants and their individual skill will be far less than at present needed.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

What is the effect of a condenser upon a continuous current?

What is the action of a retardation coil between different lines connected to the same "booster?"

(Page 30.) Give the cause for one of the classes of trouble in telephone work and its effect?

(Page 32.) Study the cause of a noisy telephone line by electrostatic induction, and study the distribution and relation of charges as shown in Fig. 6.

In what manner can the distributed charges on a telephone line be controlled?

What is the effect of transposing the positions of the two sides of the telephone circuit as shown in Fig. 7 on page 33?

If these transposed sections are again divided, what will be the effect on the operation of the telephone?

Why is it generally advisable to use twisted pairs for inside wire and cable conductors?

What methods are used to measure potential differences in telephone lines?

What is the objection to the electrostatic method of measuring potential?

What is the more usual method of measuring?

(Page 34.) Upon what does a voltmeter depend for its action?

What does the voltmeter actually measure and what is the relation of the current passing through it to the potential at its terminals?

How is an ammeter connected with the circuit in which the current is to be measured?

How is a volt connected for measuring voltage?

What is the difference between a voltmeter and an ampere?

What is the difference between static and dynamic electricity?

What is the meaning of the term "counter-e. m. f."?

If the current from a battery of twenty-four volts pressure is opposed by an earth potential of six volts, what pressure is available for the circuit?

What is the principle of the booster battery?

Which side of a dry cell booster battery should be connected to the line, and give the reason why?

(Page 35.) What are the three principal factors in electrical work?

What is the unit of measurement for current and what is the unit for pressure and for resistance?

Is the resistance to the passage of a current offered by a wire the only impeding factor?

What is the nature of resistance?

(To be Continued.)

The Passing of Old 195 Broadway, New York.

The general operating department of the Western Union Telegraph Company was, on June 28, moved from 195 Broadway, New York, where they had been located since 1875, to new quarters in a new fire-proof building situated on Walker street and on Lispenard street, New York. Entrance to the new building, known as the "Walker-Lispenard Building," is from either No. 24 Walker street or from No. 24 Lispenard street.

Walker and Lispenard streets are parallel streets crossing Broadway just south of Canal street. The new office occupies a position in about the center of the block bounded by Walker street and Lispenard street and by Church street and West Broadway.

The company's quarters in the new office will be on the eleventh to seventeenth floors, inclusive; other tenants occupying the remainder of the building. The building is equipped with the most modern and scientific fire, pneumatic and safety appliances. An inside fire stairway, having entrance only from a concrete fire-escape balcony, connects each floor of the building.

FIG. 1—NEW OPERATING QUARTERS, WALKER-LISPENARD BUILDING, NEW YORK.

The operating department in the new office occupies two floors, the fourteenth and fifteenth. The other departments, employes' retiring rooms, employes' restaurant, etc., are located on the other floors in the new office as follows:

Eleventh floor—Women's retiring rooms. Twelfth floor—Men's retiring rooms. Thirteenth floor—Inside plant equipment: Plant room and general wire chief, time service department, chief equipmentman, operating clerical force, storeroom, operating department, service department, generator room. Fourteenth floor—General operating department: City division, way division, distributing center, commercial news department. Fifteenth floor—Automatic department and trunk circuits. Sixteenth floor—Bookkeeping department: Complaint bureau, money transfer department. Seventeenth floor—Employes' restaurant and telephone bureau, medical department, lecture room, operating school.

Women employes of the company are permitted to spend their lunch relief on the roof of the building.

The restaurant on the seventeenth floor is modern in every detail. The "Cafeteria" method of self-service is in force. The dining-room has a seating capacity for 272 persons.

Over the operating tables are belt carriers, and as messages are received they are deposited on the belt by the receiving operator and carried to the distributing department.

On the fifteenth floor is located the automatic department, which includes the Barclay, Wheatstone, Morkrum and Multiplex printers. On the thirteenth floor are the switchboards, power plant and repeater department.

FIG. 2—THE PRESENT BUILDING AT 195 BROADWAY. JUST VACATED AND TO BE TORN DOWN TO MAKE ROOM FOR NEW BUILDING.

Three thousand nine hundred wires run into the new office, and the operating force consists of 2,000 persons.

Frequently the New York main office handles upward of 160,000 messages in one day.

In our issue dated August 16, 1913, were given details of the new office, which will be of interest in this connection.

Mr. W. N. Fashbaugh, general superintendent of traffic, has gotten up a booklet for distribution among the employes, giving some useful information about the new quarters. It gives directions for reaching the building by the various street transportation routes and from the railroad ferries; location of the different departments in the building, etc. The front cover contains spaces for the employe's name and other information for guidance.

The executive offices and main operating department of the Western Union Telegraph Company have been located at 195 Broadway, New York, since February 1, 1875. At the time of its erection the structure was regarded as a massive building and one of the most imposing in the city. It comprised ten stories and a tower. It is situated on the northwest corner of Dey street and Broadway, and the site cost $900,000. The total cost of the land and building was $2,200,000, which was regarded as an unusually large expenditure for business property at that time. The style of the building may be called, with some latitude, the French Renaissance. The outer wall was 140 feet in height and the distance from the pavement to the top of

FIG. 3—ORIGINAL BUILDING AT 195 BROADWAY, AS IT APPEARED BEFORE THE FIRE.

the tower was 230 feet. It was supposed to be fire proof throughout. The walls of the two first floors were of Massachusetts and Virginia granite, and those above were of Baltimore brick with occasional belts of Virginia granite. The roof, embracing three floors, was of iron, so constructed as to require support only from the outer walls, thus leaving the seventh floor, which was the operating department, an unbroken area of 145 feet by 70 feet, with a height from floor to ceiling of twenty-three feet.

On the first floor were located the offices of Henry H. Ward, the cashier, and his assistant, H. C. Fardon, and I. C. Hendrickson, money transfer agent; Edmund Clasback and John B. Oltman also had offices in those days on the ground floor. In 1875 there were just about one hundred messengers employed at the main office. A. H. Watson, keeper of stores, also had an office on this floor.

The executive offices of the company occupied the third, fourth and fifth floors. The entire sixth floor of the building was given up to a battery room containing 15,000 cells of bluestone battery. The operating room was the chief feature of the building. It received light from every side and the outlook from the windows, which at that time overtopped all buildings in the vicinity, was magnificent. To-day, however, the building is hemmed in by higher structures on all sides.

There were eighty-four quartette tables. These were made of cherry frames with mahogany tops, flat and intersected by plates of glass, twelve inches wide encased in light mahogany frames. The machinery and telegraph instruments of the operating department at that time consisted of: Morse instruments, 144; Phelps motor printers, 3; Duplex sets, 23; Quadruplex sets, 21; Milliken's automatic repeaters, 3; Button repeaters, 4. A fine switchboard, thoroughly up to date at that period, had a capacity of 300 wires.

The manager of the operating department at that time was Alfred S. Downer. The office force under Mr. Downer numbered three hundred and seventeen persons, of whom two hundred and nineteen were men, and ninety-eight women. A. S. Downer was

FIG. 4—VIEW OF THE OPERATING ROOM AFTER THE FIRE.

assisted by David R. Downer, senior chief operator; J. H. Dwight, first chief operator; S. S. Bogart, S. L. Griffin, E. A. Leslie, chief operators, and F. W. Gregory, assistant. Miss F. Letitia Daly was chief operator of the ladies' department.

The night force, numbering about one hundred persons, was under the management of Thomas Dolan, assisted by Thomas M. Brennan and Thomas G. Kennedy, chief operators, and A. E. Sink, assistant.

The number of messages handled per day at that period was 35,000.

M. S. Roberts, who had charge of the bookkeeping department, with thirty assistants, occupied space on the eighth floor. A spacious lunch room also occupied a portion of the same floor.

The Associated Press, under the general managership of James W. Simonton, also occupied space on the eighth floor. Portions of the eighth and the ninth floors were used for kitchen, janitor's apartments and message storage.

On the ridge of the roof of the building as it was found in those days was an enclosed walk from which perhaps the finest view of New York and its surroundings could be seen.

Mr. John Dauler had charge of the messenger department. About 3,000 messages were delivered per day from the 195 Broadway office at that period. Many men were on the messenger force and almost the entire night shift at that time was composed of men. There were many associations in those days. Even the messenger boys maintained "The Enterprise Dramatic Association." "Jumbo Gum" in their hands was no second-class production. They gave frequent performances. They had also the "Electric Dramatic Association" and the "Electric Glee Club," besides a brass and string band.

The employes of the company, covering the entire country in 1875, numbered: Males, 9,200; females, 750.

In 1890 fire destroyed the operating room and the upper floors. A temporary operating department was established in the halls on the various lower floors until the reconstruction work above the sixth floor was completed. Three new stories were added to the building to replace those destroyed, two of them being given over to the operating department, which had outgrown the old quarters. So rapidly did the telegraph business develop that within two years after the original building was finished the aisles were filled with additional tables to make room for added circuits and instruments. Mr. A. S. Downer, the manager of the operating department, had previously informed the publisher of this paper that he would never live to see the large operating department crowded for space.

Presidents of the Western Union Telegraph Company.

The impression seems to prevail in the minds of many telegraph people not familiar with the history of the Western Union Telegraph Company that most of that company's presidents were former telegraphers. Of the nine presidents the company has had, up to the present time, including the present incumbent, three were former operators and six were from other professions.

The following table shows in order, from the first, the names, former occupations and years of service of the presidents:

Henry S. Potter, merchant, of Rochester, N. Y., April 2, 1851, to July 30, 1856.

Hiram Sibley, sheriff of Monroe County, N. Y., July 30, 1856, to July 26, 1865.

Jeptha H. Wade, portrait painter and pioneer telegraph builder, July 26, 1865, to July 10, 1867.

William Orton, lawyer and ex-commissioner of Internal Revenue at Washington, D. C., July 10, 1867, to April 22, 1878.

Norvin Green, doctor of medicine and telegraph organizer, April 22, 1878, to February 13, 1893.

General Thomas T. Eckert, telegraph operator, builder of lines and superintendent of military telegraphs, East, February 13, 1893, to March 12, 1902.

Colonel Robert C. Clowry, telegraph operator, superintendent of military telegraphs, Southwest, March 12, 1902, to November 23, 1910.

Theo. N. Vail, telegraph operator, president American Telephone and Telegraph Company, New York, November 23, 1910, to April 15, 1914.

Newcomb Carlton, present incumbent, mechanical engineer, elected April 15, 1914.

Universal Telegraph Alphabet.

BY GEORGE SMALLBONE, CHICAGO, ILL.

Recently there has been published in TELEGRAPH AND TELEPHONE AGE a number of articles, some from very capable authorities, about the adoption of the Continental code in North America, and in view of a wide experience with both codes in Europe as well as America, the writer believes he is competent to add a few words in support of its introduction.

What is known here as the Continental alphabet is in reality a later code compiled by Professor Morse, intended by him to supplant the American code because he was convinced of its imperfections. At that time the old code had become thoroughly established here and operators, therefore, were unwilling to embrace the reformation.

The chief defects in the American Morse are the spaced letters, the long dash and the large number of dots, as instanced in the figure 6, the latter resulting in many cases in an exuberant flow of dots, far in excess of the correct formation.

In the Continental alphabet these imperfections are eliminated, and although in changing from the Morse to Continental, there would, no doubt, be a few days inconvenience, in the end its adoption would prove advantageous, beside making more thoroughly universal the latest and best creation of Professor Morse.

In Great Britain the code we call "Continental" is known by no other name than the "Morse" code.

MERCHANTS' ASSOCIATION OF NEW YORK.—The Merchants' Association of New York has just issued its year book for 1914. The book contains 212 pages and gives a classified list of members. Under the head of Electrical Apparatus and Supplies are found the names of J. H. Bunnell & Co., Western Electric Company, etc. Among those classified under the head, "Telephone, Telegraph and Alarm Service," are Gamewell Fire Alarm Telegraph Company; A. S. Hibbard, American Telephone and Telegraph Company; New York Telephone Company, represented by Mr. F. H. Bethell, vice-president; James A. Scrymser, president Mexican Telegraph Company and Central and South American Telegraph Company, Western Union Telegraph Company, etc.

THE INDIVIDUALS whose lives are really valuable, never ask anyone how to make them so. The strength of your life is measured by the strength of your will. But the strength of your will is just the strength of the wish that lies behind it.—*Henry Van Dyke.*

Line Construction.

BY F. E. HORTON, DISTRICT PLANT SUPERINTENDENT, WESTERN UNION TELEGRAPH COMPANY, SALT LAKE CITY, UTAH.

The subject of the best line construction that can be had from the usual available material on hand is so broad, and there is so much in the proper construction and so many able construction men endeavoring always to obtain the best, that I hesitate to point out any betterments. There is one point that I might mention and which I feel sure has not been given sufficient attention, that is, the use of clean insulators in replacement or construction work. The point is small in a way. However, recent tests conducted by the American Telephone and Telegraph Company have demonstrated the fact that too much care cannot be used in cleaning our insulators. This was brought out in the following manner: In the construction of the trans-continental telephone circuits, two routes were considered between Salt Lake City and the west. One, a north route, from Salt Lake north sixty miles, then west along the old Southern Pacific route, north of the Great Salt Lake. The second, and preferable line, to follow a westerly direction around the south end of the Great Salt Lake approximately forty miles, from this point west, proposing to parallel the Western Pacific Railroad, providing certain unsatisfactory conditions could be overcome in the section across the Great American Desert.

It is 120 miles approximately from Salt Lake City to the far side of the Great American Desert. Of this fifteen miles is across the valley just west of Salt Lake. Then a section of line built across the south end of Great Salt Lake seventeen miles. Then comes a stretch which follows, in a general way, the shore of the lake for about ten miles, and stretches to the west. The line has but few turns and crosses the low mountain range between Delle and Knolls. Knolls is at the eastern edge of the desert.

Aside from a little grease wood at the edge of the desert there is no vegetation for forty miles. The track is straight and level. In the summer, which is hot and dry, this is a desert of sand, or rather fine dust, excepting for a distance of possibly twenty miles where the desert is a bed of salt—salt that glares like a field of ice. In the winter the greater part of this desert is covered with salt water.

The Western Pacific Railroad and the Western Union Telegraph Companies operate a joint line of three No. 8 B.W.G. iron and two No. 9 B. & S. copper wires. Since the construction of the line it has often been difficult in the winter time to operate a telegraph circuit across the desert. The trouble is caused by fine dust carried by the south wind settling on the glass, filling every crevice, and coating the petticoats, the wood caps, pins and crossarms. The analysis of the dust, which is as fine as the finest flour, shows it to be slightly alkaline with a trace of salt. In the fall and winter, before the heavy rains, a fog or mist rises and saturates the dust. Tests show that the insulation then drops to as low as .2 megohm per mile, the copper circuits testing only a very little better.

The tests were made to determine the possibility of maintaining physical and phantom circuits across the Salt desert between Knolls and Wendover. Tests were conducted under the supervision of Mr. A. B. Clark, of the American Telephone and Telegraph Company, and the work of construction and reinsulating of wires by the Western Union Telegraph Company. Tests were started January 18 and were continued at intervals of three hours for nearly two months.

To make comparative tests, two 435 lb. coppers were constructed between Knolls and Arinozia, distance twenty miles, using the ordinary method of construction, except that greater care was exercised than usual in distributing insulators. These were taken from the barrels in which they were packed and wiped with burlap before being placed. At the start of the test the insulation resistance of the iron circuits was about .2 megohms per mile, while the coppers at the same time were .1.3 megohms per mile, during the night hours. At 6 or 7 o'clock a. m. the insulation would rise abruptly. At 9 o'clock the iron wires would show six megohms and the coppers ten to twelve megohms per mile. At noon when the day was calm and cloudy, the iron wires would go to twelve megohms and coppers as high as twenty-five megohms per mile. This continued for four or five days and it was noticed that the wires kept their same relative insulation. At 12 midnight, January 26, all wires went below .2 megohms. At noon the following day they tested 100 megohms. At this time Postal wires, two test wires of the American Telephone and Telegraph Company and five Western Union and Railway wires were under test. Voltmeter tests indicated heavy escape at times, which led to the reinsulation of one Western Union iron and two Western Union coppers, replacing all glass where there was any dirt, glass which had been carefully washed being substituted.

On February 21 we completed reinsulating one iron and two copper wires on the Western Union lead, using Hemingray No. 40 glass. The result was that whereas the wires which were not reinsulated tested .5 megohms at 6 p. m., the Postal line .4 megohms, the reinsulated iron wires 21.5 megohms, the reinsulated Western Union coppers showed ninety-five megohms and the experimental fifty-five megohms per mile.

A week later the experimental line had been reinsulated with glass which had been washed. At midnight, with practically the same weather conditions, the iron wires, which had not been reinsulated, showed fifty megohms, the Postal line on high tension insulation fourteen megohms, the reinsulated iron wire seventy-five megohms and the reinsulated coppers on the Western Union line and the reinsulated experimental line showed over 1000 megohms.

From this time all wires preserved the same relative insulation, and while iron wires on the old insulators and the Postal line dropped to 1.5 megohms, the reinsulated iron wire would test over

forty-five megohms and the reinsulated coppers over 1000 megohms per mile. This is conclusive that we can attain greater efficiency by the use of clean insulators.

While the telegraph operation is not seriously affected where the insulation runs seventy-five to 100 megohms per mile the comparatively low insulation resistance seriously affects telephone operation, and as the railroad companies are entering the telephone field for dispatching trains and handling railroad message business, the study of line insulation must be given careful attention.

[NOTE.—Contributions on this subject were published on page 275 of our May 1 issue from Mr. W. J. Camp, assistant manager of the Canadian Pacific Railway's telegraph, Montreal, Que., and Mr. W. Salisbury, district plant superintendent, Western Union Telegraph Company, Omaha, Neb. In later issues we will describe the practice of the telegraph and telephone companies in line construction.—EDITOR.]

Utility of Wires on the Pennsylvania Railroad.

(*Continued from page 352, June 16.*)

It is sometimes desirable to extend a metallic circuit by making use of a single wire, or vice versa. This may be done by connecting the ends of the metallic circuit to one side of a repeating coil and connecting the end of the single wire through the other side of the coil to earth, as in Fig. 21.

It is obvious that the arrangement is a reversible one, that is, a message can be transmitted either way,

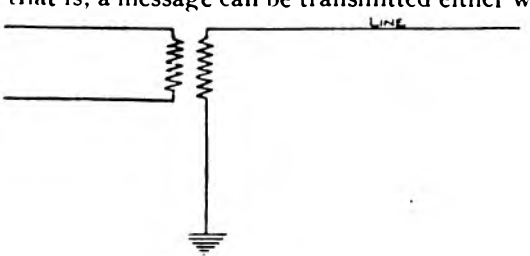


FIG. 21—CONNECTING GROUNDED LINES TO METALLIC CIRCUITS.

and thus a line of considerable length can be pieced together from single and double portions.

Sometimes a grounded telephone line parallels a long telegraph wire for a short distance. In this case it is possible to use the telegraph line as the second telephone wire, thus making the telephone circuit metallic without interfering with the working of either circuit. This may be done in three ways:

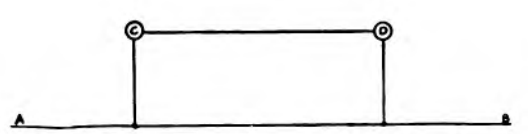


FIG. 22—TYING TELEPHONE LINES TO TELEGRAPH WIRES, THE TELEPHONE WIRE BEING DIRECTLY CONNECTED TO THE TELEGRAPH WIRE.

In Fig. 22 let A-B be the telegraph wire and C, D two telephone stations. C and D are directly connected to the telegraph wire. Comparatively little of the telegraph current will flow around the branch C, D, because the resistance of the telephone instruments is much greater than the resistance of that portion of the telegraph wire used with the telephone circuit.

Fig. 23 (similarly lettered) illustrates the second way. C and D are connected to the telegraph wire through condensers E and F, which allow the alternating telephone current to pass but hinder the pas-

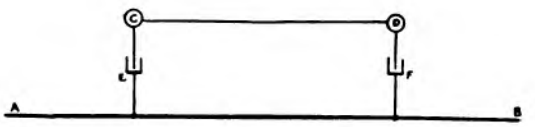


FIG. 23—TYING TELEPHONE LINES TO TELEGRAPH WIRES, THE TELEPHONE WIRE BEING CONNECTED TO THE TELEGRAPH WIRE THROUGH CONDENSERS

sage of the telegraph current. This procedure may be resorted to when the first arrangement will not give a telephone line free from the clicking of the telegraph current.

A third method is to use two retardation coils. (See Fig. 24.) A telegraph wire is cut opposite the telephone stations C and D. The ends of its middle segment are connected to the terminals of the coils and the other free ends of the telegraph wire to the middle of the coils. The other terminals of the coils are connected to the ends of the telephone wire, and the telephone stations are bridged in as shown in the figure. The action of this arrangement is as follows: A telegraph current coming from A will divide equally when it encounters the coil, traverse the non-inductive resistance which the coil offers to it, and pass along the two wires between which the telephone stations are inserted without entering the telephone instruments. The telephone current from Station C or D will traverse the circuit C-E-F-D-

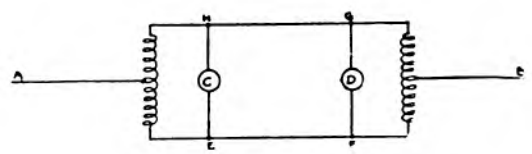


FIG. 24—TYING TELEPHONE LINES TO TELEGRAPH WIRES USING TWO RETARDATION COILS.

G-H without entering the retardation coils. The reason of this is that the coil opposes an inductive resistance to the current entering by either terminal, and the telephone current being a high frequency alternating current would encounter a great impedance in the coil.

A metallic circuit constructed in either of these three ways should be transposed like any ordinary metallic circuit and for the same reason.

In either of these three ways intermediate telephone stations may be inserted by bridging, but in none of them is it practicable to introduce intermediate telegraph stations.

The telephone wire should have the same resistance as the portion of the telegraph wire used with it. Should this not be the case, resistance should be inserted in the side containing the wire of the smallest gauge.

(*To be Continued.*)

How Submarine Cables are Made, Laid, Operated and Repaired.

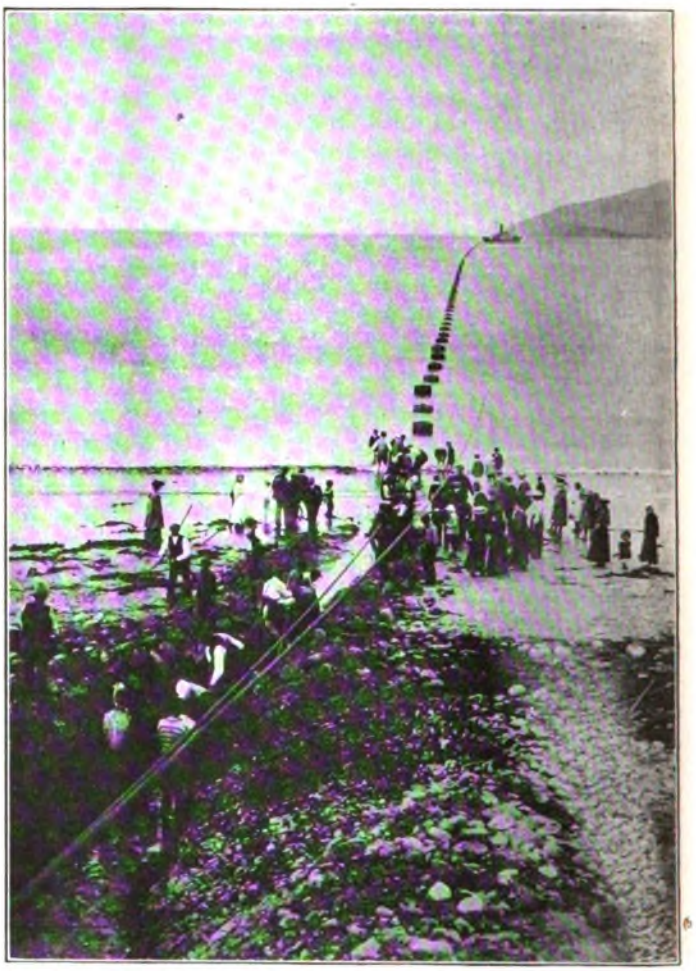
(*Continued from page 322, June 1.*)

But the conditions which obtain at these great depths are very unfavorable to animal life. Apart from the glacial temperature, the pressure for every 1,000 fathoms is one ton to the square inch, or 160 times greater than the atmosphere in which we live. At 2,500 fathoms it is twenty times more powerful than that of the steam in an average locomotive boiler. As late as 1880, a leading zoologist explained the existence of deep-sea animals at such depths by assuming that their bodies were composed of solids and liquids of great density, and that they contained no air. This, however, is not the case with deep-sea fish, which are provided with air-inflated swimming bladders. If one of these fish in pursuit of its prey ascends beyond a certain level, its bladder becomes distended with the decreased pressure, and carries it towards the surface in spite of all its efforts. This kind of misadventure may be described as falling upwards, and victims to it no doubt meet a violent death soon after leaving their accustomed level, and long before their bodies reach the surface in a distorted and unnatural condition. Even ground sharks brought up from a depth of only 500 fathoms die before they gain the sea level.

But to return to the laying of submarine cables. On reaching the place selected for the landing of the cable, the ship approaches as close to the shore as possible and, letting go anchor, prepares to land the shore end. By some companies this is done by means of rafts, in others a couple of spider-sheaves or large V-shaped wheels in light iron frames are sent ashore and fixed by sand anchors some sixty yards apart. Hauling lines are paid out from the ship reeved through the sheaves and brought back on board again. One end of this continuous line is attached to the cable and the other to the picking-up gear. The engines are then set in motion, and the cable is dragged slowly out of the ship towards the shore. As it goes, large inflated india-rubber buoys or wooden casks are lashed to it every fifty or sixty feet, to keep it afloat and prevent the damage which would result from it being dragged along the bottom.

When sufficient cable has been landed, the length on shore is laid in a trench which runs from low-water mark to the cable hut, and the end is inserted through a hole in the floor. Testing and speaking instruments are set up in the hut, which is occupied day and night during the laying by the electrician in charge and his assistants. When a satisfactory test has been taken the ship gets slowly under way.

The scene on the deck of a cable ship during the commencement of paying out is full of interest. The cable, being made fast on shore, drags itself out as the ship moves forward. At first it rises slowly from the tank, passing along a series of guiding troughs to the paying-out machine, round the drum of which it runs several times. Between this drum and the sheave at the stern by which the cable leaves the ship, stands the dynamometer. This machine shows the strain to which the cable is subjected, and plays an important part in cable laying. As the



LANDING SHORE END OF A CABLE.

water deepens, the weight of cable in suspension tends to make it run out more quickly. This tendency is counteracted by increasing the weights on the brake arms of the paying-out machine. If the water shoals, the weight of the cable outboard is considerably reduced, the strain lessens and the brakes have to be eased, in order to allow it to run out at the same speed as before. The amount of cable in suspension varies according to the depth and rate of paying out. In 2900 fathoms, with the ship steaming at eight knots per hour, no less than twenty-five miles of cable are in suspension in the water. Two and a half hours are occupied in this case by any particular point in the cable, from the time of leaving the ship to touching the bottom.

(*To be Continued.*)

NEW YORK ELECTRICAL SHOW.—The Electrical Exposition and Motor Show of 1914 will take place at the Grand Central Palace, New York, from October 7 to October 17.

Telephone Development in England.

In referring to the English telephone service, Hon. Charles Hobhouse, postmaster-general, stated before the House of Commons recently that $53,425,000 had been spent in the purchase of the National Telephone Company's system, and nearly $90,000,000 on the development of the government telephones, making a total expenditure of $143,310,000. They are valued at the present moment, making account for full depreciation of these telephones, at about $115,000,000. "Despite all complaints," he said, "I think there is a very considerable and happy development of the telephone service. It is a very serious rival to the telegraphs, and I think it is quite possible that some of the expenses now borne by the country in respect of telegraphs will be lifted off its shoulders by the replacing of this service by the telephone. The telephone development at the present moment is very great. Complaints are made of delay in the provision of telephones. That is a difficulty which must occur in every expanding business. We have under our charge at the present moment nearly 2,000,000 miles of telephone wire, and we find it impossible to procure the services of skilled and trained workmen in sufficient numbers not only to maintain this great amount of existing wire, but to lay down new wires required by the public service. We have a large number of schools in London and the provinces for training telephone workmen and we hope to turn them out at the rate of something like three or four thousand a year. In London there are nearly 243,000 telephones, an increase on last year of over 13,000. I hope this year to be able to open four new exchanges, and I intend to spend this year on the extension of the telephone system in London about $3,750,000. In the provinces there are about 480,000 telephones, an increase on last year of nearly 27,000. I propose to spend in extending the service all over the provinces $8,250,000, which I hope may procure a more rapid development of the system than has yet been possible. It has been found possible to provide in the country what are known as rural party lines. They were looked upon by farmers with great suspicion at first, for conversations could be overheard, and they feared that their neighbors would learn their prices and profits. These fears appear to have decreased, and there are now 2,300 such telephones, an increase of over 1,400 upon last year. The demand for them is spreading with rapidity, and I hope to meet it with satisfaction to the subscribers. There has been created an intertown communication system. Liverpool and Manchester can now talk to each other as if they were on the same exchange, and 70 per cent of the calls which originate in one or other of the towns are now satisfied within less than one minute. I am hoping to extend this system to Leeds and Bradford at an early date, and eventually to spread it over the country. It will do a great deal to quicken up business communications.

"Within the last few years a system of automatic telephone exchanges has been adopted in the United States of America. In Germany, where they have adopted this system on rather a large scale, I saw the other day an exchange in Berlin which was operating, I think, 4,000 lines, and in Dresden I think they have one operating 17,000 lines. In this country there are only two in existence, one on a very small scale at Epsom serving less than 100 lines, and the official switch at the General Post-Office. The machinery is very delicate and complicated and requires very skilled and expert workmen for its manufacture. But the result has been uniformly good where it has been tried and I propose to extend it on a very considerable scale in this country as soon as possible. I hope at a comparatively early date to supply Accrington, Darlington, Dudley, Grimsby, Newport, Paisley, Portsmouth, Stockport and Leeds with automatic exchanges. If they prove successful they will be introduced all over the United Kingdom. In this system there is much greater complication, but, if possible, it will be extended to London."

The Late Albert G. Hall.

BY G. C. MAYNARD, CURATOR, DIVISION OF TECHNOLOGY, NATIONAL MUSEUM, WASHINGTON, D. C.

Albert G. Hall, who died in Washington, D. C., March 22, was one of the early telegraph operators. He and his twin brother, G. A. Hall, were born in Vassalboro, Me., September 19, 1831, and both learned the telegraph business on the Bain line. In 1849 they were both employed in the Bain office in Washington, D. C., which, at that time, was located at the corner of Four and One-half street and Pennsylvania avenue, N. W. After a comparatively short time the company was absorbed by the Magnetic Telegraph Company, operating the Morse system, and the Hall brothers went to work for that company. They continued in the telegraph business for three or four years and subsequently, for many years, held various offices under the municipal government of Washington and the government of the District of Columbia.

Mr. G. A. Hall is still living in Washington with a sister, who is the widow of Dr. R. B. Donaldson, a prominent dentist, who manufactured telegraph instruments for Morse in the early years of the business. He was a delegate from the District of Columbia to the Republican National Convention in Chicago, in 1860, at which Abraham Lincoln was nominated for president. While the convention was in progress Hall made the acquaintance of the telegraph operator on duty there, and arranged with him for the transmission of a report of the nominations at the earliest moment. He wrote and filed with the operator a message addressed to his brother in Washington, with a blank for the insertion of the name of the successful candidate, and upon a signal from him, the operator inserted the name and started the message, which reached Washington very promptly.

Not long since a story was published and widely circulated, that Hall himself was the operator at the Chicago convention, and that he transmitted the news to Washington over a continuous through line. That story was an absurd fake without any foundation.

Physical and Phantom Transpositions.*

BY M. H. CLAPP, SUPERINTENDENT OF TELEGRAPH, NORTHERN PACIFIC RAILWAY, ST. PAUL, MINN.

There have been for several years successful systems of transpositions for telephone circuits on pole lines on which all of the wires were arranged in pairs and used as telephone circuits. These systems used by the telephone companies, while permitting the use of telegraph circuits on the conductors of the transposed pairs, do not contemplate the use of voltages on the telegraph circuits exceeding about 120 volts, positive and negative, and, in general, only duplex and single telegraph circuits are used. Therefore, when it became necessary to place telephone circuits on a pole line on which there were not only telephone circuits, but telegraph circuits carrying voltages as high as 360 volts positive and negative, and different kinds of rapid telegraph circuits, the problem of obtaining a satisfactory system of transpositions was much harder to solve than was the case in connection with the telephone circuits alone. Also, there is the condition, which is largely peculiar to the railroad, of desiring to create a phantom circuit from two local telephone circuits to which are connected a considerable number of offices. This condition by itself presented a very interesting problem, when laying out a system of phantom transpositions, in endeavoring to avoid cross talk between the physicals and the phantoms and noise on both.

As far as I know, there has been only one system of transpositions devised for general use on telegraph pole lines that contemplates taking care of all the possible pairs on an eighty-wire lead, which system was devised by the Western Union Telegraph Company. While this system is not perfect, it gives very good results. However, it does not provide for phantom circuits, and except in a few special cases, the Western Union Company has not made up and furnished any system for phantom transpositions. On account of obtaining authority for the installation of some 700 miles of phantom telephone circuits on the Northern Pacific Railway, it was necessary to devise a plan for transposing the circuits.

Mr. Clapp then outlined the principles he followed and the phantom transposition system he developed. The transpositions were based upon the system of the Western Union Telegraph Company. It was decided that one mile should be the maximum distance between any two transpositions of the phantom circuits. All the physical and phantom circuits balance with one another.

In creating a phantom circuit from two local physical circuits on which there are a large number of telephones bridged, he continued, there is considerable question as to the effects of these bridges on the phantom and physical circuits. If there are an unequal number of stations bridged on the physicals or the pairs bridged on the side circuits are of unequal lengths, there will be an unbalanced condition which may make the phantom noisy or cause cross talk. Also, the location of "S" poles with reference to the offices, especially the ones into which all the wires are looped, has considerable to do with the problem of obtaining satisfactory circuits. All of these possibilities should be taken into consideration when planning a phantom circuit.

In laying out for the Northern Pacific Railway Company a phantom circuit 151 miles long, which was created from two physical circuits on which there are bridged twenty-two and twenty-four Western Electric relay type selectors, the two physical circuits were cut in for test at seven points along the line and "S" poles were established at five intermediate stations. This plan of locating "S" poles would not be satisfactory for the purpose of loading.

In locating the transposition poles on the line, care should be taken to make all measurements continuously from one end of the transposition section to the other, even though the transposition poles do not come exactly at the points located.

In order to obtain a satisfactory phantom circuit it is very necessary to obtain a perfect balance of the coils and condensers used at the terminals. At the stations along the line there is not much possibility of trouble unless the apparatus bridged on the line should increase the capacity or resistance of one of the physicals by a considerable amount. He showed in diagram the arrangement and wiring of apparatus to provide a phantom and two physical telephone circuits and two simplex telegraph circuits with a composite ringer on the phantom circuit for use in connection with four wires properly transposed.

In conclusion, Mr. Clapp stated that the phantom and physical telephone circuits obtained according to the plans described give very good results. There is, however, a certain amount of cross talk between the phantom and the physical telephone circuits and some induction from the calling battery of the selectors. These conditions, he believed, are largely due to irregularities in transpositions, all of which he has not as yet been able to remove.

*Abstracts of paper read at the Annual Convention of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

How to Find and Remedy Telephone Troubles.

An extremely handy and valuable little book for telephone installers, operators, students and others interested in the telephone, is "Telephone Troubles and How to Find Them," by W. H. Hyde, Milwaukee, Wis. The character of the book is denoted in the title. The work covers troubles on overhead lines, cables, and in instruments and switchboards, of both the magneto and common-battery systems. The arrangement of the information is very convenient, and by the aid of many diagrams, the subject is made much more easily understood. A good description of telephone apparatus in general is given, and the pamphlet will be found valuable to all telephone inspectors and to everyone who uses a telephone, because it enables one to be his own telephone doctor.

The price of the booklet, which is paper covered, is twenty-five cents per copy. Copies are sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

THE RAILROAD.

MR. N. E. SMITH, superintendent of telegraph of the New Haven System, New Haven, Conn., and B. F. Thompson, telephone inspector, Baltimore and Ohio Railroad Company, Baltimore, Md., were recent New York visitors.

MR. J. H. SHEARER, formerly division operator of the Pennsylvania Railroad Company at Elmira, N. Y., now retired, was a recent New York visitor. Before returning to Elmira he made a trip to Richmond, Va., by steamer.

Mr. Camp's Boomerang.

Mr. W. J. Camp, assistant manager Canadian Pacific Railway Telegraphs, Montreal, Que., is a noted joker, but, like the rest of his kind, occasionally gets caught in his own trap by the reaction of a joke.

It came to pass once upon a time that Mr. J. J. Ghegan invented for Mr. Camp's use an instrument of torture—a shocking machine—and nothing gave Mr. Camp so much pleasure as to grasp the hand of a friend and see him squirm under the influence of a shock.

In order to understand the causes that led up to Mr. Camp's undoing it will be necessary to digress for a moment and describe the inhuman device.

The first thing noticed by the innocent friend was that Mr. Camp had his right forefinger tied up in a rag. Naturally one would hesitate to grasp an injured hand, but Mr. Camp had no hesitation about it. He would grasp the proferred hand and impart a lively shock which made the victim see a few stars in broad daylight.

The finger protector had attached to it two copper buttons connected to flexible wire cords running up through the coat sleeve to a small induction coil and a battery concealed in the pockets. On shaking hands the pressure of the victim's hand upon the buttons closed the circuit and a shock resulted. On one warm day Mr. Camp met a friend whom he was especially delighted to see. With his shocking apparatus primed for action he grasped his friend's hand, but all of a sudden Mr. Camp's arm flew up in the air and was out of control. His friend, of course, was astonished to witness such an exhibition of gymnastics. Mr. Camp, from previous training, "went out on the line" to discover the underlying cause of his remarkable acrobatic demonstration, and found that, on account of perspiration, his body had come into contact with the wires, they not having rubber insulation, so that instead of his friend experiencing the delights of a powerful shock, Mr. Camp himself enjoyed (?) it.

OBITUARY.

F. E. DUMAS, aged thirty-seven years, operator for the *Boston Herald*, died in Everett, Mass., June 22.

N. W. Krouse, aged fifty-eight years, superintendent and second vice-president of the Southwest Pennsylvania Pipe Line Company and a former telegrapher, died in Pittsburgh, Pa., June 7.

CHARLES EDWARD MCCLUER, aged seventy-nine years, died at Tarboro, N. C., on June 14. Interment was at Richmond, Va., his old home. He had been identified with the telegraph since 1852. He was located at Piermont, N. Y., when that was the terminus of the Erie Railroad. He held many prominent positions in the telegraph service and was an occasional writer of most interesting telegraph reminiscences for this publication. He was born at Indianapolis, Ind. On the breaking out of the Civil War he was located in Richmond, Va., and from 1862 to 1864 be was superintendent of supplies for the Confederate telegraphs at that point. In 1867 he became manager of the Western Union office at Lynchburg, Va. In 1880 he was appointed superintendent of the Southern Bell Telephone Company at Richmond, Va., and later identified himself with opposition telephone interests until 1890, since which time he had been engaged in other lines of business.

INDUSTRIAL.

THE GENERAL RAILWAY SIGNAL COMPANY, Rochester, N. Y., has just issued two sets of leaves for insertion in its loose-leaf catalogue. One set relates to train-order signals and the other to table lever stands. The leaves contain specifications and illustrations of the apparatus to which they refer.

INTERPHONES AND SUPPLIES.—The Western Electric Company has just issued a catalogue on its interphones and supplies. It contains not only catalogue information, but helpful suggestions as to the selection and installation of interior telephone systems. It has been issued with the hope that it will be of assistance to the electrical dealer and contractor handling this class of work. The catalogue is liberally illustrated with general views of the apparatus and diagrams of circuits.

THE SERIAL BUILDING LOAN AND SAVINGS INSTITUTION, New York, which is organized for the purpose of systematic saving and borrowing on mortgage, is experiencing its greatest success since the Institution was organized, over twenty-five years ago. It pays five per cent on all deposits and a charge of six per cent when money is borrowed on mortgage. It is managed by telegraph people for the benefit of the members of the telegraph and telephone professions. Those residing outside of New York are taking advantage of the Institution's offer to accept their deposits, paying five per cent dividends on the same from the day of deposit. It is teaching hundreds of members of the telegraph profession how to save systematically. It is therefore performing an excellent service among its members. Its field of operation should be enlarged and everyone in the telegraph and telephone service is invited to participate of its benefits. Mr. A. G. Saylor, general manager of the Eastern Division of the Western Union Telegraph Company, New York, is president. All communications and remittances should be addressed to Mr. E. F. Howell, 195 or 253 Broadway, New York.

MUNICIPAL ELECTRICIANS.

IMPROVED FIRE ALARM BOX IN CHICAGO.—A new type of post and fire alarm box invented by Mr. Oscar Kleinsteuber, superintendent of fire alarm service, Milwaukee, Wis., is to be introduced in Chicago.

MR. H. C. BUNDY, superintendent fire alarm telegraph, Watertown, N. Y., will discuss the topic "The Advantages and Disadvantages of a Fire Chief Assuming Charge of the Fire Alarm Telegraph," at the Fire Chiefs' Convention in New Orleans in October.

Fog Guns Operated by Wireless.

At a recent meeting of the technical committee of the Marconi Wireless Telegraph Company of England, some interesting facts were developed regarding fog signals and distant control. The following excerpt from the minutes will be of special interest at this time:

If the dots and dashes of the Morse Code can be transmitted with regularity over thousands of miles, it would seem only reasonable to suppose that with the help of suitable relays, valves could be turned on and off, helms moved to port or starboard, machinery checked and started, alarms rung, in fact, that a whole number of useful operations could be controlled by the electric waves used in wireless telegraphy. Hitherto, of the many inventions along these lines, not one has come to any good result. Now, however, the Marconi Company has an apparatus for distant control which has been tested under the most adverse conditions possible. From the start it has been combined with an automatic fog gun erected on an isolated beacon in mid-sea, and has not only been left unattended for weeks together, but has all this time been exposed to all weathers and to the "jamming" from strong signals from ships passing close by.

There are at present two such fog guns fitted with the Marconi control—both belonging to the Clyde Lighthouse Trust. These guns, when once started, will continue to fire at intervals of about twenty seconds, until the supply of acetylene gas is exhausted—which would take two or three weeks. The function of the wireless control is to enable the coastguard station to turn "on" and "off" the gun as desired, by this means prolonging the time for which the gun can be left unattended to three or four months, according to the conditions.

The Marconi Company's gas admission valve is introduced between the gas generator and the gun. It is a needle valve controlled by two electromagnets, so arranged that when the first magnet is energized, the valve opens wide and allows the gas to pass freely, while when the other magnet is energized, the valve shuts firmly so as to be gas tight.

Next to the valve is a water-tight metal box containing the receiving gear.

Connection to the receiving aerial is made through an insulator and the received signals pass through the "jigger" to earth. The jigger secondary goes to the actual detector, which is a special form of coherer. This detector actuates a special relay which is so constructed that although very sensitive it has quite a large movement and is therefore capable of keeping in adjustment under all kinds of temperature conditions. This end is further assured by the provision of counter balancing springs. Two "synchronizers" form an essential part of the apparatus and render it perfectly immune from the two great troubles of wireless—atmospherics and interference from powerful signals from passing ships—and enabling the same apparatus to perform two distinct functions—turning "on" and "off" the gun.

Each of the synchronizers is connected to one of the two electromagnets of the gas valve, so that when one synchronizer is actuated by the relay, it energizes one magnet and opens the valve, which remains fully open until the second synchronizer, actuated by the same relay, energizes the second magnet and closes the valve.

LEASED WIRE INVESTIGATION.—The government is investigating the leased wire service of the telegraph and telephone companies, and representatives of the Western Union and Postal Telegraph-Cable Companies and the American Telephone and Telegraph Company have been subpœnaed to testify on July 1 before Interstate Commerce Commissioner Hall, in New York.

IN FAVOR OF WESTERN UNION.—The United States Supreme Court on June 22 reversed a South Carolina decision, giving a verdict of $750 against the Western Union Telegraph Company for delay of a message announcing a case of illness. The court held the South Carolina law an interference with interstate commerce.

The Maintenance of Telephone and Telegraph Equipment.*

BY M. B. OVERLY, ENGINEER TELEGRAPH DEPARTMENT, CLEVELAND, CHICAGO, CINCINNATI AND ST. LOUIS RAILWAY, INDIANAPOLIS, IND.

Prior to the adoption, by the railroad companies, of the telephone for train dispatching and other purposes, little attention was paid to the construction and maintenance of the inside plant. A brief inspection of the wiring of the average telegraph office even to-day will prove this to be true. This is all being changed, however, and the general tendency is towards better construction and a higher class of maintenance. The telegraph company is rapidly improving its standards, both as to the class of equipment it uses and furnishes and to the manner in which it shall be installed and maintained.

Every department of the railroad is rapidly reaching a point where it will depend upon company-owned telephones with which to handle its business. No one wishes to give anything but the best service that can be produced. To do this will require the building up of an organization that will work together harmoniously, intelligently, and diligently. We must adopt and use a standard of maintenance that will bring about the highest possible efficiency in our telephone and telegraph service, and I believe only the highest class of maintenance will do this.

Every superintendent of telegraph who has telephone train dispatching on his road has done a lot of thinking upon the question of maintenance and just what methods he shall use to handle it in the best way. Every man has, no doubt, asked himself many, many times what kind of employes he shall use on this class of work. He has wondered whether he shall divide his territory into small districts and have his stationed linemen do all the work, both inside and out in a given territory, or whether he shall divide his territory among the stationed linemen without regard to the telephone equipment and employ telephone inspectors or maintainers to look after the equipment. I believe there are several correct answers to this question, because the problem is just a little different on each railroad. It would seem that one man, in going over a given territory, should be sufficient, and that he should take care of all classes of work. It would seem that too much time is wasted in riding on a motor car from station to station when no work is being done other than equipment inspection.

Our experience was probably very similar to that of all other roads. We built and equipped seven telephone-dispatching circuits in about three months. None of our regular men knew anything about telephones, and few of them knew what a selector looked like. Our installers were telephone men we picked up here and there, and few of our stationed linemen were used to help out. When we finished the installation of the first circuit we immediately put it into service and started to work on the installation of another one. We had scarcely left that territory, however, before little things began to happen on that circuit. We had no wire chiefs and our chief dispatchers and dispatchers knew nothing about testing on telephone circuits. If a fuse blew out in the main battery or some simple trouble developed, there was no one who knew how to make the simplest kind of a test. This resulted in our being compelled to take the best man available, out of one of our gangs, and put him in charge of the telephones on that division. This man had been a lineman at one time, but he had developed into a telephone equipment man and finally into a telephone wire chief. Because of the fact that we had no wire chiefs he had to be a sort of a traveling wire chief and equipment inspector. If a case of trouble came in he first made a test to find out whether it was line trouble or equipment trouble; if it proved to be line trouble the stationed lineman went after it, but if it proved to be equipment trouble the inspector went after it himself. At first we did not tie him down to any very hard and fast rules to follow, but allowed him to use his own judgment to a considerable extent. As time went on, however, we employed wire chiefs for all of the more important points on our road. These men immediately took charge of all testing, and, in addition to this, looked after the handling of duplex apparatus and telegraph repeaters, and, in some cases, also acted as manager of the office. We then relieved the inspector of all testing, and required him to inspect every office in his territory at least once every thirty days. We required him to inspect the dispatchers' master equipment and main battery once each week. On his inspection trips, the inspector carried with him a supply of cords, mouthpieces, receiver shells, diaphragms, etc., together with a supply of dry batteries, so that he could fix up any case of trouble that might develop. Our aim was to avert trouble rather than to wait until it came. These men were each given about 300 miles of road on which there is a dispatcher's telephone circuit, a station-to-station telephone block circuit, and a number of siding and yard telephone circuits. We supply them with simple blue-prints of all circuits in use in their territory. They are also supplied with all specifications that we get up or use, and we try to keep them supplied with everything they may need in the way of telephone apparatus parts. We believe it pays to keep these men well supplied, so that they do not have to wait on equipment to clear trouble.

The fact that most of our stationed linemen are without telephone experience and most of them with little, if any, experience on inside work of any kind, makes it imperative, it seems to me, that we should employ a certain number of good equipment men. We need not call these men telephone inspectors if we do not wish to, but we might call them telephone instructors. Most of us could use them in that capacity to a good advantage by having them instruct the stationed linemen how to make simple repairs and to teach them how to make tests to determine whether the trouble is in one piece of apparatus or another, or whether it is outside the

* Extracts from paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

office. The old way for a stationed lineman to run down a case of trouble in an office was to have wiring hanging loose so he could run his hand along on the wire and trace it out.

Whether we employ stationed linemen to look after the equipment, or employ telephone inspectors to do it, it will be found necessary for inspections to be made at least every thirty days. As previously stated, this is necessary to avert trouble and clear it before it comes in. If stationed linemen alone are employed, it will be found necessary to employ a certain number of first-class telephone equipment men to clear equipment trouble that linemen are unable to find and to make a general inspection trip at least every three or four months to pick up any irregularities that may creep in due to the stationed linemen not being familiar with the equipment.

We have each of our stationed linemen and telephone inspectors send to the wire chief a daily report in duplicate, showing what trouble they have cleared, what work they have done on inspection, and also a report of any installations that they have made. The wire chief checks these against his log book and gets from them any information that he may require. He keeps one copy and forwards the other to the office of the superintendent of telegraph. At the end of each month each wire chief makes up a report showing the exact amount of each class of material that has been used in each territory on each class of telephone line, and sends it to the office of the superintendent, so that it may be reduced to dollars and cents. He also makes out a report, showing the different kinds of trouble that have developed on each class of telephone circuit, and what part of the equipment has become defective. At the end of each month each telephone inspector and each stationed lineman who clears telephone equipment troubles fills out a printed form, showing what telephone equipment and material he has on hand. We use this report to check against his daily work report of material used, and also to keep us in touch with what each man has, so that we can call upon him to ship something to other points if needed, and so that we may know whether or not he has the equipment on hand to make an installation in a hurry, if necessary.

In the discussion of Mr. Overly's paper, Mr. J. A. Kick said that while the paper was one expressly on maintenance, yet he believed it was right and proper to discuss installation, as its proper conception and execution represented a large percentage value in the maintenance cost factor. Many of the original installations were so expensive to maintain that it was found profitable to entirely re-wire and re-arrange the equipment, so that it could be properly and promptly tested, inspected and repaired.: The present remarkable status of the telephone in train operation is due, in a great part, to the record time made in installation at times when funds were available and the establishment of a sufficient number of circuits on important territories was desirable for a demonstration of the practicability of the system. On some of these hurried installations it was later found that maintenance was prohibtive and after a more extended experience with the class of equipment used, the methods of installation in their relation to maintenance were more carefully considered. Installations irregularly and poorly made influence maintenance, in that a poor installation does not create a feeling of pride in the maintainer, while one that is properly and neatly made greatly influences the maintainer to do his work well and maintain the standard which has been set for him. In general, it was his belief that all installations should be made in accordance with specifications, covering the proper location and alignment of all equipment, the location and treatment of wiring forms and their proper protection. An accurate maintenance cost per station or cost per mile factor can be secured if it has a value. However, there can be no question of the value or the cost of maintenance in some intelligible divisible form. Is highly efficient maintenance at $1,500 per year per division preferable to decidedly poor maintenance at $1,200 per year?

Old Time and Military Telegraphers' Reunion

The Old Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps will meet in annual convention at the Hotel Baltimore, Kansas City, Mo., September 15, 16 and 17. Mr. George M. Myers is the president. Mr. Myers is an active business man of Kansas City and an old-time telegrapher, and desires all who can to attend this year's reunion. A good time is promised.

The programme so far arranged is as follows:—

September 15, 10:00 a. m., business meeting of the Old Time Telegraphers' and Historical Association; 11:00 a. m., meeting of the Society of the United States Military Telegraph Corps. In the afternoon, go as you please. Evening, 8:00 p. m., theatre party.

Wednesday, September 16, 1:30 p. m., trip to Excelsior Springs, Mo., by train, returning to the city at 6:30.

Thursday, September 17, 2:30 p. m., automobile trip over the world-famed boulevard system, Kansas City, starting from the Baltimore Hotel; 6:30 p. m., banquet at the Hotel Baltimore.

The chairmen of the various committees are as follows:

General Committee on Arrangements, George M. Myers; Reception Committee of the Old Time Telegraphers' and Historical Association, B. F. Rommell; Ladies' Reception Committee, Mrs. G. W. Brownson; Committee on Hotels, R. L. Logan, superintendent telegraph Kansas City Southern. Kansas City, Mo., to whom all communications concerning hotel reservations should be addressed; Finance Committee, G. W. Brownson.

Colonel William Bender Wilson is president of the Society of the United States Military Telegraph Corps and David Homer Bates, 658 Broadway, New York, is secretary of the Society. Mr. F. J. Scherrer, 30 Church St., New York, is secretary of the Old Time Telegraphers' and Historical Association.

Wireless-Controlled Boat.

John Hays Hammond, jr., son of the celebrated mining engineer, has for a number of years been experimenting with wireless telegraphy and adaptations of wireless to other purposes. On a wooded cliff near his father's summer home on the shore of Gloucester, Mass., harbor, he has erected a wireless station, with two masts rising 360 feet high from a granite base. From his lookout station on the cliff he can, by touching a key, start or stop and steer his wireless-controlled boat out and back along an eight-mile course filled with rocks, shoals and harbor craft at the speed of the swiftest cruiser.

Forty horse-power gasoline motors propel the craft, the wireless being used to start and stop her and to guide her in whatever course the operator elects. She has two masts, each forty feet high, one with alternate black and white painted cylinders on it. By these masts in the daytime Mr. Hammond sights the craft at any distance. At night these are illuminated with clusters of electric lights.

Mr. Hammond's sending station is the most powerful private equipment in the world, and is capable of transmitting a distance of 2,000 miles.

An Excellent Book on Telephony.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the best books of its kind. As its title implies, it deals with electricity and magnetism as applied to telephony, and the subject is presented in such a clear manner that an understanding of it comes with little effort. The author, Mr. Cummings, is a practical telephone man, and in his daily work he has encountered many difficult problems. He analyzed and investigated them to find the causes and has, based upon this valuable experience, written a book that every telegrapher and telephonist should study. This is an excellent book for students, as it keeps the principles clearly before them. This book is now being used as the basis for the "Question and Answers," which are now appearing regularly in these columns. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, New York, at $1.50 per copy.

OFFICERS OF TELEGRAPHERS' UNION.—The Commercial Telegraphers' Union of America, which held its fourth biennial convention in Detroit, Mich., June 8, 9 and 10, elected officers as follows: S. J. Konenkamp, of Chicago, president; James F. Campbell, Vancouver, B. C., vice-president; Wesley Russell, Chicago, secretary-treasurer. General executive board: Charles E. Hill, Toronto, Ont.; C. H. McElreath, Detroit, Mich.; Joseph F. Malion, New York; Charles H. Ludwig, Philadelphia, Pa.; D. K. Stevenson, Pittsburgh, Pa.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 569 and 570 to meet the claims arising from the deaths of D. B. Cole at Leominster, Mass.; M. J. Doran at Brooklyn, N. Y.; J. F. Gunter at Los Angeles, Cal.; E. J. Davis at New Orleans, La.; S. A. Jessup at New York; G. F. Clark at Ithaca, N. Y.; H. V. Shelly at New York; Annie M. Bradley at Manchester, N. H.; T. F. Stevens at New York; E. C. Stewart at Washington, D. C.; O. J. Waddell at Cincinnati, Ohio; G. W. Logan at Brooklyn, N. Y.; J. H. Milliken at Salem, Mass.; J. J. Coady at Toronto, Ont.; W. H. Tyhurst at Pataskala, Ohio.

IF YOU perform your duty the best you know how you cannot find fault with yourself, nor can anyone else find fault with you.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

FULTON MARKET OFFICE.—The city authorities, having decided to tear down the old Fulton Market, this company's office has been moved to 107 South street.

MISS KATHERINE MARONEY, operator at the Imperial Hotel, New York, died on May 29.

Telegraph and Telephone Age

No. 14. NEW YORK, JULY 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Peg Switchboards and Their Operation.

(*Continued from page 376, July 1*)

At the top of the switchboard, a disc attached to a wire, the other extremity of which is buried in the earth, is placed between the two brass strips of each main line. This row of discs is called the "ground wire," and is used for the purpose of locating an "opening" in the main circuit.

For instance, if wire No. 1 is "open" and the instrument closes when a plug is inserted in hole 2, it would show that the circuit is open east of the office. In this case the current from the west, after traversing the instruments via the pegs in 3 and 6 which must be left in during this test, would pass to the earth through the ground wire at 2. For the same reason it would be known that the circuit was open west, should it be necessary to plug in at 1 in order to close it. This time, however, the current would come from the east end of the line, provided there is battery at both ends of the wire.

It frequently happens that a wire is found to be open in a certain office. The manner in which a chief operator at the western terminal or testing station locates it as follows:

Having first located the opening between the intermediate office and the west side of the next station east, he again calls you up and asks you to ground No. 1 "west." If the wire is O. K. to the plug which you insert in hole 1, it will close to him, but not to you, because the current will go straight into the ground via that plug, before it reaches your set of instruments.

Finding the circuit O. K. to the "western" ground, the chief operator will then say, "Now

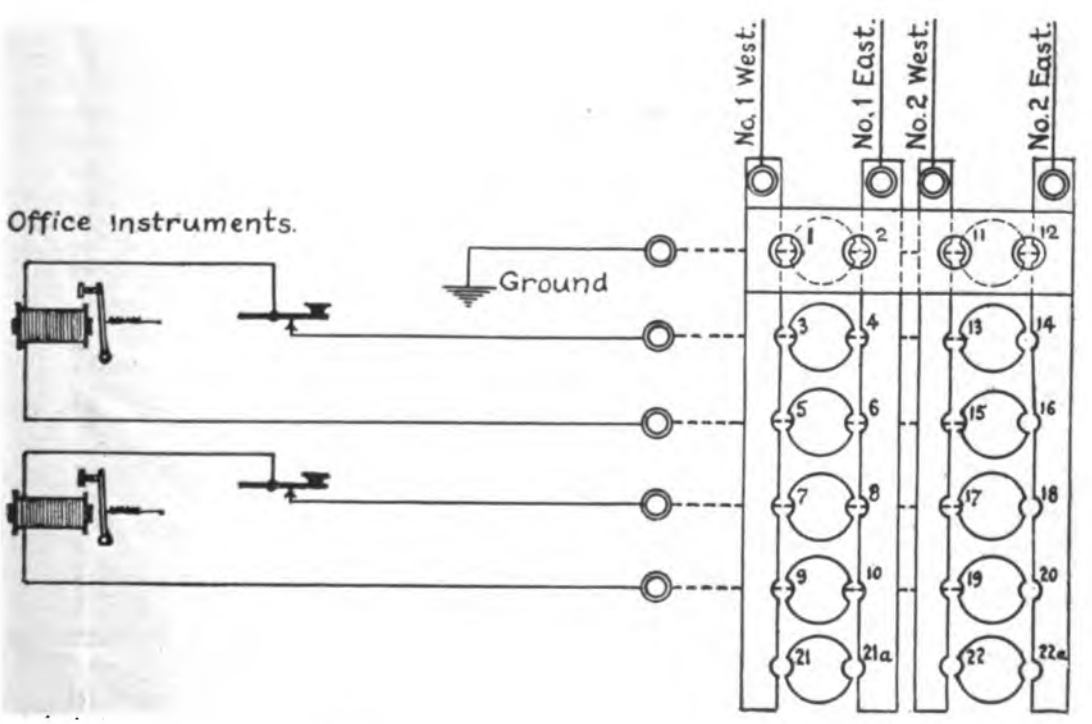


FIG. 5—LATER FORM OF SWITCHBOARD.

ground it east instead of west." When this has been done by removing the plug from 1 and placing it in 2, and the circuit does not then close to him or you, it is evidence that the opening is between 1 and 2. It may be caused by a loose connection in some of the binding posts of the relay, key or switchboard, or the key may have been accidentally left open.

One of the quickest ways for an operator at an intermediate station to learn whether the opening is in his own instruments or office connections is to insert a knife blade loosely into the "cut-out" hole at the bottom of the board. If the opening should happen to be within the room, a spark will be seen between the edge of the blade and the brass pieces every time the imperfect contact breaks the connection. His own relay, of course, will not close, but the circuit will be "O. K." to all others on the line, so long as his knife makes a solid connection. Some prefer to "feel" for the battery at each of the top binding posts, but as the sensation of finding the battery is not always very agreeable, especially to women operators, the knife-blade test is not only as satisfactory, but is frequently more certain, for the reason that a spark will appear on "breaking" a circuit, although the current may possibly be too weak to feel with the finger.

Fig. 5 illustrates a later form of the switchboard. The principal difference is the provision of an extra disc between the two brass strips of each main line wire, at the bottom of the board where those strips were shown bent towards each other in Fig. 4. Two plugs are therefore required to cut out either set in this case, being placed in holes 21 and 21a for No. 1 wire, or 22 and 22a for No. 2 wire. All the other possible changes are made in the same way as described, the holes in Fig. 5 being numbered to correspond with those in Fig. 4.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED JUNE 16.

1,100,116. Testing System for Telephone Party Lines. To C. C. Bradbury, Rochester, N. Y.

1,100,168. Telegraph Key. To A. H. Adams and J. N. Wallace, Sparkill, N. Y.

1,100,385. Control System for Automatic Telephone Switches. To F. R. McBerty, Antwerp, Belgium.

1,100,413. Selective Impulse Transmitter. To J. A. Wotton, Montclair, N. J.

1,100,480. Telephone Equipment. To W. M. Haralson and J. F. Pilkington, Dallas, Tex.

ISSUED JUNE 23.

1,100,856. Telephone System. To A. R. Tucker, Lott, Tex.

1,101,018. Signaling Circuit for Train-Dispatching Systems. To J. C. Field, Orange, N. J.

1,101,175. Aerial for Wireless Telegraphy. To E. Girardeau, Paris, France.

ISSUED JUNE 30.

1,101,533. Wireless Telegraphy. To L. De Forest, New York.

1,101,684. Automatic Telephone-Exchange Selector. To E. B. Craft, Hackensack, N. J.

1,101,853. Automatic Telephone System. To A. E. Keith and J. and C. J. Erickson, Chicago, Ill.

1,101,854. Automatic Trunking System. To A. E. Keith, Hinsdale, Ill.

1,101,914. Apparatus for Electric Signaling. To R. A. Fessenden, Brant Rock, Mass.

1,101,915. Wireless Signaling. To R. A. Fessenden, Brant Rock, Mass.

1,102,164. Switchboard-Cord Reel. To F. R. Parker, Chicago, Ill.

1,102,184. Detector for Wireless Telegraphy. To R. C. Browne, Salem, Mass.

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, July 13 :

American Telephone and Telegraph Co.	119
Mackay Companies	79
Mackay Companies, preferred	70
Marconi Wireless Telegraph Co. of America (par value $5.00)	2⅞
Western Union Telegraph Co.	58¼

PERSONAL.

MR. E. KLEINSCHMIDT, an electrical manufacturer of New York, sailed for Europe on July 4 on a business trip.

MR. G. W. HICKEY, of New York, formerly identified with the telegraph service, will spend the summer at Bethlehem, N. H.

MR. J. FRANK HOWELL, the well-known old-time telegrapher, and now a prominent stock broker of New York, will receive the third degree in Masonry in Tuscan Lodge, No. 115, Englewood, N. J., July 25.

COL. GEORGE W. FOSTER, of Dallas, Tex., a well-known old-time telegrapher, is the author of a long article in the *Dallas Daily Times-Herald*, in which he discusses the question of government ownership of public utilities.

MR. W. E. PERKINS, a former telegrapher, now, and for many years past, a distinguished member of the theatrical profession, is in New York, in connection with the work of adapting his play, "My Friend from India," to moving pictures.

MR. J. J. DEMPSEY, a well-known New York broker telegrapher, for many years chief operator for the old firm of Counselman and Day, and later with Shearson, Hammill and Company, is now located in New Haven, Conn., in another line of work.

Mr. J. M. Barnes, manager of the Canadian Pacific Railway Company's Telegraph, St. John, N. B., writes: "I am enclosing a money order for $2.50 to renew my subscription to TELEGRAPH AND TELEPHONE AGE for another year. During the year just passed I have enjoyed the perusal of the paper with much satisfaction and have received much useful information from its columns."

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. CLARENCE H. MACKAY, president, sailed for Europe on July 11, on the steamer "Olympic."

MR. EDWARD REYNOLDS, vice-president and general manager, has returned to his office from a trip of inspection through the middle west.

MR. C. C. ADAMS, vice-president, gave testimony on the subject of wire leases by his company before the Interstate Commerce Commission in New York at the beginning of this month.

MR. W. I. CAPEN, vice-president, New York, has returned from a trip of inspection through the South.

MR. E. S. WILLIAMS, superintendent, with headquarters at Chicago, has assumed charge of a new district known as the "First District, Western Division." This district is made up of offices and lines in northern Indiana and northern Illinois, heretofore under the supervision of superintendents A. L. Lafferty and J. F. Looney.

AMONG RECENT EXECUTIVE OFFICE visitors were Superintendents C. E. Bagley, of Philadelphia, and H. S. Scrivens, of Pittsburgh, Pa., and Manager S. G. Flint, of Bridgeport, Conn.

MR. T. N. POWERS, chief operator of the Chicago office, is given the title of "Manager, Operating Department." Mr. John Nering will continue as manager of the city of Chicago. The advancement of Mr. Powers was made in recognition of the valuable work done by him as chief operator, and both manager Powers and manager Nering will hereafter report direct to general superintendent E. W. Collins.

MR. B. F. RAMSDELL has been appointed assistant manager at Chicago.

MR. JOHN Z. HAYES, chief operator of the Postal Telegraph-Cable Company, Detroit, Mich., was a recent New York visitor. He made his stay in New York the occasion to call on numerous old friends. Mr. Hayes is one of the old timers in the telegraph service, and while in New York was the guest of the branch office managers at their outing on June 27.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: R. L. Blaine, Alexandria, Va.; R. E. Pickering, Lexington, Neb.; Miss L. A. Norrell, Marietta, Ga.; R. F. Fowler, Paducah, Ky.; W. V. Emory, Warrenton, N. C.; C. T. Wright, Lexington, N. C.; M. T. Snyder, Marion, Ohio; L. E. Shull, Dodge City, Kan.; J. B. Little, Gadsden, Ala.; G. N. Caudell, Henderson, N. C.; C. F. Williams, Portsmouth, Va.; Edith Nelson, Cedar Falls, Ia.; L. H. Bradley, Goldsboro, N. C.; C. Congdon, Charlottesville, Va.

THE OFFICES at Moline and Rock Island, Ill., have been transferred to the sixth district, in charge of Mr. C. A. Comstock.

HIGH-SPEED RECORDS.—Mr. James L. Chapple, operator in the Washington, D. C., office during the year 1913, handled 129,004 messages without an error. This record was made in 2,447 hours, at the rate of fifty-three messages an hour. Mr. Chapple has been in the Washington office continuously for twenty years. Mr. Allen J. West, operator at Providence, R. I., sent 91,462 messages during the same period, with but twelve errors. His record for a single hour is eighty-two messages. He is now cashier of the Providence office.

Outing of Postal Branch Managers' Association.

The seventh annual outing of the Branch Managers' Association of the Postal Telegraph-Cable Company took place on June 27, as was briefly announced in our issue of July 1, and was attended by 529 employes of the company. The party was conveyed to Witzels', College Point, L. I., on the steamboat "Montauk" in the afternoon, and on their arrival at the grounds a group photograph was taken. This was followed by athletic events, which resulted as follows:

Relay race between Commercial Cable and Postal employes, won by the Postal team.

Putting the shot: W. Hanley, first; A. Renken, second.

Walking match: P. A. Hickey, first; S. Cohen, second.

Quarter-mile run: C. Dedon, of the Commercial Cable, first; G. Mitchell, second.

Potato race: H. Christ, first; E. Jordan, Commercial Cable, second.

100-yard dash: J. Cassidy, Commercial Cable, first; R. Commerford, second.

The baseball game between the general operating department operators and branch office men was won by the former team. Score 11 to 10.

Handsome and useful prizes were awarded to the winners of the various contests.

After a strenuous afternoon, dinner was served at 7 p. m., at the conclusion of which the guest of honor, superintendent C. F. Leonard, made an address on "Organization." Mr Leonard also read a very encouraging letter from president Clarence H. Mackay, which added very much to the cheer and good-fellowship.

Vice-president and general manager E. Reynolds, who was unable to be present on account of his absence from the city, sent a greeting by telegraph.

Among those who attended from out of town were superintendents C. E. Bagley, of Philadelphia, and H. Scrivens, of Pittsburgh, Pa.; J. Z. Hayes, chief operator, Detroit, Mich., and S. G. Flint, manager, Bridgeport, Conn. Mr. S. F. Austin, superintendent, Commercial Cable Company, New York, was also present.

THE FIRST RELAY.—Sir Charles Wheatstone was the first telegraph man to employ the principle of closing a telegraph circuit by means of a relay, or its equivalent. Instead of using an electro-magnet to operate the circuit-closer he employed an electro-magnetic needle, deflected by being hung in the centre of a coil. The needle was provided with a point of metal which closed a circuit and rang a bell by dipping into a cup of mercury that formed one electrode of an open circuit, the needle being the other.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. A. G. SAYLOR, general manager Eastern Division, New York, has returned from a business trip through the New England States.

SUPERINTENDENT W. A. SAWYER has been visiting several Hudson River towns in his district, making arrangements for the re-establishing of independent Western Union offices.

MR. JOHN E. BIERHARDT, manager of the Syracuse, N. Y., office of this company for the past thirty years, has resigned.

MR. E. R. COLLINS, formerly district commercial manager at Charlestown, Va., has been appointed manager at Syracuse, N. Y., vice John E. Bierhardt, resigned.

MR. C. E. JONES, manager of the Zanesville, Ohio, office of this company, has been appointed manager of the Hamilton, Ohio, office.

THE NEW WESTERN UNION HEADQUARTERS.—The old building at the corner of Broadway and Dey street, which, for thirty-nine years, was the general headquarters of this company, and was familiarly known as 195 Broadway, has been completely vacated, and is now being torn down to make room for the new building which is to be erected on the site. All of the offices have been moved into the Dey street portion of the new building, recently completed. The public receiving room, on the ground floor, is a magnificent apartment. The walls are finished in Italian marble and the public writing desks are of massive construction of solid mahogany. There are eight telephone booths and several pay telephones. The lighting is on the semi-indirect system, and a soft, mellow light diffuses the room. The American District messenger service is also conducted from this floor. The building is equipped with the latest improvements in everything, and the offices are being rapidly straightened out. A magnificent view of New York and harbor, in all directions, is obtained from the upper floors. The president's offices, on the twenty-sixth floor, are handsomely finished in Circassian walnut. When the entire building is completed, it will be one of the most imposing structures in New York.

MORSE CLUB OUTING.—The summer outing of the Morse Electric Club, New York, will take place on Saturday, August 1, at College Point, L. I. The Western Union's steamer "Western Union" will be placed at the disposal of the club to convey the members to the grounds, where games will be played in the afternoon and a dinner served in the evening. President Belvidere Brooks and other of the high officials of the company will attend. A game of baseball between officials and employes will be played. Prizes will be awarded to the winners of the various contests.

Death of L. E. Moores.

L. E. Moores, aged fifty-seven, chief operator of the Western Union Telegraph Company, Cincinnati, Ohio, died on June 29, at the home of his brother-in-law, in Dayton, Ohio, where he had gone to attend the funeral of his wife's sister.

Mrs. Moores was awakened early in the morning by the heavy breathing of her husband, and a doctor was hastily summoned. All efforts to revive Mr. Moores, however, failed, and he died in the arms of his brother-in-law. Death occurred in seven minutes from the time that his condition was first discovered.

In the death of Mr. Moores the company looses an able and efficient official, and the operators a true friend; he was loved by all.

The funeral services were held in Dayton, on July 1, and the burial took place in Oakwood Cemetery.

Mr. Moores was born in Dayton, Ohio, and during his early career was a railroad operator. He joined the Western Union service in Louisville, Ky., in 1879, and, in 1881, went to Cincinnati. In 1885 he resigned to become night manager for the Baltimore and Ohio Telegraph Company at Louisville, Ky., and, on the consolidation of that company with the Western Union, in 1887, he returned to Cincinnati, where he remained up to the time of his death. He was appointed chief operator at the beginning of 1909.

"Western Union News."

This company has begun the publication of a monthly company paper, entitled *Western Union News*. The first number is dated July 1, and the leading article, written by president Newcomb Carlton, is one of inspiration to the employes. Mr. Carlton takes "Co-operation" as his text. "May the *News* bring to you," says Mr. Carlton, "a better understanding of our problems, a stronger grip on your work, a new happiness through better acquaintance, and the support of a brotherhood of workers for one cause—Western Union." An excellent portrait of Mr. Carlton appears on the front page.

Besides several articles of general interest to Western Union people, there are news departments from the various divisions. These are of a personal nature. The *Western Union News* is well prepared mechanically, as well as editorially, and is for free distribution among Western Union employes. It is "edited by employes for employes."

Presidents of the Western Union.

In our issue dated July 1, in the article on page 387, under the heading "Presidents of the Western Union Telegraph Company" the paragraph referring to Jeptha H. Wade leads to the inference that Mr. Wade was not an operator prior to becoming president of the Western Union Company. He was an operator at Milan, Ohio, in the early days, and he always claimed to be the first operator to receive messages by sound. That was some years before the Western Union Telegraph Company was organized. It is therefore proper that Mr. Wade should be classed among the operators who finally became presidents of the Western Union Company.

Reminiscences of the 195 Broadway Office.

The transfer of the operating department of the Western Union Telegraph Company from 195 Broadway to the Walker-Lispenard Building, New York, naturally turns the memory of old-timers back to the days when the change was made from 145 Broadway to 195. Of the original force at 195 only five appear upon the list who transferred their services to the new Walker street headquarters, viz.: T. M. Brennan, W. J. Quinn, L. E. Weller, Conrad A. Myers, and Miss S. Dougherty.

Among the living members of the original 195 force are the following, besides those mentioned: Miss F. L. Dailey, W. M. Allison, G. W. Brownson, J. F. Cleverdon, E. W. H. Cogley, E. J. Fullum, Dr. L. R. Hallock, W. H. Hoyt, C. Fred Hutchinson, R. B. Lown, M. Labaugh, M. J. Landy, S. L. Griffin, W. Maver, jr., J. W. McLaren, R. H. Morris, W. J. Morrison, W. C. Pearse, F. B. Rae, G. W. Sawyer, T. F. Taylor, T. R. Taltavall, E. F. Welsh, W. S. Williams, J. L. Edwards, T. J. Tobin, Edwin Mesler, J. M. Foster, R. Morton, Wm. Holmes, A. R. Brewer, J. B. Van Every, Emory H. Falls, Lewis Dresdner, E. O. Dierks, W. H. Dougherty, W. E. Seaman.

There were ten chief operators, fifty-six female operators, nine female clerks, four office girls, 118 male operators, thirty clerks, four battery men, two linemen and twenty office boys. The Commercial News Department had eleven operators, three clerks and four office boys—a grand total of 271.

In glancing through the list of names of the original force are found those of many celebrated operators now dead. Among them are: T. Allen, F. W. Baldwin, C. F. Bennett, John Brant, M. Brick, W. Blanchard, Fred. Catlin, S. A. Coleman, F. P. Cox, J. W. Callahan, Willis J. Cook, F. W. Gregory, W. H. Jackson, A. J. Locke, W. S. Lewis, L. B. McCarthy, D. W. McAneeny, G. D. Merrill, T. H. O'Reilly, C. H. Parr, Roscoe Sprague, C. H. Robinson, and others.

Mr. T. M. Brennan, who is still as active as he was forty years ago, is rightfully entitled to the distinction of being captain of the old guard. He is one of the very few old-timers left whose memory can turn back to the early days and recall the principal events and facts of those times. Mr. Brennan has prepared some very interesting reminiscences, suggested by the abandonment of 195. He goes back to the times when "145 Broadway" was in its glory and gives an interesting history of the old place.

The first cable office located in New York was here, and was the most sacred place in the building. In order to get to it, it was necessary to pass through General Eckert's office and be scrutinized by Colonel A. B. Chandler and E. C. Cockey. The cable office was then in charge of Mr. W. J. Dealy.

The quarters at 145 became so crowded that the company erected the building at 195 Broadway, which, for several years, was considered the height of perfection in architecture and construction.

When the force took possession of 195 Broadway, on February 1, 1875, female operators were somewhat of a novelty, and it was considered the proper thing to keep them and the men rigorously separated. The sexes were not permitted to mingle, and, in order that they might not exchange glances, the women's department was screened off from the men's gaze by a movable canvas fence, which was taken down at night when the women went home. This barrier, however, was soon removed, and, from that time on, the sexes gradually mingled. Occasionally a male operator, in fun, would stand on a chair and peek at the girls over the screen, but if he was caught he was likely to receive a severe reprimand at the instance of the ladies' chief, Miss Snow.

Figures given by Mr. Brennan show that in the New York operating room 8,265 messages were handled per day in 1868; 45,000 per day in 1881, and, on August 7, 1885, 93,127. At the present time upward of 160,000 messages are handled daily.

Mr. Brennan gave an interesting account of the fire at 195 Broadway in 1890, and mentioned, in connection with the reconstruction work, the names of General T. T. Eckert, vice-president and general manager; C. A. Tinker, general superintendent; W. C. Humstone, superintendent; A. S. Brown, New York superintendent; electricians Gerrit Smith and G. W. Gardanier; R. H. Morris, mechanical engineer, and his assistant, J. M. Moffatt. On Washington's birthday, February 22, 1892, the operating force took possession of the renovated quarters. When manager W. J. Dealy arrived at 9:30 a. m. the entire force arose and gave him an ovation of cheers. Later General Eckert came in and was escorted to the middle of the room by Mr. Dealy. Then, for an instant, every key was opened, and every employe stood up and gave the General a mighty cheer, accompanied by handclapping, waving of handkerchiefs, etc. The next day, president Dr. Norvin Green was similarly received. The force had worked on pine-board tables for nineteen months during the reconstruction period.

The traffic force at the present time consists of 1,502 persons, including 637 Morse operators and 234 automatic operators.

Everyone is well pleased with the new quarters, and the operators, especially, appreciate the new operating facilities. Everything is modern and up-to-date in every particular, and the comfort of the staff was one of the principal considerations in planning the new office.

EVERY POSITION IS IMPORTANT.—"Each man in our corporation," said Mr. Theo. N. Vail recently, "will feel the importance of his position. You all must be aware that each man in his position is just as important as any other man. It may be a big position or it may be a small position, but the work that is being done and carried on depends on each man doing his particular duties just as well as they can be done. Without that you can't do anything. You are not only strengthening your own position by doing that way, but you are enabling the company to carry on its work successfully."

THE CABLE.

MR. F. B. GERRARD, general superintendent, Commercial Cable Company, New York, is spending the month of July on a vacation in Nova Scotia.

MR. JOHN F. FRASER, superintendent of the Direct United States Cable Company, Halifax, N. S., is receiving the sympathy of his many friends on the death of his son, Frederick, in California.

MR. WILLIAM BELLAMY, manager of the Anglo-American Cables at Heart's Content, N. F., has retired after fifty years of continuous service.

REDUCTION OF RATES.—The Indo-European Telegraph Company has reduced its tariff for press telegrams from London to all Eastern countries that are served by that route, amounting to fifty per cent or more.

JAPANESE CABLE.—The Japanese Government has made an appropriation to lay a new cable from Nagasaki to Shanghai for the transmission of Japanese messages. It is to be under the direction of the Department of Communications.

THE ALL-BRITISH CABLE TO AUSTRALASIA.—At a recent meeting in London of the Dominions Royal Commission on the subject of an all-British cable to Australasia, Mr. Stanley J. Goddard, European representative of the Western Union Telegraph Company, gave evidence concerning a suggestion which had been made, that it might be possible for his company to lease to the governments concerned one of its existing Atlantic cables connecting Great Britain with the North American Continent, and to arrange to operate it by British subjects on British territory on behalf of the governments. He said he had communicated the suggestion to Mr. Newcomb Carlton, president of the company, and that Mr. Carlton saw no insuperable objection to such a proceeding, as a general proposition, subject to the company's interest being properly protected. The "line" would be leased from London to Montreal, where it would connect with a line worked by the Pacific Cable Company for Australasia. The line would be for "general purposes," and would ensure communication between England and Australasia being entirely on British territory and worked by British subjects.

UNDERGROUND CONNECTIONS FOR CABLES.—In the British House of Commons the Postmaster-General stated that with the completion of the underground cables from London to the landing-places of foreign cables, there would be no need to extend further the telegraph system, but where the telegraph overhead routes between large centers were locally congested the wires would be put underground.

Mr. T. C. Leckey, of Portsmouth, N. H., in renewing his subscription writes: "Live and let live, let 'um come. This book, the AGE, is one of the works that will never die. The older its age the younger and spicier it gets. I have cast my eyes on it since 'way back just after the close of the Civil War."

THE TELEPHONE.

MR. FRANK H. BETHELL, vice-president of the New York Telephone Company, spoke against government ownership of the telegraph and telephone systems before the Board of Trade in Newark, N. J., on June 10.

DIVIDEND.—The American Telephone and Telegraph Company on July 15 paid a dividend of two dollars per share.

TELEPHONE INVESTIGATION AND VALUATION.—The Public Service Commission has appointed William McClellan, formerly chief of the division of light, heat and power of the Public Service Commission, Second District, confidential engineer in connection with the physical valuation and investigation of the New York Telephone Company.

TELEPHONES IN JAPAN.—So great is the demand for the installation of the telephone in Japan that the Japanese Department of Communications has drawn up a scheme for the extension of the system on a much larger scale than hitherto. The plan provides for an expenditure of £400,000 ($2,000,000) per annum for a period of five years, during which time it is hoped to install about 70,000 telephones.

Toll Telephone Traffic.

Mr. Frank F. Fowle, the well-known telephone and telegraph engineer, of New York, read a paper on "Toll Telephone Traffic" at the recent annual convention, in Detroit, Mich., of the American Institute of Electrical Engineers. He described experiments to determine the relationship between telephone circuit loads and the corresponding delay to traffic. The operating methods employed and the number of circuits available determine in general, he said, the number of messages per day which can be handled over a single-toll circuit. The average delay to traffic obviously depends upon the number of messages per circuit per day, or the circuit loads. With a given load-factor, increase in the circuit loads will increase the average delay to traffic. At the same time the revenue per circuit mile will correspondingly increase. The practical limit, however, is approached when the delays to traffic reach a point where the service is unsatisfactory. The results of the experiments described illustrate the fact that increasing circuit loads increase the delay to traffic, and vice versa. The revenue per circuit mile is directly proportional to the product of the circuit load and the toll rate per minute-mile; consequently the relationship between the quality of service and the toll rate is generally obvious, assuming a certain rate of return on the plant investment.

In the discussion Mr. J. L. Wayne, of Indianapolis, Ind., stated that in telephone traffic the public should realize that speed costs money. He told of the practical difficulties of telephone operation, many of which are little realized by the general public in its eagerness for good service with low rates.

An idle machine becomes stiff and rusty for want of use. So it is with a man's brain.

CANADIAN NOTES.

MR. CHAS. E. DAVIES, formerly supervisor of equipment, Great North Western Telegraph Company, Ottawa, Ont., has been transferred to Toronto, with the title of traffic superintendent.

RADIO-TELEGRAPHY.

MR. WILLIAM MARCONI has announced that an attempt to talk by wireless telephone from Carnarvon, Wales, to New York probably would be made within the next three months. Mr. Godfrey Isaacs, managing director of the English Marconi Company, stated that a speed of 100 words per minute will be possible between the station at Carnarvon, Wales, and that at Belmar, N. J. The company, he said, is contemplating a direct service between England and Buenos Aires, and it intended to communicate between England and Brazil, between France and New York, and between Norway and New York. The Marconi Company further is on the eve of organizing a press service to Canada and from Canada to this country at a half-penny per word.

COMPLIMENT TO MR. NALLY.—The report of the Marconi Wireless Telegraph Company of England, just issued in London, says that considerable difficulty was experienced in obtaining the services of a man with the knowledge and ability needed for the direction of the American company. Lack of such a man rendered the business less profitable than it otherwise would have been. The directors believe that Edward J. Nally, who was eventually appointed, will fill the position satisfactorily.

PORTABLE WIRELESS IN THE ARMY.—The signal corps of the United States Army has tested a portable wireless set for army field service. A wireless truck can be set up for use in twelve minutes, and messages sent within a radius of 800 miles under favorable conditions.

WIRELESS IN BELGIUM.—The Belgian Government has formed a special radio-telegraphic department under the Ministry of Posts and Telegraphs. A new wireless station will probably be erected at Antwerp. It is proposed to set up receiving stations at thirty-five centers, to receive the time signals from the Eiffel Tower.

MEETING OF MARCONI MARINE COMMUNICATION COMPANY.—The general meeting of the Marconi International Marine Communication Company was held in London, England, June 30. Mr. William Marconi presided. He announced a dividend of ten per cent. He said the number of ships fitted with Marconi wireless increased from 580 at the end of 1912 to 788 at the end of 1913, and now numbered 873. The receipts from ships' telegrams, news services, subsidies, rentals, etc., during the past year were £146,316 ($731,580), compared with £100,322 for the preceding year.

LARGE WIRELESS STATION IN WALES.—The largest wireless transmitting station in the world has recently been completed at Cefndu, near Carnarvon, Wales. When the station is opened, direct wireless communication will be established between the United Kingdom and the United States. The new station will bring London and New York into direct wireless touch. By this means it is hoped to shorten the time occupied in communicating with the United States, as well as to reduce the cost of transmission. At the Cefndu station there are ten steel masts, each 400 feet high, and the last row of masts is about 1,400 feet above sea level.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

When we speak of drop or loss of energy, what becomes of the energy that has thus disappeared?

Does the shape of the electrical circuit affect the resistance?

In computing the resistance of a conductor, what properties must be known to arrive at a result?

Does coiling or bending a wire affect its electrical resistance?

(Page 36). Is there in nature any substance which is a perfect conductor and is there a perfect insulator?

What substance has the lowest resistance?

What is the difference between a good conductor and a poor conductor, ordinarily known as an insulator?

What is the specific electrical resistance of any substance?

What is the standard of comparison of resistance?

What are the specific resistances of copper, wrought iron, German silver and mercury?

Why is the measurement of resistance a less simpler operation than that of measuring current or electromotive force?

What is the definition of an ohm?

(Page 37.) What is Ohm's Law?

In a given circuit, how is the value of current determined and how is this fact expressed in the form of an equation?

What are the two other ways of expressing the equations?

In the fundamental electrical equation, what do the letters I, E and R represent?

If two of the factors in an equation are known, how may the third be determined?

What would be the simplest method of measuring resistance if a voltmeter and an ammeter were available?

How is the resistance of a telephone circuit ordinarily tested in many exchanges?

(Page 38). When greater accuracy in resistance measurement is desired, what is the method used to make the measurement?

When a current of electricity flows through a circuit, why does the pressure fall and what is the law of its decrease?

(To be Continued.)

Marconi Trans-Atlantic Service.

Mr. Edward J. Nally, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, announces that the Marconi Company expects to open its new service to the public within the next month, inaugurating a wireless service across the Atlantic direct from New York, with the various classes of service at reduced rates. A commodious main office has been leased at No. 42 Broad street, a few doors south of the Stock Exchange, in the financial district, and a branch office will be located at No. 44 East Twenty-third street. Other branch offices will be opened later. The main office is being handsomely fitted up in mahogany, and will be in charge of Mr. Harry Chadwick, as manager, assisted by Mr. Paul Kast, as cashier, and Messrs. Walter E. Wood, G. Jameson and C. I. Weaver, as supervisors, with an efficient staff of day and night operators, clerks and messengers. Mr. W. A. Winterbottom will be commercial manager. Direct automatic and multiple circuits, overland wires, will connect with the high-power wireless stations at Belmar, N. J., and New Brunswick, N. J., from which points automatic duplex wireless communication will be established with Towyn and Canarvon, Wales, whence land lines connect with London, affording a prompt and accurate service. The branch office will be in charge of Mr. W. H. Barsby, with capable assistants. Mr. Lee Lemon has been appointed superintendent of commercial and operating departments, with headquarters at No. 42 Broad street.

At Belmar, Wm. W. Ward will be manager, with the support of Mr. P. J. Barclay, as supervisor, and a staff of trained operators. Mr. J. E. Hudson will be resident engineer at Belmar, and Mr. H. E. Hallborg at New Brunswick. The company is building its own land lines to connect Belmar with the transmitting station at New Brunswick and with New York.

High-power stations are nearing completion on Cape Cod, which will open up wireless circuits to Norway, radiating to Sweden, Denmark, Russia, etc., and land lines will connect this new service with the Marconi offices in New York and Boston.

The International or Continental Morse code will be used exclusively on all Marconi circuits, and the American Morse code abandoned, on account of its dangerous combinations and resultant inaccuracies, the Marconi Company being the first American telegraph company to adopt the International code.

The staff organization and office arrangements are under the direction of Mr. E. B. Pillsbury, assistant traffic manager.

Leased Wire Investigation.

The Interstate Commerce Commission held hearings in New York, on July 1, 2 and 3, in its investigation of the leased-wire systems of the telegraph and telephone companies. Among those who testified were C. C. Adams, vice-president Postal Telegraph-Cable Company, New York; M. C. Rorty, assistant to the vice-president; F. W. Lienau, chief of tariffs; H. Mason, assistant engineer, and Frank D. Giles, special agent, Western Union Telegraph Company, New York.

The Western Union Company was represented by Rush Taggart, general counsel; the Postal Telegraph-Cable Company by R. H. Overbaugh, and the American Telephone and Telegraph Company by D. A. Frank.

Mr. C. A. Wilson, general superintendent of the American Telephone and Telegraph Company, New York, also gave testimony.

The Interstate Commerce Commission is investigating complaints made to it that the leasing of wires to large concerns constitutes a discrimination against smaller ones that have to send their messages at commercial rates. The principal complaints have come from the Grain Receivers' Association of Chicago.

The investigation was transferred to Chicago on July 9, and will be resumed in New York at a later date.

Year Book of Wireless Telegraphy and Telephony.

The year book of wireless telegraphy and telephony for 1914, has just been issued by the Marconi Publishing Corporation, New York. It is a remarkable book in its scope and fullness, and will be a very valuable addition to the library of the technical and practical wireless man. Another noteworthy fact is the remarkably low price of the book ($1.00 per copy). The amount of information given is worth much more than the price to anyone interested.

Among the contents of the book may be particularly mentioned: Record of the Development of Wireless Telegraphy (16 pages); International Radio-Telegraphic Convention, London, July 5, 1912 (35 pages); Wireless Laws and Regulations of All Countries (177 pages); List of Ship and Land Stations of the World and Call Letters (217 pages); Directory of Leading Wireless Companies in the World; biographical sketches of prominent men identified with the invention and development of wireless, besides a vast amount of useful information, technical and practical. The book contains 742 pages of reading matter and 108 of advertisements, besides a large folding map of the wireless stations of the world.

Orders for this book will be filled by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price, $1.00 per copy.

POLE PRESERVATION TREATMENT.—Impregnation of wood with oils and chemicals to increase its resistance to decay and insect attack is an industry which has become important in the United States only in recent years. In Great Britain and most of the European countries practically every wooden cross-tie and telephone or telegraph pole receives preservative treatment. In the United States less than thirty per cent of the 135,000,000 cross-ties annually consumed are treated, and the proper treatment of an annual consumption of four million poles may be said to have scarcely commenced. In 1885 there were only three pressure plants in the United States; in 1895 fifteen and in 1913 there were 117.

Telegraph and Telephone Age

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, JULY 16, 1914.

Farewell Old 195.

After an active life of thirty-nine years the headquarters of the Western Union Telegraph Company, at the corner of Broadway and Dey street, New York, familiarly known as "One-ninety-five," has passed into the hands of building wreckers, and soon will be a thing of the past. Around the old building will cling many memories of by-gone days, although, in late years, it was evident that the sentiment attached to it was also disappearing. Everything has been gravitating toward a machine basis, and what was affectionately looked upon by the old-timers as a sort of a home, became simply a workshop of brick and stone, with a lot of clattering instruments. Stern business necessity demanded that the old place give way to modern progress and ideas. It was out of joint with the spirit of the times, that is all.

During its existence this old building throbbed with the life of the entire world. In one sense it was the pulse of the world, for every happening, great or small, in any clime, was felt and recorded here.

Locally, the building has been the scene of stirring events of its own, and if its walls could speak what an interesting story they could tell! Upon its site will be reared a building of noble proportions, but it will not be the same place to the old-timers. It will be the office, the workshop having been moved to separate quarters further uptown.

Every operator should take off his hat as he passes the old building during its destruction, in memory of the past.

The Business Outlook.

It is a popular belief that the business of railroads reflects the business conditions of the country at large, and it does not require any deep argument to prove why this should be the fact. The prosperity of the country has been at a low ebb for some time, but there now seems to be a slight improvement in the railroad situation, which is equivalent to stating that general business conditions are improving. There is a more hopeful feeling among business men generally and there is every reason to believe that better times are at hand.

Submarine Cables.

There has always been, and probably always will be, a fascination about a deep-sea telegraph cable—its manufacture, its laying and its operation—and to the contemplative mind the thought that a slender copper wire, laying on the ocean bed—a region where man can never hope to penetrate—is, indeed, awe inspiring. Telegraph wires, whether under the seas or on the land, are the life-nerves connecting widely-separated minds, and by their means we know what men of other cities and countries are thinking and doing.

As far as the physical features of submarine and land lines are concerned there is a vast difference in placing them in position for practical use. Overhead land lines can be seen and inspected every inch of their length, but not so with submarine cables. Once they are laid they will never be seen again unless it becomes necessary to bring them to the surface for repairs. There are no mischievous boys down in the ocean depths to throw stones and break insulators, and entangle kite tails with the wires. Instead of kite tails cables are sometimes prey to boat anchors, and icebergs inflict damage to cables by grinding over them on the sea bottom. Other things are liable to happen to a cable, but they are few compared with the troubles of land lines.

The story of how submarine cables are made, laid, operated and repaired, which we have been publishing in instalments for several issues, is a highly interesting narrative of the life history and work of a cable. It is well and entertainingly written by cable experts and is therefore accurate. There is no guess-work or fancy about the facts as stated, and there is a charm about the story, apart from its practicality, that is attractive. We advise all to read it and learn how the interesting work of submarine cable telegraphy is conducted.

Man creates more discontent to himself than ever is occasioned by others.

The Salem, Mass., Fire.

Shortly after one o'clock Thursday afternoon, June 25, a fire started in the residential section of Salem, Mass., and was not under control until two o'clock Friday morning. The loss is estimated at about $15,000,000. A thousand buildings were destroyed and twenty thousand people were rendered homeless. Telegraph traffic at Salem made a tremendous bound and it was necessary for the Western Union Telegraph Company to detail for duty there a number of men from the Boston office.

Inspector Johnson, of Superintendent C. F. Ames' office, was on his way home from Gloucester, but stopped off at Salem and was early on the scene. District Commercial Manager Pearson arrived soon after and took charge of general operations. He was assisted in an able manner by local manager C. E. Freeman.

The plant department, represented by Plant Chief Bell, Inspector Elliott and Foremen Thompson and Smith, with a gang of men, were on the ground shortly after 10 p. m. Thursday and by 9 a. m. Friday had placed in service several thousand feet of temporary cable between points where the pole line was destroyed by the fire. The traffic department at Boston at once sent men to Salem on early trains. Traffic Supervisor Hall was in charge and was accompanied by Wm. E. Conroy, H. J. Finn, Peter L. Murphy, Harry J. Waters, Walter M. Powers, seasoned and veteran operators.

The Associated Press and a number of Boston newspapers took along private operators to work on leased circuits. The telegraph file jumped from perhaps fifty messages a day each way to 1,000 and the press file to 25,000 words daily for the three days of excitement and activity. With four senders and receivers working at top speed the traffic was magnificently handled, there being little or no delay. Many words of commendation and expressions of admiration for the excellent service given the public and the newspaper men by the company were frequently heard. Everybody worked with enthusiasm. There was no let-up in activity all day and all night, and only for the expertness of these old-time operators business would have been almost hopelessly delayed and confused.

The greatest difficulty came in the delivery of telegrams received from anxious relatives and friends. Hundreds of deliveries could not be made because of addressees being burned out. Lists of undelivered telegrams were posted in the State armory and relief committee rooms from time to time. Notices were mailed, but the post-office department had over three thousand address changes on hand. By Sunday afternoon almost all deliveries had been made.

Twenty-five of the Postal Telegraph-Cable Company's poles on the south side of the office burned before 6 p. m. June 25. The underground service was uninjured, leaving ample facilities via the inland route to Boston. At 7:45 p. m. the police ordered the Postal employes to leave the building, as it appeared to be doomed and the dynamiting of the railroad station nearby was considered. The fire was gotten under control without blowing up the railroad station and the Postal building was saved.

Superintendent C. A. Richardson, with Chief Operator H. L. Vincent and two Boston operators, reached Salem on the first Boston train through the fire at 6 a. m. on Friday, starting business immediately.

A temporary cable was hung on posts and burned pole stumps, giving full facilities before noon. The large volume of business was kept moving without delay.

Manager George T. Skelley handled deliveries most successfully. Operator Miss LeBel reported promptly in the morning even though she lost everything through the burning of her home the night before, and one messenger, who also lost everything, reported as usual.

The press file was very heavy and handled promptly both day and night.

The International Electrical Congress at San Francisco.

Thirteen volumes will be published by the International Electrical Congress, to be held in San Francisco, Cal., in 1915, during the Panama-Pacific Exposition, containing the papers to be presented and the discussions thereon. The subjects of the volumes will be as follows: 1. Generation, transmission and distribution; 2. Apparatus design; 3. Electrical traction and transportation; 4. Electric power for industrial and domestic use; 5. Lighting and illumination; 6. Protective devices, transients; 7. Electro-chemistry and electro-metallurgy; 8. Telegraphy and telephony; 9. Electrical instruments and electrical measurements; 10. Central station economics; 11. Electro-physics; 12. Miscellaneous; 13. General congress proceedings.

Book on Telephone Installation and Maintenance.

"Telephone Construction, Installation, Wiring, Operation and Maintenance," by W. H. Radcliffe and H. C. Cushing, jr., gives the principles of construction and operation of both the Bell and Independent instruments; approved methods of installing and wiring them; the means of protecting them from lightning and abnormal currents; their connection together for operation as series or bridging stations; and rules for their inspection and maintenance. Line wiring and the wiring and operation of special telephone systems are also treated.

Intricate mathematics are avoided, and all apparatus, circuits and systems are thoroughly described. The appendix contains definitions of units and terms used in the text. Selected wiring tables, which are very helpful, are also included.

The book, which contains 180 pages and 125 illustrations, is intended for electricians, wiremen, engineers, contractors, architects and others interested in the installation of telephone exchanges in accordance with standard practice.

The price is $1.00 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Ralph D. Blumenfeld, Former American Operator, Now a Prominent London Journalist.

Mr. Ralph D. Blumenfeld, a former and well-known press operator in this country, and a brilliant newspaper man, who has resided in England for over twenty years, is now publisher and editor-in-chief of the London *Daily Express*. Mr. Blumenfeld is the subject of the following interesting sketch, in part, by Edward T. Heyn in *Leslie's Weekly*.

Mr. Blumenfeld, who is one of the most brilliant and successful journalists in England, is an American, having been born in Watertown, Wis., on April 7, 1864. His rise from a printer's apprentice to head of two of the leading English newspapers constitutes a remarkable career.

Mr. Blumenfeld's father, David Blumenfeld, was one of the German revolutionists of 1848, who, with

RALPH D. BLUMENFELD, LONDON, ENGLAND.

Carl Schurz, came to America. David Blumenfeld founded at Watertown *Der Weltbuerger*, the first German newspaper in the West. He was associated with Carl Schurz until 1854, when the latter left Watertown to become United States minister to Spain.

Ralph Blumenfeld learned the art of typesetting in his father's office. Then he learned to telegraph, and became so proficient that by the end of 1880 he was providing the Milwaukee daily papers with the night report of the Associated Press. From Milwaukee he went to Chicago, where he handled more press reports, and was one of the first operators employed by the Postal Telegraph Company, and later entered the employ of the Chicago *Herald*.

During 1884, while in Chicago, he acted as agent for TELEGRAPH AGE. In September, 1885, Mr. Blumenfeld went to New York to work for the United Press, then conducted by Walter P. Phillips, and he did considerable work for TELEGRAPH AGE while in this city. Mr. Phillips sent Mr. Blumenfeld to London in 1887 to Queen Victoria's first jubilee, after which he returned to New York, going first to the *New York Journal*, and then to the *Evening Telegram*, of which he became editor. In 1890 James Gordon Bennett sent Mr. Blumenfeld to London as resident correspondent of the *New York Herald*.

In 1893 Mr. Blumenfeld returned to New York as superintendent of the *New York Herald* office. He went back to London in 1894, where he was given a responsible position on the *Daily Mail*, and, in 1902, he joined the *Daily Express* as editor.

Mr. Blumenfeld's task in this direction was not easy, as he had to contend with a powerful board of directors who were opposed to any sweeping change of policy. But Mr. Blumenfeld persisted, believing that the British public would come round to his point of view in time. But, also, in business lines he has followed an energetic course of independence.

In this paper he would not print an advertisement or notice that in the least conflicted with his views of a fearless policy. As a result the *Daily Express* has become a power in English journalism, having developed to a circulation of 500,000 copies daily.

Also in a political direction Mr. Blumenfeld is an important factor in English life. He is an enthusiastic advocate of tariff reform, which, in England, unlike America, means an increase of the tariff. Such an increase, Mr. Blumenfeld believes, should be about fifteen per cent. He claims that British agriculture needs such protection. He is an advocate of cheaper freight rates on the English railroads. At present, he says, one can send wheat cheaper from Minneapolis to London than from Lancaster to the British capital. Mr. Blumenfeld owns a farm near Dunmow, forty-five miles from London, and is the friend and advisor of the people of the neighborhood.

Mr. Blumenfeld is one of the foremost and bitterest opponents of the English socialist party, accusing it of anarchistic tendencies. He has been an exponent of pure food, of the agitation for national defence and of the Boy Scouts movement. He is frequently consulted by the leaders of political thought, and has been chosen a member of the exclusive Carlton Club. Another reason for Mr. Blumenfeld's great success is the fact that he is one of the most approachable men in London. He is a tremendous worker, and has never lost his American bent for hustling.

Mr. Blumenfeld writes to us that he is an ardent reader of TELEGRAPH AND TELEPHONE AGE, to which he first contributed from Chicago as long ago as 1883. He keeps in touch with the old friends of long ago through the medium of this paper.

Our enemies deserve our greatest attention always, sometimes our extreme respect; from them comes amendment and correction.

New Main Office of the Western Union Telegraph Company, at Buffalo, N. Y.

Last December the Western Union Telegraph Company moved into its new quarters in the Seneca Building, Buffalo, N. Y.

The company occupies all of the second floor, with its operating department, test-boards, bookkeeping department, rest and locker rooms. The ceilings are high and all parts of the room are ventilated by the most approved methods of forced ventilation.

The main receiving and delivery departments still remain in the Ellicott Square Building quarters on Main street, but the commercial manager and cashier have commodious accommodations on the ground floor of the new Seneca Building. A receiving department and delivery department are also maintained in the Seneca Building in order to take care of the business in the immediate vicinity. Pneumatic tubes connect the operating department with the local receiving office on the ground floor and also with the main commercial office in the Ellicott Square Building.

In the test room, there are provided nine main and one loop switchboards of the latest Western Union pattern. They are made up entirely of metal, slate and porcelain and every precaution has been taken to minimize the amount of inflammable material in their makeup, the test shelves being made of steel with linoleum tops. As in other boards of this type recently installed, regular "set-ups" are permanently arranged so that under normal conditions the boards present an unusual appearance because of the very small number of cords in evidence.

All switchboards, underground cables, repeater and operating tables connect with a cross-connecting frame placed immediately in the rear of the main line switchboards. By means of this frame it is possible to make routing changes in any of the circuit arrangements of the installation at will. The cross-connecting frame has a capacity of 7,047 connections and is arranged so that it may grow ultimately to a capacity of 8,337 connections. There are ten repeater tables arranged in front of the main line and loop boards which accommodate eight half duplex sets, twenty-five duplex sets, fourteen quadruplex sets, forty-five duplex repeaters and six half repeater sets, four single line repeaters, eight Wheatstone repeaters, two double loop repeaters and eighteen single Atkinson repeaters. There are also 178 Morse positions arranged on ten sixteen-position and one eighteen-position table and nine Barclay printers.

In the center of the operating room is the routing department. All telegrams are brought from the operating positions into the routing department by means of belt conveyor apparatus. The belts pass over the center and slightly above the operating tables in front of all operating positions so that the operators deposit the telegrams upon the belts destined for the routing center immediately when received from the wire. The messages are distributed by means of Lamson carrier systems which radiate from the routing center to various sections of the room.

All wires and cables are carried to the repeater and operating tables under the floors in a metal conduit system which is designed to carry both the telegraph circuits and the power circuits. This joint conduit system makes it unnecessary to install a large number of small conduits for carrying the usual power wires in the operating rooms. Underground cables enter a commodious fireproof vault in the basement of the building where the cables are neatly racked. They reach the distribution frame by means of terra cotta conduits arranged vertically in the walls of the building.

The telephone department consists of a twelve-position recording board for the transmission and reception of telegrams over the New York Telephone Company's service, and a six-position recording board for the transmission and reception of telegrams over the Federal Telephone Company's service.

The operating and repeater tables are built with angle iron under-structure and wood tops. The cables connect to these tables through porcelain terminal blocks located in steel cabinets arranged at one end of the tables.

The power plant consists of eighteen motor generators of the latest Western Electric pattern. These are mounted on Western Union approved benches. The switch panels are placed immediately above the motor generators. All connections are made by means of copper straps.

The power for operating the motor-generators is the 220-volt, three-wire direct-current service of the Buffalo General Electric Company. In case of emergency a thirty horse-power gas engine, belted to a twenty-one kilowatt Western Electric generator is ready for service. This emergency unit is located in the basement.

In addition to the regular telegraph service, there is equipment for the operation of time circuits, messenger call circuits, baseball ticker circuits and stock ticker circuits.

The general lighting is of the semi-indirect type. Those who are compelled to work by artificial light speak very highly of its efficiency.

INTERNATIONAL ALPHABET IN MEXICO.—The Radio Telegraph Convention, Berne, Switzerland, has issued official notification that the Mexican administration will, on July 1, adopt the International telegraphic alphabet on the lines of the Federation. An article was published in our April 16 issue to the effect that the Mexican Government had decided to adopt the International alphabet on its lines on July 1 and had given the operators four months' time in which to familiarize themselves with it.

MR. WILLIAM MAVER, JR., of New York, the well-known electrical engineer and author, writes: "Enclosed find my check covering a renewal to your paper, the perusal of which I always find very interesting and profitable."

Organization of Gangs, Including Plans for Boarding the Men.*

BY M. B. WYRICK, DIVISION PLANT SUPERINTENDENT, WESTERN UNION TELEGRAPH COMPANY, DALLAS, TEX.

The organization of a gang should be governed by the kind of work to be performed.

A gang engaged on heavy construction or reconstruction work, or, in general, any gang consisting of twenty or more men, should be composed of a foreman, assistant foreman, general workman and as many men as can be used advantageously. Smaller gangs will not require a general workman, and gangs of six or eight men should rarely require an assistant foreman.

The foreman should have, among his other duties, full authority over his men, power to discharge them and to hire men at the minimum salary rate; however, he should not have authority to increase salaries of his men, pay the maximum rate to the new men, or hire an assistant foreman without first submitting a recommendation to his superior and obtaining specific authorization. These restrictions are necessary to insure keeping the gangs on a uniform salary basis consistent with the work in hand and work to which the gang will next be assigned.

He should be skilled in all work performed by his men and competent to instruct them to perform the various operations in the most efficient ways. He should personally supervise as much of the work as possible. He should not hesitate to "pitch in" himself and set an example for his men. He should see that all material handled conforms to the requirements of specifications and is properly accounted for. He should see that suitable tools are provided and kept in first-class condition. He should be paymaster and arrange to pay his men with cash.

The assistant foreman should be a skilled workman, thoroughly familiar with the specifications covering the work in hand, and competent to handle men, so that in any unavoidable absence of the foreman he may take charge of the gang and carry on the work properly; under such circumstances he should be responsible to the foreman for the work performed.

The general workman should assist the foreman in handling material, making reports, engaging board—when the gang is stopping at boarding-houses—carry dinner to the men, etc. These duties will not occupy all of his time and he should help on the work in any way he can.

Because of the frequency with which camps must be moved the use of temporary portable houses is not practicable, and canvas tents must be used when the conditions require the use of some form of portable boarding outfits. The cost of boarding in camp runs from 10 per cent to 20 per cent higher than in camp cars.

Boarding-houses prove satisfactory in many places, especially when towns are close together, and rates of $1.00 to $1.25 per day per man can be obtained; but when rates exceed $1.25 per day or boarding-houses are at such distances apart that much time is consumed going to and from work they are not generally satisfactory.

Camp cars are generally more satisfactory both to the men and the company for construction and reconstruction work. Good meals and cheerful sleeping and living quarters can be provided at lower cost than by any other method. The cars can be located comparatively close to the work, which is very desirable, as then minimum time is used to get from the place of boarding to the work, or return. The cost for board and lodging varies from 80 cents to $1.25 per day, depending on the location and season. This cost includes interest on the investment, also depreciation and cost of repairs.

Mr. Wyrick then described the character of equipment for camps and camp-car outfit camps.

Board may be furnished in camps or camp cars by the company. This is the most satisfactory method, because, in general, the company can board the men as economically as others, and should save the profits of the others.

There is no advantage in having the board furnished by the foreman or general foreman, but there are many objections to the method.

Pools are unsatisfactory. The men come and go, and when leaving, often fail to pay their proportions of the expense. Most of the men coming to a gang are without funds to pay for their meals in advance under this plan. Another objection to this method is that if provisions are not paid for the party selling them usually expects to collect from the company employing the men.

The wages of gang foremen should vary from $65 to $100 per month; expenses for transportation, if any, and board and lodging should be paid by the company. The rate for the average foreman should be $75.

Assistant foremen generally should be paid $50 to $55 per month, and linemen $35 to $45, depending upon their ability to perform work.

The paper concluded with a statement of the size of gangs required for different kinds of work, and the making of reports by telegraph and mail by the foreman.

* Abstract of paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, New Orleans, La., May 19-22.

A LIBEL ON THE MESSENGER.—*Hearst's Magazine* for May publishes a so-called "story" about the temptations in the life of a telegraph messenger boy, which ought to receive the condemnation of telegraph managers and employes and all self-respecting citizens. It is fictitious, of course, but it is a libel on the character of the faithful messenger. The story is of a messenger being tempted by evil-minded persons and finally becomes a slave to a deadly drug habit. The boy's mother takes the matter so to heart that she blames the telegraph superintendent for her son's downfall and shoots and kills him. The boy finally dies.

He who assumes to be what he is not, will inevitably become nothing at all.

Government Ownership of Public Utilities.

BY CHARLES P. BRUCH, VICE-PRESIDENT, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

(*Concluded from page 382, July 1.*)

It is said that the telegraph and telephone service are interdependent, that the real and active principle (electricity) is the same for both, and that at the present time the same telephone wire may be, and actually is, simultaneously engaged in conveying both forms of communication; that every telephone wire is in fact, or potentially, a telegraph wire; and from this the conclusion is drawn that telephone wires will permit the discharge of the double function without interference one with the other: that is, that both telegraph business and telephone business can be conducted with equal efficiency over the same wires at the same time.

It is true that wires in use for telephoning can, under certain conditions, at the same time be used for the transmission of telegrams; but it is not true that the telephone service and the telegraph service, *as a whole,* can be performed with equal efficiency on the same wires at the same time. On a few wires, between great centers, this so-called "composite service," namely, telegraph service and telephone service at the same time over the same two wires, may be carried on without much trouble; but to do this over a system of wires reaching all parts of the United States is impossible from a practical point of view. One service or the other must take precedence. The telegraph must be subordinate to the telephone, or vice versa. One or the other will suffer. Both kinds of service can be performed on the same wires at the same time, with equal efficiency, only to a comparatively limited extent.

It is seriously proposed and vigorously urged that the government buy only the American Bell Telephone plant and use it for the conduct of both telegraph and telephone business for the public in competition with the Postal and Western Union Telegraph Companies and the independent telephone companies.

In the name of common honesty! "Where are we at?"

Our government is a government "of the people, by the people and for the people." It is a government by the whole body of citizens for the whole body of citizens. It may possibly be constitutional or lawful for all the people to compete in business with some of the people; and such competition would be horribly unfair, unless all of the people (that is, the government) charged a fair rate for service, no lower than the rates charged by some of the people (that is, the telephone and telegraph companies). If the government arbitrarily reduces the rates without regard to the cost of the service, and takes the deficit out of the pockets of the taxpayers, the telephone and telegraph companies, who are not lucky enough to sell out to the government, will be ruined beyond redemption and their properties will go into the junk heap.

The telegraph and telephone corporations are nothing more than an aggregation of the thousands of their stockholders, who are citizens possessing the same rights under the government as all other citizens. If the government acquires the telephone lines and operates them in the manner that has been proposed, the result will be a "conspiracy," a "combination in restraint of trade," a "trust" and a monstrous injustice.

The argument recently made before Congress contains instance after instance of fallacious reasoning and specious statement and unfair comparisons. For example: The rates charged by foreign telegraph administrations are compared with the rates charged in the United States. It is figured out that because in the United States twenty-five cents is charged for a message containing ten words in the text, the rate per word is two and one-half cents, and this rate of two and one-half cents is compared with the rates charged in foreign countries (ranging from one-half cent to nearly two cents), ignoring the fact that in foreign countries all the words of the address and the signature are counted, while in the United States nothing is counted but the words of the body of the message, the address and signature not being counted or charged for.

From this false comparison the conclusion is drawn that the telegraph rates in the United States are much too high.

Accurate telegraph statistics show that the average number of words in a ten-word telegram, counting in the address and the signature, is about twenty-five; hence the charge in the United States on a ten-word telegram is really about one cent per word. There is in the argument no comparison of the respective conditions under which the business is actually handled, the speed and accuracy with which it is handled, the facilities provided the public, the cost of the service, or any of the other factors which must be considered in order to fairly compare the service abroad with the service in America.

This whole argument is a structure of cards. It looks a good deal like a real house, but it isn't. If one goes too close, it tumbles down. Its conclusions can be refuted one by one as easily as single cards can be torn to pieces.

Another statement that has often been made in support of government ownership is that foreign telegraph service is better than the telegraph service in America. That is not true. The service abroad is far inferior to corresponding service in the United States. As a rule, the head of the government telegraphs in European countries is appointed by reason of his political service or importance; he is rarely experienced in telegraph matters, so that his decisions must be based upon the judgment of underofficials. The real manager of the telegraphs is usually a man whose appointment is also, to some extent, a political one, although he may be a telegraph man. The working organization is cautious, dilatory, and is enervated by the absence of reward for individual initiative, industry and enterprise. The economic administration of the government telegraphs abroad is almost completely without control as to payment commensurate to work done, the employes generally being paid according to the length of time they have been in the service and not according to their working efficiency.

Most of the government-owned telegraphs in foreign countries, unlike commercial competitive telegraphs in this country, are conducted under conditions which would be inconceivable in a privately managed enterprise here. Progress in European telegraphs has been secured mainly by popular agitation and legislation, and reforms which would have been speedily carried out by privately owned concerns, under pressure of competition, have been very slowly realized in Europe.

The European government telegraph makes its patrons pay for every word in the address and signature, which the telegraph companies in this country do not charge for; makes its patrons send telegrams through the government telegraph office, while American telegraph companies furnish messenger service free; makes them pay for their telegrams in advance, while the American companies allow their patrons to have running accounts; and some governments even make patrons pay for telegram blanks used.

The foreign administrations pay little or no attention to the convenience or rights of the public. For example: They put no telegraph offices in hotels, and their courts refuse to recognize any legal liability whatsoever in regard to errors and delay in transmission of a telegram.

The only good reason why foreign railways and telegraphs are operated by the government is because government ownership and operation is part of the scheme for national defense. That reason does not exist in the case of the United States, especially in view of our government's legal right to take possession of the telegraphs and the railways in time of war.

The fact is that our American system of telegraphs and telephones is the admiration of Europe for a quality of service unattained there. If privately owned wire operation is abandoned in this country, there is every reason to apprehend that our service would fall to the comparative inefficiency of the service abroad.

Our postmaster-general has denominated the telegraph business as being monopolistic in its nature. In this he is mistaken. There never has been more continuous, keen and even bitter, competition than there has been between the commercial telegraph companies in the United States. Indeed, the conditions under which we live make competition between public utilities essential to the general welfare, which the Constitution charges Congress with the duty to conserve. Competition means efficiency—it means constant improvement of equipment and service of the competing companies—and the public benefits directly from these improvements, because each company desires to please and demonstrate its superiority or distinctive merits.

Mr. Justice Willard Bartlett, now Chief Justice of the New York Court of Appeals, says: "There is no stronger inducement to a public service corporation to serve the public well than a healthy apprehension that a rival concern will do so."

The question of what the government must pay in just compensation to the telephone companies for the lines proposed to be purchased is perhaps the main question. $900,000,000 would not be a "look-in." The Bell Telephone Companies alone would demand more than that, to say nothing of the thousands of independent telephone companies scattered all over the country.

Including both the telephone and the telegraph lines, the entire bill for the poles, wires and equipment would be about $2,000,000,000.

Nor is this the worst!

Judging from English experience, that vast sum would be entirely lost, because under government management the operating expenses year by year would exceed the income.

Evidence of this is found in the following quotation from an address made by the Hon. C. Hobhouse, postmaster-general of Great Britain, to the House of Commons, on April 30, 1914:

"I wish to say a word about the telegraph department, because it is the least satisfactory of the departments of the post-office. It has been carried on at a loss for a great number of years. In the last forty years the excess expenditures upon telegraphs has amounted to the very large sum of £22,000,000 ($110,000,000). The greater portion of that excess expenditure is due entirely to the action of the House of Commons. In 1885 or 1886 the House of Commons insisted upon having a sixpenny (12 cents) telegram. Of course, it was a very great convenience to the individual, but inasmuch as the ordinary sixpenny (12 cents) telegram costs on the average 11d. (22 cents) to transmit and deliver, it is quite clear that the House of Commons was inflicting a great loss on the postal service for the convenience of the individual sender of telegrams. I do not say that it is not a justifiable course, but the result has been that, whereas the telegraph service was at that time struggling into solvency, it has been involved ever since in hopeless bankruptcy. It is carried on at a loss of £350,000 ($1,750,000) a year; a deficiency which does not include the interest on the original purchase money, liability for pensions of the employes, or amortization of the original purchase money."

In commenting on the postmaster-general's statement, the London *Daily Mail* says:

"The £22,000,000, does not include the original purchase money, or the interest on it, or any provision for its amortization, or the payment of pensions to the telegraph employes. If these and similar items were included it would be found that State ownership of the telegraphs has resulted in a loss of nearer £40,000,000 ($200,000,000) than £20,000,000 ($100,000,000). And even that would not be telling the whole story."

One of the serious complications that would arise in connection with the purchase of existing lines by our government would be in regard to the contracts between the telegraph companies and the railroads. England found this out when it took over the telegraph lines and then had to pay the railroads an enormous sum to get control of telegraph lines which were built on the railroads and in which the railroads had an interest, the same as in this country.

Moreover, government ownership would wipe out local, state and federal taxes now collected from telephone and telegraph companies, aggregating from $15,000,000 to $20,000,000 a year.

It has also been urged that the profits which now go to private enterprise would under government ownership go to the people; but it is more than probable that the loss due to wasteful methods and inefficient management would greatly exceed the moderate profits of the service under private management, and the people would have to make up the difference.

In considering the making of the telegraph available to all citizens by reducing rates, extending lines and increasing the number of offices, it must not be forgotten that the number of individuals who have occasion to telegraph is very small in proportion to the number of people in the United States. The biggest part of telegraph traffic comes from a comparatively few business concerns. The great majority of individuals very seldom have any occasion to send a telegram; they are seldom or never patrons of the telegraph, nor would they become patrons even were the rates reduced by one-half, as is proposed under government ownership.

There is no more reason to do government business at a loss than to do private business at a loss.

Those who get the service should pay the cost, and not pay less than the cost, leaving those who do not get it and do not need it to make up the deficit.

The carrying out of these recent propositions would result in government monopoly. There would be no redress for errors, delays or non-deliveries, or otherwise faulty or inadequate service, and the great business public would be left to the tender mercy of the political party that happened to be in power.

An analysis of the statistics presented and statements made to Congress in favor of government ownership impresses one with the truth expressed in the old couplet:

"'Tis better not so much to know,
Than know so much that is not so."

Whatever has been said to the contrary, the truth is that at the present time the telegraph service in America is the most complete and most efficient and the fastest in the world. Its equipment is the most modern, its employes the most expert, its methods the most progressive.

If government ownership prevails, competition will stop, service will retrograde and progress will cease.

Government ownership of the telegraph would be bad for the public, bad for the employes, and bad for the administration itself. This conclusion is confirmed by recent editorial expressions of leading newspapers and by the views of the speaker of the House and the respective chairmen of the House and Senate Committees on Post-Offices and Post Roads.

The resolution recently urged for adoption by Congress provides that "a monopoly of the function of communication for hire by electricity" be vested in the United States, and to that end that the "telephone net-work"—except farmers' lines—be appropriated and the title transferred to the United States and thereafter operated by the post-office department.

To plain, honest business men with average common sense this proposed measure appears to be confiscatory, absolutely impracticable and altogether outrageous.

The Universal Telegraph Alphabet.

BY W. D. TERRELL, RADIO INSPECTOR IN CHARGE, NEW YORK.

Replying to your letter concerning the substitution of Continental for the American Morse code in the United States and Canada, so that these countries will be in harmony with the rest of the world in the matter of telegraph alphabets, and requesting me, as a delegate to the recent Wireless Conference, to express an opinion concerning such change, I have respectfully to inform you that I used the American Morse continuously for about twenty-two years. I have not had an opportunity to use the Continental Morse commercially. However, I believe that a universal alphabet is desirable. In my opinion, the American Morse has certain advantages over the Continental Morse, in being more rapid and more rhythmic, and certainly preferable in the matter of numerals and punctuation.

As far as I can see, the only advantage in changing to the Continental Morse code would be in securing a universal alphabet. If it was possible to arrange a universal alphabet which would be adopted by all countries, it is my belief that the American Morse numerals and punctuation should be retained, and just such changes as might be necessary in the other two alphabets, which would result in their being uniform.

For instance, a new combination should be provided for the letter "C," and the present combinations restored to the original American "J." The combination for "F" should be restored to the American "Q," and the combination for "R" should be restored to "F," and a new combination arranged for "R." The combination for "L" should be restored to "X," and a new combination, or the original dash, provided for "L." A new combination should be provided for "O." There is no objection to the five dots for the letter "P," restoring the present combination to the figure "1" (one). The combination used for "X" should be restored to "9," and the combination for "Y" might remain as it is. The combination for "Z" should be restored to "7," and a new combination formed.

Such a change would, of course, mean a concession on the part of both alphabets, but I do not believe it would meet with much opposition in this country, and I believe that this alphabet would be more desirable than the present Continental Morse code.

The majority of men lack initiative coupled with judgment. Men fail because they fear to make an attempt.

How Submarine Cables are Made, Laid, Operated and Repaired.

(*Continued from page 390, July 1*)

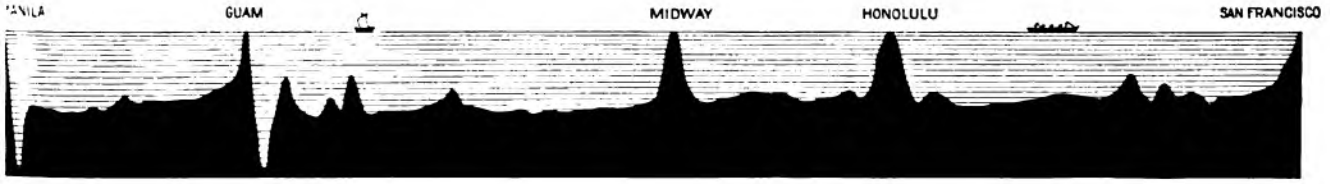
One of the most interesting spots on board of a cable ship during laying is the testing room. Here, in front of a table, glistening softly with the polished ebonite and bright brass terminals of various testing instruments, sits an electrician, watching a spot of light as it sways to and fro on a graduated scale. This spot is a reflection from the mirror of the galvanometer, and the swaying movement is caused by the induced currents set up in the coiled cable by the rolling of the ship. At the end of every fifth minute the spot gives a kick sideways on the scale, and the electrician duly notes its magnitude. This kick is caused by a signal from the shore, and proves that the continuity of the conductor is still preserved. As the cable leaves the ship and sinks into the almost freezing temperature of the ocean bed, the insulation improves and the spot of light gradually works down towards zero. When, on the other hand, the deflection grows larger and the spot shows an inclination to steal off the scale, something is wrong and a careful test must be taken. Should this prove that a fault exists, the ship is stopped, the cable cut, and if the fault is near picking up is commenced. If the fault is some distance away the cable is buoyed, and the ship steams to the locality of the faulty portion.

Supposing, however, all goes well, the whole section is payed out and buoyed, and the ship steams to the second landing place. Here the shore end is landed in the same manner as before, and the cable is payed out up to the buoy. When the end of the first section has been hauled on board the splicing operation commences. This consists of, first, a joint between the cores, and, second, a splice between the outer sheathing. A skilled jointer and his assistants clean and solder together the ends of the two conductors. Then, drawing down over this joint the gutta-percha covering from either side, he applies two or three more coats of the same material. As heretofore stated no air holes must be left between these different coverings, as the enormous pressure at the sea bottom might burst them and render the cable faulty. The splice in the sheathing wires is performed by the cable hands, and in a much less delicate piece of workmanship.

Under the most favorable conditions cable-laying is anxious work for those in charge of the operation. At any time during the paying out—which may last, with a long section, some ten or fourteen days—a storm may arise or some mishap may occur on board, which results in losing the cable in a depth of over 2,000 fathoms. In such a case the date of its recovery cannot be predicted. It may be in three or four days, it may be in as many weeks or months. Every precaution is therefore taken against such accidents. Buoys are slung in the rigging ready for slipping into the water, buoy ropes and grappling ropes are coiled where they can be paid out at a moment's notice, and means of signaling with a bell in the engine room are placed in convenient positions at the top of each cable tank.

Should the cable break outboard, and be lost in spite of these precautions, a mark buoy is immediately lowered to guide the ship in grappling operations. Dragging is then begun at right angles to the line in which the cable lies. Should the dynamometer, under which the grappling rope runs, show a steady rise in the strain, the cable is evidently hooked and heaving up commences. As soon as the grapnel reaches the bows with the bight of the cable on one of its prongs, the two sides are firmly secured by lines from the ship, and the bight is cut. After the two ends have been tested from the testing room the short length is abandoned or buoyed, and the other is spliced to the cable in the tanks, when paying-out is once more resumed.

The rate at which submarine cables are laid varies according to the depth of water. In shallow water they are laid at a rate of approximately eight miles an hour, but in the deeper water the rate is necessarily slower, sometimes not exceeding five miles an hour. Sufficient amount of slack must be laid out so that every part of the cable will find a resting place. If the cable were laid too taut it would be impossible to lift it without severely straining and damaging it.



CONTOUR OF PART OF THE PACIFIC OCEAN BOTTOM.

The accompanying illustration shows the contour of the bottom of a portion of the Pacific Ocean. During the very exhaustive soundings taken in the Pacific Ocean when the route for a trans-Pacific cable was surveyed, a depth of over 5,000 fathoms (over 5 miles) was discovered off the Island of Guam, Ladrone Islands. The pressure at this great depth would be about five tons per square inch, and it would have been practically impossible to maintain and repair a cable laid in such a depth. It was therefore necessary to make a wide detour of this "deep" and approach the island from another direction. This was done after further surveys were made and a path found with submarine slopes of gradual contour. The Commercial Pacific Cable Company's cable is lying in depths of over 3,000 fathoms (three miles).

Before the carrying capacity of present-day cable ships was attained the operation of laying a long cable had to be done either by two vessels, each one

starting from opposite ends, and meeting in the center, or it required two trips of one vessel. A cable-laying ship like the "Colonia," heretofore described, has sufficient carrying capacity to lay a cable approximately 4,000 miles in length.

During the laying of a cable careful nautical records are kept by the navigating officers of the vessel and the engineer in charge of the cable expedition, showing as near as possible the position in which the cable is being laid. When the entire cable has been finished a copy of these records and charts showing the route of the cable are furnished to the company owning the cable, for future reference in locating the position of breaks in the cable.

After the laying of the cable is completed the electrical engineers at both ends of the line also take final tests, ascertaining the electrical measurements of the cable for future use, and the records of these tests and all data relating to the cable are handed over to the company owning the cable.

(To be Continued.)

A Good Safety Habit—"Courtesy."

BY W. T. SALISBURY, MANAGER POSTAL TELEGRAPH-CABLE COMPANY OF TEXAS, ARDMORE, OKLA.

Much has been written or suggested among public-service corporations, railway, telegraph and telephone companies on safety habits for the protection of the public, the safety of employes and protection of equipment. With skilfully trained employes the percentage of cases of carelessness resulting in accidents is very small. After all, it appears that man's intellect should act as the real "safety habit," the preventive, "Courtesy." It is a protection for his personal welfare and a very great "safety habit" for his company. Courtesy will undoubtedly avert more accidental losses, reduce the number of complaints, and possibly lessen damage litigation resulting from negligence upon the part of employes in the performance of their duties.

In dealing with the public, the representative of the company is expected, by its patrons, to measure up and cater to the purchaser of its service, and be courteously accommodating. Your goods are inferior if there is a lack of courtesy. Plant or equipment, while representing an investment, cannot be claimed as the whole of the assets. The service is your real selling stock, and if service is to be sold it will not find willing purchasers without courtesy. It is the most economical element an employe can put into the company's service. It costs no man a penny; the individual can exercise courtesy without much effort, thus greatly enhancing his own earning power, and creating a greater demand for his company's service.

Of the suggestions brought to our attention we note the telephone company suggests the "smile habit," which is a meritorious one, and yet will the "smile" penetrate the office walls and traverse the telephone circuit?

A superintendent recently remarked, "I am all smiles while dictating to my stenographer." I wonder if the recipient of the letter a hundred or so miles distant could read the "smile"? The "courtesy habit" can easily become a part of human action; it can be read between the lines in business correspondence; observed in telephonic conversation and transmitted by personal association. No official can advance too high, or become too busy, that he should fail on courtesy. I recently visited the office of a prominent general manager who happened to be absent from headquarters. After introducing myself to his chief clerk, who appeared quite busy, I became so impressed with his courteous reception that I ventured an excuse for an intrusion upon his time. I did not assume that I could be an exception. During my visit this chief displayed like courtesy toward other employes calling, and he convinced me he had the "habit." Among minor employes a vital part of co-operation should be the exercise of courtesy toward each other. Let us encourage also the safety habit of "courtesy."

Courtesy Gets the Business.

She came into the telegraph office and rapped on the counter. The clerk remembered that she had been there about ten minutes before as he came forward to meet her. He wondered what she wanted this time.

"Oh," she said, "let me have that telegram I wrote just now. I forgot something very important. I wanted to underscore 'perfectly lovely' in acknowledging the receipt of that bracelet. Will it cost anything extra?"

"No, ma'am," said the accommodating clerk, as he handed her the message.

The young woman drew two heavy lines beneath the words, and said: "It's awfully good of you to let me do that. It will please Arthur ever so much."

"Don't mention it," said the clerk. "If you would like it I will put a few drops of violet extract on the telegram at the same rates."

"Oh, thank you, sir! You don't know how much I would appreciate it. I'm going to send all my telegrams through this office. You are so obliging."

And the smile she gave him would have done anyone good, with the possible exception of Arthur.—*The Pathfinder.*

Lead-Covered Cable.

The development of lead-covered cable was the direct result of conditions existing in the City of New York in the early 90's. The telephone lines formed a labyrinth of overhead wires. It was foreseen that soon the system could not be extended much more, and that further business expansion would be impossible. Accordingly, the question of putting all wires underground was broached, and, after a great deal of experimenting with different kinds of coverings, such as concrete, iron pipe, creosoted wood and lead pipe, the present standard lead-covered cable was developed. Lead-covered cable, in its simplest and most usual form, takes for its manufacture four different raw materials: Copper for the wire; paper for the insulation, and pure lead, or an alloy of lead and antimony, for the sheath.

THE RAILROAD.

MR. F. E. WHITCOMB, superintendent of signals and telegraphs, Boston and Albany Railroad, Boston, Mass., was a recent New York visitor.

G. E. BUCKLEY, aged thirty years, former manager of the telegraph department of the El Paso and Southwestern Railway, at El Paso, Tex., died on July 2.

MISS LURA H. GRIFFITH, daughter of Mr. E. P. Griffith, superintendent of telegraph of the Erie Railroad, Jersey City, N. J., was married on June 29 to Mr. Edward C. Raper, of Passaic, N. J.

MR. J. F. CASKEY, superintendent of telegraph, Lehigh Valley Railroad, South Bethlehem, Pa., has been appointed chairman of the topics committee of the Association of Railway Telegraph Superintendents by president W. C. Walstrum.

MESSRS. A. B. TAYLOR, of New York, and S. L. Van Akin, of Syracuse, superintendent of telegraph and assistant superintendent of telegraph, respectively, of the New York Central and Hudson River Railroad, visited the St. Lawrence Division headquarters at Watertown, N. Y., on July 3, to inspect the new private-branch telephone exchange at that point.

TRAIN DISPATCHERS' ASSOCIATION.—The twenty-seventh annual convention of the Train Dispatchers' Association of America was held at the Hotel Seminole, Jacksonville, Fla., on June 16. Mr. C. A. O'Connor, Springfield, Mass., was elected president, and J. F. Mackie, secretary-treasurer. The next convention will be held in Minneapolis, Minn., June 15, 1915.

How Mr. Selden Secured Telephone Subscribers.

Mr. Charles Selden, superintendent of telegraph, Baltimore and Ohio Railroad, Baltimore, Md., is an old-time telephone man, and built an exchange at Toledo, Ohio, in 1879. He is a member of the Telephone Pioneers of America, and is well acquainted with prominent Bell people throughout the country.

He tells many interesting tales of the early days of telephony, particularly with regard to securing subscribers. The one about his "oilcloth directory," says *The Transmitter*, is rather amusing. His exchange had about 350 subscribers, and Mr. Selden wanted to make this number look impressive.

He secured a strip of white oilcloth about a foot wide and fifteen or twenty feet long. He had a sign painter paint the names of the subscribers on it, each under the other, in letters half an inch high, with plenty of space between. This strip of oilcloth was attached on both ends to round sticks, so that it could be rolled up like a manuscript of old. Mr. Selden would take this roll under his arm and go out looking for business. When asked how many subscribers he had he would impressively unroll his oilcloth and display the list. This method won many new subscribers.

The distinction of being the first superintendent of railway telegraph to advocate the dispatching of trains by telephone belongs to Mr. Selden. Twenty years ago he read a paper on the subject before the Association of Railway Telegraph Superintendents at Detroit.

A set of rules for train dispatching by telephone which Mr. Selden drew up shortly after the meeting in Detroit still forms the basis for train-dispatching regulations on various systems. The following quotation is from his paper:

"I believe that with the present state of the telephonic art, while it does not or will not supplant the telegraph, it should become a most valuable adjunct and time and expense saver of that arm of the railway service. I think I am safe in saying this without the fear of meeting much, if any, opposition—that if our systems were fitted telephonically it would not be sixty days before the use of the telegraph lines would be reduced fifty per cent."

OBITUARY.

HERMAN PORTER KIMBALL, aged forty-eight years, who, for nearly twelve years was associated with the New York office of the Standard Underground Cable Company of Pittsburgh, Pa., died June 24, in New Rochelle, N. Y.

The Printing Telegraph.

BY H. H. HARRISON, ELECTRICAL ENGINEER, LONDON, ENGLAND.

I am very much interested in the article in the number of TELEGRAPH AND TELEPHONE AGE for June 16, entitled "The Printing Telegraph."

Mr. Wray, the author, ascribes the five-unit alphabet to Baudot. I am sure all American readers will be pleased to hear that the alphabet was invented by Morse.

In the book by A. Vail, "The American Electro Magnetic Telegraph," published at Philadelphia by Lea and Blanchard in 1845, the five-unit alphabet is described on page 31 as an alphabet for five pens operating together or in succession. The five-unit alphabet also appears in British Patent 2885 of 1853, granted to E. O. W. Whitehouse, and also in British Patent 1271 of 1860, of W. H. Burnett. The latter specification is extremely interesting, as it contains all the features which go to making the Baudot apparatus as we know it to-day.

Old Timers' Reunion.

The thirty-third annual reunion of the Old Time Telegraphers and Historical Association and the Society of the United States Military Telegraph Corps will be held at the Hotel Baltimore, Kansas City, Mo., September 15, 16 and 17. Mr. George M. Myers, of Kansas City, is the president of the Old Time Telegraphers and Historical Association and Col. William Bender Wilson, of Holmesburg, Philadelphia, of the Military Telegraph Corps.

An excellent programme of entertainment has been arranged and a good time is promised for all who attend.

The chairman of the hotel committee is Mr. R. L. Logan, superintendent of telegraph, Kansas City Southern Railway, Kansas City, Mo., to whom all hotel reservations should be addressed.

Mr. Frank J. Scherrer, 30 Church street, New York, is secretary of the Old Timers and David Homer Bates, 658 Broadway, New York, of the Military Telegraph Corps.

MUNICIPAL ELECTRICIANS.

ASSOCIATION OF MUNICIPAL ELECTRICIANS.—The nineteenth annual convention of the International Association of Municipal Electricians will be held at Atlantic City, N. J., September 15 to 18, with headquarters at the Hotel Isleworth. In connection with the convention an exhibit of fire-alarm and police-signal apparatus will be made. Mr. John W. Kelly, jr., Camden, N. J., is president of the association, and Dr. C. P. Steinmetz, Schenectady, N. Y., is first vice-president. The secretary is Mr. Clarence R. George, Houston, Tex.

Municipal Fire-Alarm Systems.

Fire-alarm telegraph signaling systems consist of four elements: namely, fire-alarm boxes, or street signaling stations; alarm apparatus; central-station equipment; circuits.

Fire-alarm boxes may be divided into three general types; namely: "Successive," "Non-Interfering," and "Interfering," or so-called "Plain" boxes.

The "Successive" type of fire-alarm signaling box represents the highest development in the art, and the special result achieved by the use of these boxes is the transmission of definite, independent signals from a number of boxes when operated at or about the same time without the loss of a signal for many of the boxes.

The positive non-interfering and successive box is rapidly replacing all other types for municipal service, both in this country and abroad, and is also widely used by the governments of the United States and Great Britain to protect army posts, naval stations and important buildings. Many private corporations, such as railroads and large industrial organizations, have adopted this type of box for use in their terminals, plants and warehouses.

The "Non-Interfering" type of fire-alarm box is constructed in such a manner that no interference or confusion of signals will result through the operation of two or more boxes at or about the same time, one of the boxes so operated being automatically selected to transmit a complete and definite signal.

The "Plain," or interfering boxes, do not contain either the successive or non-interfering features.

The central station is the heart of the fire-alarm system, and at this point is located the apparatus for receiving, recording and transmitting signals and alarms of fire. The battery for supplying the electromotive force necessary to operate the system is also located in the central station.

Fire-alarm signaling systems range in size from a single-circuit system adequate for a small town to systems of many circuits, requiring a force of operators constantly on duty in the central station, and may be classified under two general heads; namely, automatic and manual.

The use of the word "automatic" may only be applied to systems which require no manual intervention whatever in transmitting alarms from the street signal boxes to the fire-fighting force.

When a system becomes large enough to warrant the constant attendance at the central station of one or more operators it ceases to be entirely automatic in its functions, and requires facilities for the manual transmission of signals from the central station to the fire-department houses.

The so-called "manual" systems may also have facilities for automatic and semi-automatic operation.

Purely manual operation consists in receiving all signals at the central station and transmitting them to the fire-department houses by a manually operative instrument.

When systems are operated semi-automatically, the first round of a signal is received at the central station, at the conclusion of which, the operator, by a simple operation, causes the remaining rounds of the signal to be transmitted directly to the fire-department houses.

The automatic operation consists in transmitting signals from street boxes through the central station directly to the fire-department houses without manual intervention. All signals are recorded and sounded in the central station, regardless of the method employed in transmission.

The performance of the functions as pertaining to fire-alarm central stations requires various types of switchboards and instruments capable of performing, in addition to those enumerated, a wide range of minor functions, all of which have their proper place in the general scheme, and go to make up a complete and efficient system.

The electromotive force for operating fire-alarm signaling systems is furnished from the central station, and may be supplied by either storage or gravity battery.

Utility of Wires on the Pennsylvania Railroad.

(*Continued from page 389, July 1.*)

The simplex circuit is an arrangement for telegraphing over a metallic telephone circuit without interfering with the working of the telephone. It is represented in Fig. 25.

A and B are two telephone stations connected by a metallic circuit. Into this circuit are inserted two repeating coils, C and D. Wires lead from the middle of one side of each coil, as shown in the

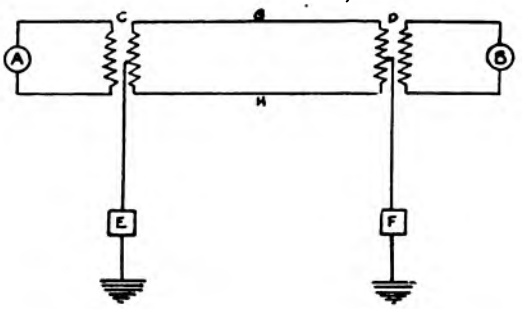


FIG. 25—THE SIMPLEX CIRCUIT.

figure, through two telegraph offices E and F to earth. The wires G and H carry the telephone current in opposite directions, but carry the telegraph current in the same direction in both wires, forming, as far as the telegraph current is concerned, a divided circuit of two branches, completed by a ground return. The telegraph current flows in opposite directions in the two halves of the coils, and thus each portion neutralizes the inductive effect of the other, and no clicks are heard in the telephone.

For the proper working of the simplex the telephone circuit must be perfectly balanced. The divided circuit of which the telegraph line consists makes this line much lower in resistance than is

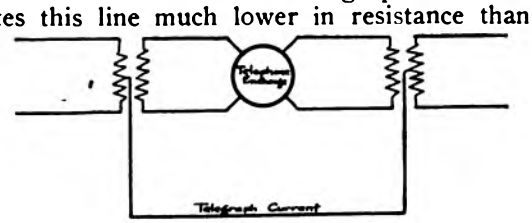


FIG. 26—INTERMEDIATE TELEPHONE STATIONS ON SIMPLEX CIRCUIT.

usual for a single grounded line, and consequently earth currents will enter it more easily. To overcome this trouble, enough resistance should be inserted to cut down the earth currents to a harmless value. Of course this resistance should not be inserted in the divided portion of the line. If much resistance has to be introduced, it may also be necessary to increase the voltage of the line.

Much of the success of the simplex depends on the proper choice of repeating coils to fit the conditions of the line.

Intermediate telephone stations may be inserted along the line by bridging in the usual way.

If it is desired to run the line through an intermediate telephone exchange the arrangement of Fig. 26 is used.

Repeating coils are inserted in the metallic circuit on each side of the exchange and the telegraph current taken off by a single wire from the middle of each coil and carried around the exchange.

The inserting of intermediate telegraph offices on the simplex requires a specially wound coil. It consists of two retardation coils of the usual pattern wound in opposite directions on the same core (Fig. 27).

The telephone current entering by A and leaving by B will encounter an inductive resistance, and to this current the coil will act like an ordinary induction coil, of which the secondary terminals are C

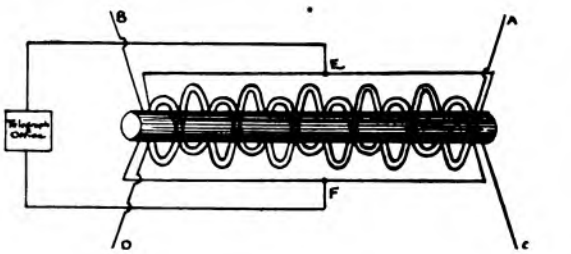


FIG. 27—SPECIALLY WOUND RETARDATION COIL FOR USE AT INTERMEDIATE TELEGRAPH OFFICES ON SIMPLEX CIRCUIT.

and D. The telephone message will therefore pass through the coil and on.

The telegraph current entering both at A and B encounters a non-inductive resistance, producing, therefore, no effect in the secondary coil, but passes out by the wire at E through the telegraph office and re-enters the secondary coil at F. Here it again encounters a non-inductive resistance and divides equally, and flows out by C and D.

None of the telephone current will escape at E or enter at F, because, as far as the telephone current is concerned, these are points of equal potential.

The phantom is an arrangement by which two metallic telephone circuits can be made to do the work of three. The two metallic circuits are called the physical circuits, and the third circuit, resulting

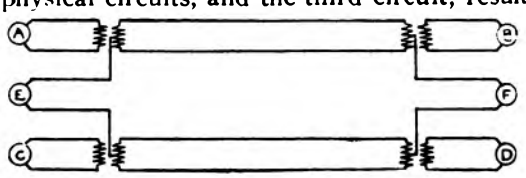


FIG. 28—THEORETICAL DIAGRAM OF THE PHANTOM CIRCUIT.

from their combination, is called the phantom circuit. Fig. 28 illustrates the connections.

A and B are two telephone stations connected by a metallic circuit. C and D are another pair similarly connected. Two repeating coils are inserted in each circuit and wires led off from the middle point of these coils to the telephone stations E and F. It will be seen by the figure that the circuit containing the stations E and F is metallic, and consists mainly of two divided circuits, each of two branches. On account of this, its resistance is much less than that of either physical circuit.

(*To be Continued.*)

MR. J. M. FERNANDEZ LAMOTHE, Rosario, Argentina, writes: "I enclose herewith remittance for $3.00 for continuing my subscription to TELEGRAPH AND TELEPHONE AGE. I hope to be a subscriber for many years to come."

Milwaukee Western Union Messengers' Picnic.

The fourteenth annual messenger bicycle race and picnic of the Milwaukee Western Union messengers was held on the Janesville Plank road and Jackson Park, Sunday, June 28, over 125 messengers participating.

After the five-mile bicycle race, which took place at 10 a. m., there were baseball games, watermelon races, pie-eating contests, bag races, running races, rolling races and handball.

The baseball game between the "Has Beens" and the "Regulars" resulted in a score of 15 to 14 in favor of the "Regulars," very much to the delight of all who witnessed the game.

The five-mile bicycle race was won by Edward Sporer, a fifteen-year old messenger, who received a gold medal, properly inscribed. Messenger Sporer also distinguished himself last summer by rescuing Mary Fox, an infant, from drowning at McKinley Beach. Albert Dombeck was second, and Richard Mundigler, third. There were forty entries.

Everyone had a good time, and voted their thanks to Mr. Charles Salb for his untiring efforts in arranging and making this yearly affair a success.

SPANISH ELECTRICAL EXPOSITION.—The International Exposition of Electrical Industries that was to have been held in Barcelona in 1915 has been postponed and will probably be opened in 1917 on broader lines and under more favorable conditions.

MEETING OF JOVIANS.—The annual meeting of the Jovian Order will be held in St. Louis, Mo., October 14, 15 and 16. Mr. Ell C. Bennett, twelfth Mercury, 1415 Syndicate Trust Building, St. Louis, is secretary. The Jovian Order is composed of men engaged in electrical pursuits and has for its purpose the advancement of electrical interests in general and the promotion of co-operation and good fellowship among its members. Its membership includes railway telegraph superintendents and telegraph and telephone men.

THE TELEPOST.—Senator R. L. Owen, of Oklahoma, recently in the United States Senate asked to have his resolution on the Telepost inquiry recalled on account of his prospective participation in the reorganization of the company. A similar resolution was taken up later by Senator Chamberlain, who presented a letter from Mr. H. Lee Sellers. In the letter Mr. Sellers outlined the telepost, and stated that "the messages will be handled at each end by the post-office in the usual way, but transmitted by the telepost by wire at its rate of 1,000 words per minute between the two post-offices. If special delivery is desired, the proper stamp will secure it."

NEW APPLICATION FORM T. & T. L. I. A.—The Telegraph and Telephone Life Insurance Association has recently revised its application blank, and Secretary M. J. O'Leary is now distributing them. The blank formerly used was somewhat long and difficult to fill out and, at times, appeared formidable to young men unaccustomed to deal with forms of the kind. The new blank is short and very simple so that it is easy for anyone to write an application for membership. Mr. O'Leary reports that the association is constantly increasing its membership and is now even better and stronger in every respect than it has ever been in the forty-seven years of its existence.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

A. E. Bradley, of this office, has been appointed assistant to the night repeater chief, and is also helping out on the multiplex.

L. E. Aarons, who has served in this office as operator, repeater attendant, assistant wire chief and automatic attendant, has been appointed manager at White River Junction, Vt., vice M. J. Walsh, resigned, to accept the postmastership at that place.

PHILADELPHIA POSTAL.

The initial outing of the Postal Telegraph Employes' Athletic Association will be held at Woodside Park, Saturday afternoon, July 25. Track events for ladies, gentlemen and messengers have been arranged by the committee. Valuable prizes are now on exhibition. A baseball game between the main and branch-office operators will follow the track events. The affair is in the hands of the following committee: F. P. McElroy, chairman; D. Logan, secretary; W. V. Madden, M. W. Frankel, C. W. Kofink, E. M. Barnes and Wm. Miley.

The sympathy of the entire district was extended to manager J. H. Wilson on account of the death of his father, which occurred recently.

Among recent visitors at this office were H. W. Hetzel, traveling auditor, and D. H. Gage, jr., of the electrical engineer's office, New York, and J. E. Zecher, manager at Atlantic City.

CHICAGO WESTERN UNION.

Daniel C. Meehan, aged twenty-six years, an attaché of this office, died of appendicitis, July 6. Mr. Meehan's family live at Pittsburgh. He is survived by his wife, who is the daughter of J. Charles Johnson, division chief in this office.

A. J. Carlin, of the traffic and Wheatstone departments, died on July 9.

CHICAGO POSTAL.

The operating department has been divorced from the business or commercial department, and Mr. T. N. Powers, formerly chief operator, has been placed in charge of the newly created department, with the title "Manager operating department."

Mr. B. F. Ramsdell has been appointed assistant manager.

Miss Josephine Carroll, formerly in charge of records, has been appointed chief clerk to superintendent E. S. Williams.

Mr. W. R. Skeels is spending a two weeks' vacation at his old home in Iowa.

ST. LOUIS WESTERN UNION.

The Western Union Electrical Club of St. Louis held its fourth annual evening river excursion on June 16. There was music, dancing and a high-class cabaret, and a large attendance.

SIOUX CITY WESTERN UNION.

Mr. Leo Hallisey is a new arrival, coming from the M and O, South Sioux City, Neb.

Miss Dessie Norton, our chief check girl, was united in marriage to Mr. R. W. Coney on June 16.

Mr. J. H. Lillie and wife left on June 15 for several weeks vacation in Michigan. Mr. H. M. Buckley is acting chief operator during Mr. Lillie's absence.

Mr. L. D. Laro, all-night chief, has taken a two weeks vacation, going to his old home in Nebraska.

Mr. T. W. Coleman, assistant manager of this office for the past twenty years, has been promoted to the managership of the American District Telegraph Company, at Indianapolis, Ind. Mr. Coleman was presented with a ring by the traffic and commercial forces. Mr. J. A. Young, former bookkeeper of this office, succeeds Mr. Coleman. Mr. F. Vance, head delivery clerk, succeeds Mr. Young as head of bookkeeping department.

FORT SMITH, ARK., WESTERN UNION.

It has been announced that the remodelling of our office will start in about thirty days. We will then have an up-to-date and modern telegraph office. During the fruit and early potato season, just passed, we have been seriously handicapped by the lack of facilities and equipment, but hope to be in shape for the cotton business this fall.

Mr. J. W. Gilliam, former manager of the Texas Postal in this city, is now district commercial manager for this company, with headquarters in Fort Smith, Ark.

Mr. H. C. Stannard is the local manager of this company, and, with an able corps of assistants, is making a good showing in the amount of business handled so far this year.

Mr. Arthur G. Stannard, of the operating force, is absent on a thirty-day leave, and is taking photographs of the many near-by hills and the surrounding country, and occasionally spending a day fishing. Mr. I. C. Lunsford will begin his annual vacation at the expiration of Mr. Stannard's leave of absence and will also take to the hills.

A record-breaking feat was accomplished by lineman Cloud and chief operator Slack, July 4, when they strung a loop to the ball park, a distance of about four blocks, to cover the Morris-Kubiak prize-fight. After having completed the loop a storm came up suddenly, making it necessary to move the location of the fight about three blocks farther away, also making it necessary to move the telegraph line the same distance. This was accomplished in one hour, and completed in time to start the fight at the appointed hour, 4:30 p. m. A considerable amount of press-matter was afterwards handled from the ringside by late night chief L. R. Jegglin, who also provided himself with one of the many fleet-footed little messenger boys employed in this office, to use in the event the wire failed. Former division wire chief I. D. Hough and district traffic supervisor J. W. Brooks were in attendance.

Chief operator Slack and night chief operator Anderson took care of the repeaters at the main office, and moved, without a hitch or delay, the large volume of business, amounting, altogether, upward of 12,000 words. Later in the evening Mr. Hough came in and helped out for a couple of hours, which was greatly appreciated.

FORT SMITH, ARK., POSTAL.

The Mackay Telegraph-Cable Company has leased quarters here, and will begin the interior work of the room which it will occupy when it reaches the city with its line from Muskogee, Okla. The company will have an up-to-date office, and is preparing to handle a good share of the season's business this fall. It is said that the company will construct a pole line to accommodate eight or ten wires. Two wires will be strung at first. They will be transposed for multiplex and composite. Mr. Ralph Reese, a former Western Union employe, is to be the local manager.

Telegraph and Telephone Age

No. 15 NEW YORK, AUGUST 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.
Peg Switchboards and Their Operation.

(*Continued from page 402, July 16*)

For the protection of telegraph apparatus there is still another device, called a lightning arrester, from the fact that it diverts into the earth the dangerous current developed along the line by an excessive charge of electricity, such as electric light or trolley currents or of lightning. As applied to the peg switchboard, it is a very simple arrangement, being merely a strip of brass connected to the earth, and placed very near to, but not quite touching, all of the main wire strips. The idea is that a current of electricity will always take the shortest route to the ground, provided there is developed sufficient electromotive force or pressure to enable it to jump off at any point along the circuit. The close proximity of the wires to the ground-plate on the switchboard leaves a gap of only a small fraction of an inch to overcome; hence, with its abnormal pressure, the excessive current jumps the space and, through the "arc" thus formed, loses itself in the ground via that short route. The ordinary electromotive force feeding the wires is not strong enough to cross this air-gap, hence the proximity of the ground-plate does not interfere with the normal current.

This ground-plate is shown in Fig. 5 as a horizontal brass bar running across the board just in front of the ground discs. Holes are cut in this plate large enough to permit plugs to be inserted between the ground discs and the main wire strips at 1, 2, 11 and 12.

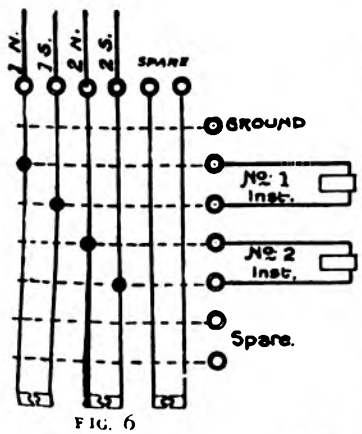


FIG. 6

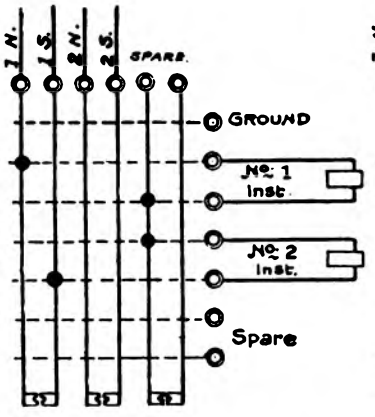


FIG. 7

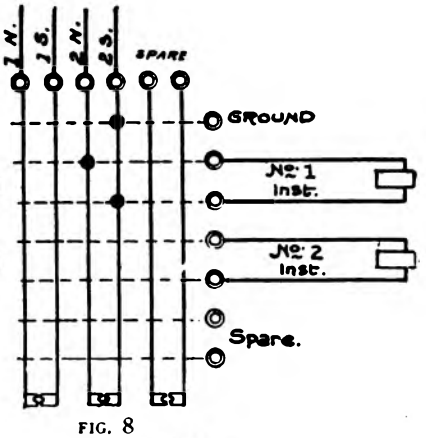


FIG. 8

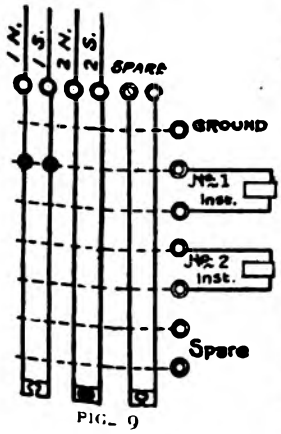


FIG. 9

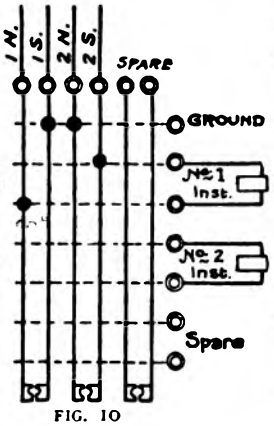


FIG. 10

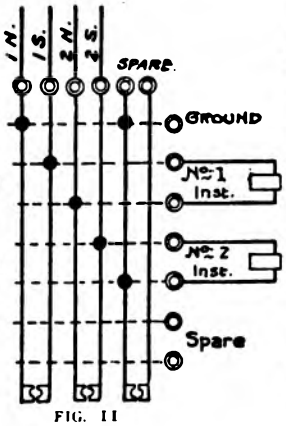


FIG. 11

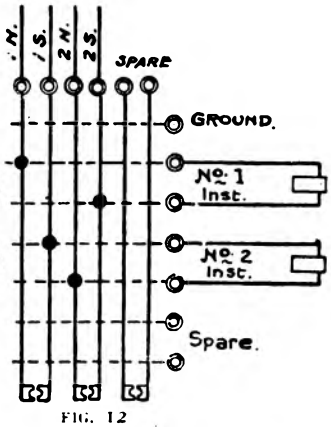


FIG. 12

At most stations, conditions are such as to require additional protective devices, which are connected to the line wires before they enter the switchboard.

Study the manner in which "patches" are made in Figs. 6, 7, 8, 9, 10, 11 and 12. They cover all the combinations, probably, that an intermediate office may be called upon to make. At any rate, if these connections are thoroughly understood it will be easy to comprehend and effect any other changes a wire chief may order.

(To be Continued.)

Telegraph and Telephone Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on the New York Stock Exchange, July 29:

American Telephone and Telegraph Co.	117¼
Mackay Companies	70
Mackay Companies, preferred	66
Marconi Wireless Telegraph Co. of America (par value $5.00)	2⅝
Western Union Telegraph Co.	56⅞

Recent Telegraph and Telephone Patents.

ISSUED JULY 7.

1,102,234. Electromagnetic Telegraph. To D. M. Bliss, Stamford, Conn.

1,102,421. Telephone Signal and Recorder. To F. J. McGowen, Los Angeles, Cal.

1,102,442. Apparatus for Selective Wireless Telegraphing. To F. G. Sargent, Westford, Mass.

1,102,600. Telephone Transmitter. To F. R. McBerty, New Rochelle, N. Y.

1,102,621. Watch-case Receiver. To H. B. Wier, Jersey City, N. J.

1,102,628. Telephone System. To E. F. W. Alexanderson, Schenectady, N. Y.

1,102,719. Telephone Indicator. To H. Christensen, Seattle, Wash.

1,102,907. Telephone Central Switching System. To E. A. Gray and E. C. Molina, Boston and Arlington, Mass.

ISSUED JULY 14.

1,103,040. Automatic Switch for Telephone Systems. To A. H. Dyson, Chicago, Ill.

1,103,073. Emergency Signaling System for Telephone Toll Collecting Apparatus. To J. J. O'Connell, Chicago, Ill.

1,103,133. Printing Telegraph Receiver. To A. F. Dixon, Newark, N. J.

1,103,288. Selective Signaling System. To R. N. Hill, Montclair, N. J.

1,103,421. Cable Telegraphy. To I. Kitsee, Philadelphia, Pa.

1,103,572. Automatic Telephone System. To B. G. Dunham, Urbana, Ohio.

1,103,583. Selective Signaling System. To R. N. Hill, Montclair, N. J.

1,103,909. Telephone Signaling System. To F. R. Parker, Chicago, Ill.

RECORD PATENT ISSUE.—During the week ending July 14 the United States Patent Office issued 907 patents, which is the largest number granted in any one week in the history of the office.

PERSONAL.

MR. ANDREW CARNEGIE is the subject of an interesting article written by Mr. David Homer Bates and published in the *Monmouth Beach News*, Monmouth, N. J. The telegraphic experiences of Mr. Carnegie are related and his benevolence towards the military telegraphers is emphasized.

MR. ALEX. CRAW, division claim agent, Baltimore and Ohio Railroad, Chicago, Ill., an old time railroad and commercial telegrapher, and for many years identified with the telegraph service in New York, recently spent a vacation of two weeks in this city, visiting relatives and friends.

MR. T. J. GALLAGHER, who has just been appointed postmaster at Geneva, N. Y., is an old-time telegrapher, having worked in British Columbia, Oregon, Montana and other western states. Mr. Gallagher also worked in several of the eastern cities including service for the Associated Press.

MRS. L. J. BRANT, wife of the late John Brant, of New York, well known to the telegraph profession, who died in 1908, has been appointed an agent for the Hamburg-American Line and is at the present time engaged in getting up a party for a round-the-world trip, leaving New York on the steamer "Cincinnati" early in January, 1915.

MR. CHARLES R. UNDERHILL, chief electrical engineer of the Acme Wire Company, New Haven, Conn., delivered a lecture on electromagnets before the student officers of the Naval Post Graduate School, at the U. S. Naval Academy, Annapolis, Md., on July 15. A number of officers and instructors attended the lecture, which was illustrated by numerous slides and actual electromagnets of various forms.

MESSRS. A. J. LAFAYE, New York correspondent of the *Pittsburgh Dispatch* and an operator, and John Coleberry, operator at Pittsburgh on the same wire, after working together over the wire for over seventeen years met in New York recently for the first time, when Mr. Coleberry visited the latter city. There was a warm greeting between the two men, who had formed an enduring friendship for one another over the wire.

How to Find and Remedy Telephone Troubles.

An extremely handy and valuable little book for telephone installers, operators, students and others interested in the telephone, is "Telephone Troubles and How to Find Them," by W. H. Hyde, Milwaukee, Wis. The character of the book is denoted in the title. The work covers troubles on overhead lines, cables, and in instruments and switchboards, of both the magneto and common-battery systems. The arrangement of the information is very convenient, and by the aid of many diagrams, the subject is made much more easily understood. A good description of telephone apparatus in general is given, and the pamphlet will be found valuable to all telephone inspectors and to everyone who uses a telephone, because it enables one to be his own telephone doctor.

The price of the booklet, which is paper covered, is twenty-five cents per copy. Copies are sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway,

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, will return to his office August 1, after a rest in Massachusetts and Rhode Island.

MR. C. P. BRUCH.—The address of Mr. Charles P. Bruch, vice-president of this company, on "Boyhood Days in Ohio," delivered before the Ohio Society of Philadelphia, has been printed by the Society in neat pamphlet form. It makes interesting reading for natives of the Buckeye State.

MR. J. F. SKIRROW, associate electrical engineer of this company, is spending his vacation in Connecticut.

MR. A. P. ANDREWS, former manager at Hot Springs, Ark., has been appointed manager of a branch office in San Francisco, Cal., in place of Mr. A. B. Bell, resigned.

HON. CASSIUS M. BARNES, who was from 1897 to 1901 governor of Oklahoma and mayor of the city of Guthrie for three terms is an old-time telegrapher. Mr. Barnes is at present a resident of Emporia, Kan., and has acepted temporarily the management of the Postal Telegraph-Cable Company at that point. The name of Mr. Barnes is one of the most honored in Oklahoma's history.

MR. F. U. SPOONER, chief operator, Indianapolis, Ind., recently called at the executive offices, New York, on his way to Atlantic City, where he will spend a short vacation.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: M. Browder, Kearney, Neb.; Mary F. Conn, Pekin, Ill.; N. W. Osterhout, Ocean Park, Cal.; Miss Florence Stewart, Clinton, Ill.; Le Roy E. Donahue, Redding, Cal.; George E. Perry, Westfield, N. Y.; Glen B. Wilson, Edwardsville, Ill.; J. L. Landau, Moline, Ill.; C. F. Decker, Fosteria, Ohio; Miss Helen May Regula, Mishawaka, Ind.

IMPROVING LINES IN WEST.—This company will expend $400,000 in improving its lines between Denver, Col., and Salt Lake City, Utah, during this summer.

MRS. W. Y. NOLLEY, wife of Manager W. Y. Nolley, of the Mackay-Telegraph Cable Company, Dallas, Tex., sailed from New York, July 8, for Paris, London and other European points, to be absent several weeks.

THE MACKAY TELEGRAPH AND CABLE COMPANY will soon reach Fort Smith, Ark., with the new line from Muskogee, Okla.

Mr. Charles P. Bruch, vice-president of the Postal Telegraph-Cable Company, New York, writes:

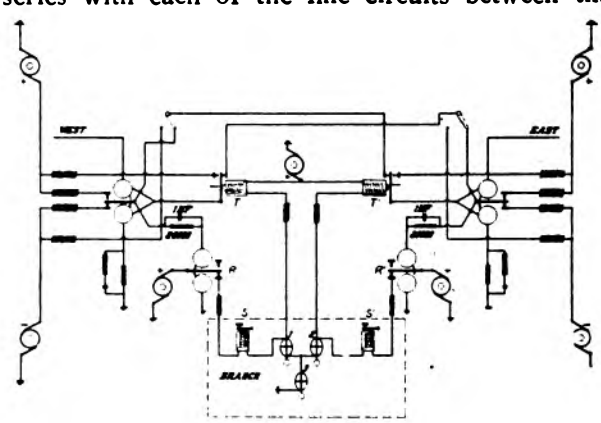
"I enclose cheque in renewal of my subscription. I read each number of the AGE as soon as I get it, because it brings me news of many of my old friends and associates, and much other information, valuable or interesting, that I cannot get from any other source. Your paper is not of current interest only. It is invaluable as a historical and biographical record of the telegraph and telegraphers. The file of the AGE is a chronicle of every event of consequence to the telegraph service as a whole, and to the individuals engaged in it, that has occurred since you started the paper. Congratulating you upon its success, already attained, and with best wishes for its future."

Direct-Point Polar Duplex Repeater with Branch Office Control.

BY A. J. EAVES, ELECTRICAL ENGINEER'S OFFICE, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The accompanying illustration shows the theory of a high speed polar duplex repeater with branch office control as employed by the Postal Telegraph-Cable Company.

The main-line circuits differ from the direct-point polar repeater that this company has used for several years, in that the closed contact and armature lever of a transmitter have been placed in series with each of the line circuits between the



DIRECT-POINT POLAR DUPLEX REPEATER

armature of the main line polar relay polechanger and the split leading to the main and artificial lines in the opposite direction to the line controlling the polechanger. The open contacts of these two transmitters are equipped with an opposite polarity and an equal potential to that of the closed contact of the main line relay polechanger which supplies the minus pole to the closed contact of the transmitter. In controlling transmitters T and T' the branch office controls the main-line current without destroying the direct point repeating feature.

For illustration: three keys controlling transmitters T and T' are shown at the branch office, although it may be desirable to equip the branch in this manner to meet all requirements. Key No. 1 transmits to the west, key No. 2 to the east and key No. 3 to both directions simultaneously.

It will be observed that during transmission from the branch office to the west, sounder S is actuated by virtue of the opening and closing of the common ground circuit of the receiving sounder and transmitter coils, and, likewise, in transmitting to the east

sounder S' serves as a sending as well as a receiving sounder. This arrangement prevents duplex operation while the branch is signaling; but a sounder can be placed in series with the transmitter and an independent ground given to the receiving sounder, then the terminal receiving from the branch at the repeater station can transmit to either the branch or the distant terminal.

The incoming signals are repeated to the branch by grounding leaks on the armatures of the pole-changer relays through 20,000 ohms resistances and polar relays. One-microfarad condensers shunt the 20,000 ohm resistances to accelerate the rise of current in the coils of relays R and R'. The polar relays repeat the signals from the east and west to the branch.

Good Advice to Way Offices from a Main Office.*

BY T. N. POWERS, MANAGER OPERATING DEPARTMENT, TELEGRAPH-CABLE COMPANY, CHICAGO.

First, remember that we are never too busy to help you. If you are too busy and cannot answer us, tell us and we will await your pleasure. Don't forget, however, to call us later, as we don't want to disturb you by unnecessary calling.

Second, if you are called away from the office, and if you know how long you will be gone, tell us and you will save us a lot of time and trouble, but be sure and tell us when you return. Likewise keep us posted when you go to lunch and supper, as well as when you return.

Third, watch your adjustments. If after you report in the morning and cut in you don't hear the instruments working try your adjustments. The safest plan is to call the main office just as soon as you report to work. Many a complaint and possible claim, as well as loss of business, could have been avoided if all offices would do this.

Above all, let us have team work, such as we can be proud of. If your pitcher or catcher at the main office is not up to snuff, don't argue with him; tell the "Big Chief"; he will immediately substitute a big leaguer if the pitcher or catcher on your wire is not in form. Let every hit be one that will count. Make an effort to punch out the home-run when the bases are full, and you will win every time.

If you have any suggestions give them to us, and you can rest assured they will be given due consideration.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president, is cruising in Eastern waters on his yacht for a few days.

MR. BELVIDERE BROOKS, vice-president, was in Clayton, N. Y., for several days this week.

MR. S. M. ENGLISH, general manager, Gulf Division, Dallas, Tex., is in New York on special business.

MR. W. H. BAKER, secretary of this company, is in the Adirondacks for the month of August.

MR. M. C. RORTY, assistant to the vice-president, is absent on a vacation.

MR. R. W. GRAY, former division plant superintendent, San Francisco, Cal., whose resignation was announced in our July 16 issue, has been appointed engineer-in-charge of telegraph and telephone valuation, Interstate Commerce Commission.

MR. M. M. MAISEL, of Silver City, N. M., has been appointed manager of this company's office at Albuquerque, N. M.

MR. C. W. MASON, formerly manager at Evansville, Ind., has been appointed to the management of the Fort Wayne, Ind., office. He is succeeded at Evansville by Mr. R. E. Eckler, transferred from Muncie, Ind. Mr. W. A. Mossman, of New Albany, succeeds to the management of the Muncie office. Mr. C. E. Honeter, of Brazil, has been appointed manager at New Albany. Mr. John T. Curtis, of North Vernon, Ind., succeeds Mr. Honeter at Brazil, and Mr. E. H. Pogue, formerly an operator at Madison, has been appointed manager at North Vernon, vice Mr. Curtis, transferred.

MR. J. E. BIERHARDT RETIRED.—In our July 16 issue, through an error in misreading copy, it was stated that Mr. J. E. Bierhardt, manager of the Syracuse, N. Y., office had resigned. Mr. Bierhardt, instead, retired on a pension.

MR. W. A. SHEPPARD, solicitor, Jacksonville, Fla., was a recent executive office visitor.

MR. W. E. LUKENS is acting chief operator of the Cincinnati, Ohio, office, vice L. E. Moores, deceased.

MR. F. B. CHAPPELLE, repeater attendant at Lynchburg, Va., has been transferred to Memphis, Tenn. Before going to Lynchburg, Mr. Chappelle filled like positions at Titusville, Fla., and Chattanooga, Tenn., and in the cable station at Punta Rassa, Fla.

THE OFFICIAL ADDRESS of this company remains 195 Broadway, although the executive offices are at 16 Dey street.

MR. J. B. VAN EVERY, a former vice-president of this company and perhaps better known to more telegraph and railroad officials than any other man in the service in his day, was a recent executive office visitor. While in the building he looked from one of the windows and saw the dismantling of the old 195 Broadway operating room by the building wreckers. It made him feel so badly that he had to turn away. 195 Broadway was to him the crowning glory of telegraph headquarters when the building was erected in 1875. He recalled the then beautiful lofty operating department, a splendid picture to look upon. Mr. Van Every is one of the few living officials who entered the old building when the telegraph had not reached the magnitude we find it to-day. He visited his former friends in the various departments, and was glad to note that the structure to be erected on the old site at 195 Broadway will far exceed in architectural beauty the former building. Mr. Van Every, accompanied by his wife, has just returned from the Pacific Coast where he has spent the past six months.

* From Postal Telegraph.

THE EARNINGS REPORT of this company for six months ended June, compared with the same period in 1913, shows the following results: Total revenues, $22,222,900; (1913), $22,111,180; total expenses, $19,533,900; (1913), $19,917,189; net income $2,020,375; (1913), $1,525,366.

MORSE ELECTRIC CLUB OUTING.—The summer outing of the Morse Electric Club, New York, is scheduled for August 1, the date of this issue, and there is every indication that the attendance will be large. The Western Union Telegraph Company, as has been its custom in the past, has placed its steamer "Western Union" at the disposal of the club to convey the members from New York to College Point, L. I., where the outing will take place. President Belvidere Brooks, of the club, will attend, together with other officials of the company. Contests of various kinds will be held, including a game of baseball.

THE CABLE.

MR. D. BUDGE, general station superintendent of the Halifax and Bermuda Cable Company, Halifax, N. S., accompanied by Mrs. Budge, has returned from a visit of several weeks to England.

MESSAGES TO AUSTRIA.—The Commercial Cable Company announces that private messages to Austria, or in transit through Austria, must be in plain German, French, English, or Italian, but those to Hungary may be in plain Hungarian language. Commercial marks, commercial abbreviations, and military news not admitted in private messages; messages without text not admitted. Coast stations and semaphoric offices will not communicate private messages until further notice. Telegraph lines between Austria and Montenegro interrupted. Private messages are subject to government censorship and delay.

Retirement of W. E. Earle, North Sydney, N. S.

Mr. W. E. Earle, superintendent of the Western Union cable office at North Sydney, N. S., on July 1 retired after a continuous telegraph service of fifty-six years. He entered the service of the New York, New Foundland and London Telegraph Company in 1859 at St. John's, N. F. In 1875 he went to North Sydney as assistant manager and in 1899 was appointed manager, subsequently being made superintendent. During his thirty-nine years' residence in North Sydney Mr. Earle has been prominent in every movement tending to the advancement of the town.

On July 4 Mr. Earle gave a harbor excursion to his former staff. About two hundred employes and ladies enjoyed a delightful sail, during which refreshments were served and dancing indulged in. During the trip Mr. Earle was presented with a suit case by his former associates.

Mr. P. J. Tierney, the well-known veteran cable manager of 16 Broad street, New York, in renewing his subscription for the thirty-second year, writes: "The purchasing power of the two-spot enclosed herein for another year's subscription is marvellous."

CANADIAN NOTES.

DOMINION TELEGRAPH COMPANY.—The annual meeting of the Dominion Telegraph Company was held in Toronto, Ont., on July 8. Sir Henry Pellatt presided in the absence of President Thomas Swinyard. The following directors were elected: Belvidere Brooks, Thomas F. Clark, Colonel Robert C. Clowry, Aemilius Jarvis, Charles O'Reilly, Colonel Sir Henry Mill Pellatt, Frederick Roper, George P. Schofield and Thomas Swinyard.

C. E. Davies, Traffic Superintendent, The Great North Western Telegraph Company, Toronto, Ont.

Mr. Charles E. Davies, whose appointment as traffic superintendent of the Great North Western Telegraph Company, and transfer of his headquarters from Ottawa to Toronto, Ont., was announced in our July 16 issue, was born in Hot

CHARLES E. DAVIES, TORONTO, ONT.

Springs, Ark., October 4, 1881. He moved to Helena, Mont., with his parents in 1888, and in 1896 he entered the service of the Western Union Telegraph Company in that city as messenger. He became an operator in 1899, and on January 1, 1906, received the appointment as chief operator for the Great North Western Telegraph Company in Ottawa, Ont. On September 20, 1909, he was advanced to the managership of the same company and in November, 1911, he was made supervisor of equipment in addition to his duties as manager. On July 1 of this year he was appointed superintendent of traffic with headquarters at Toronto, as already noted. His new duties embrace the supervision of the electrical equipment.

Mr. Davies is a gentleman of pleasing personality and possesses the faculty of making friends with all he meets. He is a grandson of James E. A. Gibbs, the inventor of the Willcox and Gibbs sewing machine.

THE TELEPHONE.

MR. H. J. PETTENGILL, president Southwestern Telegraph and Telephone Company, St. Louis, Mo., was a recent New York business visitor.

MR. W. S. GIFFORD, statistician, American Telephone and Telegraph Company, New York, is in Europe for a few weeks on a pleasure trip.

STEALING TELEPHONE POLES.—Two men were recently arrested in Detroit, Mich., for stealing four telephone poles from a railroad car and cutting them up for fire wood.

TRANSMITTING SIGHT.—Prof. Gabriel Lipmann described before the French Academy of Sciences a newly invented apparatus for transmitting sight by wire. It is based upon the well-known properties of selenium, and is called the "Telephota."

SALARIES VS. DIVIDENDS.—The Bell Telephone pays out, in the term of wages and salaries, 50 per cent of the money it receives from the public while the amount paid out in the form of interest and dividends represented, during the last year, but 4.92 per cent upon the actual plant in service.

TELEPHONES IN GERMAN ARMY.—The German Army maintains a portable telephone equipment, comprising thirty wagons, drawn by 160 horses, sixty telephones and about seventy-five miles of wire and cable. On October 1 the telephone will entirely displace the telegraph in the army.

FARM TELEPHONES.—According to Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, the rural telephone goes to more farmhouses than does the rural free delivery. He bases the statement on the fact that the farmer's mail service goes only to the nearest crossroads for a goodly portion of the families. There are, he states, about 7,000,000 farms in the United States and about 3,000,000 telephones in rural homes.

TELEPHONE EARNINGS.—The total earnings of the American Telephone and Telegraph Company, during the six months ending June 30, were $23,328,767.67, as compared with $22,731,941.97 for the same period in 1913, and the expenses were $2,759,459.58, against $2,476,088.02 last year. For the Bell Telephone System in the United States during the five months ending May 31, the gross earnings were $92,516,679, as compared with $87,871,945 the same period last year, and expenses $67,571,920, against $62,792,052 last year, leaving a balance of net profits of $17,218,231, as compared with $18,164,582 last year.

Connecting Forts by Submarine Telephone Cable.

The United States Signal Corps of the regular army is laying submarine telephone cable in Puget Sound (State of Washington) in order to establish a reliable means of keeping open lines of communication between the various fortifications that guard the approach to Seattle. Three forts are to be connected so that there will be three legs to the submarine telephone system.

Seventeen miles of 20-pair No. 19 B. & S. gauge paper insulated submarine telephone cable will be required for this work. The Western Electric Company furnished the cable.

The Signal Corps has also recently completed the laying of a submarine cable to connect the fortifications in New York harbor with those at Sandy Hook. This cable is eighteen miles long and consists of 10 pairs of No. 19 B. & S. gauge copper conductor.

Marketing Produce by Means of Telephone.

Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, states that he is looking forward to the day when farmers will call up their city customers regularly every morning and make arrangements with them for such foodstuffs as their consumers will need for the day. He says that in his opinion this plan will eliminate the waste that now comes from peddling garden stuff until late in the day, when it becomes wilted. Both garden and orchard stuff can be vended in this way, in his opinion.

Mr. Vail advocates headquarters in every city and town where farmers can sell to get quotations on produce for the day. If a farmer might have two or more such price markets with which he can connect it would give him a choice of markets when he sets forth in early morning with a wagonload of garden stuff. Mr. Vail also advocates the establishment of these centers by farmers' co-operative societies. There would be two birds killed with the same stone. In the first place, there would be less waste and loss to the farmer through spoiled produce while seeking a market after reaching town. In the second place, the consumer would come into direct contact with the producer, and the cost of farm produce would be less to the consumer.

The Telephone at the Niagara Falls Mediation Conference.

The telephone played an important part in the recent "A B C" Mediation Conference at Niagara Falls, Ont. The New York *Telephone Review* describes the special telephone arrangements made for this occasion.

At the Prospect House, Niagara Falls, N. Y., headquarters of the American delegates, a public telephone station, with operator in attendance and five booths, was installed.

To enable the American delegates to have Bell service where complete privacy could be obtained, a booth was placed in the guest room set apart for the Hon. J. R. Lamar and the Hon. Frederick Lehmann, the other United States delegate. This instrument was in direct connection through the toll board at Niagara Falls with a circuit to Washington, D. C., and this circuit was so built up that the Niagara Falls operator could ring the Washington, D. C., operator direct. A record kept of the calls to Washington shows that the American delegates called the office of the Secretary of State and the other officials with whom they were in communication by long distance telephone no less than three times a day on the average and more than this some days. In addition to this telephone in the booth, a desk-set instrument was also installed for local use by Messrs. Lamar and Lehmann.

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, AUGUST 1, 1914.

As to Fraternal Life Insurance.

Much of the trouble and misery in this world is due to thoughtlessness, carelessness and selfishness on the part of man, and one of his first natural duties should be to be thoughtful of others. Every man with a family that is dependent upon him should make provision during his lifetime for its welfare after he has passed away. Telegraphers are no more thoughtful about these matters than are other classes of men, and there is no good excuse for their neglect of this important duty.

Of the large number of deaths among telegraph and telephone employes during the past year it is a sad fact that very few of them had taken advantage of the opportunity offered by the Telegraph and Telephone Life Insurance Association, the Gold and Stock Life Insurance Association and other organizations of a like character to provide for their dependent ones. The first-named association was established by telegraphers forty-seven years ago for this worthy purpose, which is made so easy of accomplishment that it is surprising that more employes of telegraph and telephone companies are not members. The officials and agents are giving much of their time, diligently and unselfishly, to build up the association, but they cannot be expected to do all the work. Every member should co-operate, for in co-operation there is strength and success.

There is a wide field for missionary work among telegraph and telephone employes, and if each member would give a few moments of his time and attention now and then in an endeavor to secure a new applicant or, at least, say a favorable word about the association to "prospects," the membership would soon be vastly greater than it is.

An important fact to bear in mind in this connection is that the cost of insurance becomes less as the membership increases. Hence, when a member works for the upbuilding of the organization he is also working for his own interest.

A certificate of membership in this association avoids suffering and destitution in a great many cases, and it should be one of the first duties of every telegraph and telephone employe to take one out and thus make his family independent of charity after his death.

Adopting the International Telegraph Code.

It would have been incongruous, to say the least, for the Marconi Wireless Telegraph Company to have adopted the Morse telegraph alphabet, with its spaced letters, for its land connection between New York City and the New Jersey and other transatlantic wireless stations, while at the same time using the international code in handling its over-sea business. The adoption of the international code in the land service was not due to any sentiment; it was simply a falling in line with progressive ideas, and with all of the knowledge and experience of years at its command, the youngest of the telegraph utilities would have shown great lack of foresight had it not availed itself of the best.

The spaced letters in the Morse alphabet are still with us in the operation of land-line telegraphs, but they are here not because of any inherent advantage which they possess over other codes, but because of the reluctance of the human mind to change its course after having fallen into a rut.

Testing Inventions.

Every thoughtful person will readily admit that the limits of possibility in improving the telegraph is yet far remote. To be exact, it is safe to state the limits will never be reached, as further improvement is always possible. It is this fact that stimulates invention.

The telegraph and telephone companies are always on the lookout for real improvements in apparatus, because it means to them greater efficiency and economy of operation, and it is for this reason that they test independent inventions.

Many of the inventions presented to them for test are not practical and some of them prove to be utterly worthless, but the companies are put to expense and trouble just the same. For an unfavorable report they usually incur the ill-will and abuse of the inventor. Such tests are frequently made to

favor friends or the financial backers of the inventor, or to put a quietus on the claims made.

Inexperienced inventors, that is those who think they have an inspiration, are a class particularly difficult to handle. If their alleged invention proves, on test, to be worthless, they usually try to hide their own failure to make good by laying the blame upon the company making the test, alleging insincerity and indifference. They often go so far as to assert that the companies do not wish to make improvements, and that they do not give any encouragement to inventors. The fact is, however, as is evident to any fair-minded person, that the companies are ever on the lookout for improvements, but their value must be proved by exhaustive tests. If an invention is really worth anything the companies will soon find it out.

Many inventors, especially novitiates, are enthusiasts. They often waste much time, energy and money in developing ideas that they fancy are new, but which, in reality, are the reverse. If they would take the time and trouble to make an investigation into the historical features before plunging into the work of developing an idea they would often learn that others had gone over the same ground. The professor's remark that the ancients stole all our modern ideas still holds good.

Mr. Bright on Imperial Telegraphs.

"The Journal of the Royal Society of Arts," London, England, published the paper on "The Administration of Imperial Telegraphs," recently presented before the society by Charles Bright, F. R. S. E., etc., consulting engineer of the Commonwealth of Australia.

Under the head "State and Private Enterprise," Mr. Bright says:

"By far the greater proportion of the existing cable system is in the hands of limited liability companies. Unljke other private enterprises, these cables have been heavily subsidized in several instances, because it has been rightly recognized that communicating links with other parts of the Empire are of considerable value to the nation. On the other hand, the State has exercised scarcely any control on behalf of the public. Indeed, what conditions have been imposed have been almost entirely in the interest of the Government itself. The explanation of this discrepancy of policy is not far to see; there are no votes in Imperial cables, there are in municipal affairs. In my view, however, it is just what might be called domestic matters—electric lighting, telephony, etc.—which should be left to private enterprise, as being largely limited to individual comfort and convenience. Private enterprise should in such instances be left more or less free to cater for the public as, in its experience, it finds best—under general competitive conditions. On the other hand, apart from political and strategic considerations, our trade with the Colonies and its development by cheap and far-reaching telegraphy are matters of supreme importance to the Empire as a whole, and, therefore, at the same time to the nation. On these grounds, Imperial telegraphs should be far more closely controlled, if not actually worked, by the State in the interest of the country than if they were purely domestic matters."

Touching the subject of extended and cheaper inter-Imperial telegraphs, Mr. Bright says:

"While increased overhead charges and additional cables constitute a genuine commercial objection to tariff reductions on the part of the cable companies, these objections have not the same application with a Government, which, while having no shareholders to whom a certain dividend has to be paid, can also borrow money on a more advantageous basis. It is many years now since I first urged for a universal inter-Imperial ordinary rate of, say, 6d (12 cents) a word (press and deferred being proportionately less), which, besides tending to stimulate inter-Imperial trade, would also serve as an enormous impetus to the freer circulation of news, thus leading to a better understanding among all branches of the Empire. It is thought by many that the only effective way of securing relief in the rates—as well as a service in strict public interests—is to place the cables under direct Government control, so as to be free from the consideration of high profits, and to concentrate on the service alone. On the other hand, for obvious political and diplomatic reasons, there should be no attempt at interference with the administration, or tariff, of cables to foreign countries."

Other subjects considered in the paper were: "Strategic Communications," "The State Atlantic Cable," "State Control and Ownership," "Past and Present Administration," "Need for Centralization," "Suggested Future Administration," "Suggested Deputation and Royal Commission," "State Absorption of Existing Imperial Lines and Further Development," "Controlling board and Wireless Telegraphy."

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

OLD-TIME TELEGRAPHERS' AND HISTORICAL ASSOCIATION AND SOCIETY OF THE UNITED STATES MILITARY TELEGRAPH CORPS, at Kansas City, Mo., September 15, 16 and 17, 1914. Secretary of Old-Timers, F. J. Scherrer, 30 Church street, New York. Secretary, Society of the United States Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

TELEPHONE PIONEERS OF AMERICA, at Richmond, Va., October 29 and 30. Secretary, Henry W. Pope, 26 Cortlandt street, New York.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Atlantic City, N. J., September 15, 16, 17 and 18. Secretary Clarence R. George, Houston, Tex.

RADIO-TELEGRAPHY.

MR. MARCONI HONORED BY KING GEORGE.—King George of England has conferred upon Mr. William Marconi the honorary knighthood of the Grand Cross of the Royal Victorian Order.

NAUEN STATION FOR PUBLIC TRAFFIC.—The German post-office will soon take possession of the central German Telefunken experimental wireless station at Nauen and throw it open for public traffic.

TO CROSS THE ATLANTIC IN WIRELESS EQUIPPED LIFEBOAT.—Mr. and Mrs. Einar Sivard will attempt to cross the Atlantic Ocean on their wedding journey this summer in a lifeboat of new design. The boat will be fitted with a special wireless equipment, and the Marconi Wireless Telegraph Company has assigned Mr. H. J. Meldrum to operate the system on the trip. Mr. Meldrum has been an assistant at the Cape Cod wireless station.

OBITUARY.

H. R. MCLAUGHLIN, aged forty-four years, an operator for the Western Union Telegraph Company at Kansas City, Mo., died in that place July 4.

FRANKLIN H. SKEELE, aged sixty-three years, president of the Skeele Coal Company, New York, and an old-time telegrapher, died at Tully, N. Y., July 17.

GEORGE SPANGLER, aged forty-nine years, a broker operator in Memphis, Tenn., and formerly with the Postal Telegraph-Cable Company in the same city, died on July 11.

The Family Mix.

BY THOMAS M. RAGEN, NEW YORK.

When "Jim" Burke came to Summitville to take charge of the railroad station he was accompanied by "Jim" Junior, his eighteen-year old son, who had, for some time, been an apprentice to his father in an effort to master telegraphy, and, at this time, was considered a very fair operator.

Jim Senior and Jim Junior were pals, and after spending the entire day together in the little red railroad station, they were always to be found together in the evenings, until Jim Junior was finally placed as towerman and operator in a tower near the station, which, on account of difference in hours, caused father and son to be separated more than they had been for years, ever since Jim Junior's mother died, when he was little more than an infant.

Four years later, when Jim Junior had reached the age of twenty-two, he figured in a romantic wedding with a dashing widow of thirty-five summers, who, by the way, was also the mother of a beautiful daughter of about seventeen.

At first Jim Senior refused to recognize his son. In a few weeks, however, the longing to see his son caused Jim Senior to become reconciled to his son and daughter-in-law, and it was not long e'er Jim Senior paid almost daily visits to his son's home.

Jim Senior was now a man of forty-two. He had married when still in his teens, but his even temperament and fine habits now found him a handsome man, looking little older than his son. The care of his boy had ever been his first thought, and now that his son was apparently happily married and settled down, Jim Senior began to feel that a burden had been lifted from his manly shoulders.

And right here began to develop another romance. The beautiful daughter of Mrs. Jim Junior soon became very friendly with Jim Senior. Romps over the mountains in the beautiful autumn evenings soon had its effect on both Jim Senior and the girl, for they eloped one day, only to return in a few hours as man and wife, and settled down in the quiet little village.

A few years passed and we find one of the worst tangles of relationship possible. Two sons had been born to the wife of Mrs. Jim Junior, while three girls blessed the home of Mr. and Mrs. Jim Senior, and then began an effort to find out just how they were related.

Jim Junior was the stepfather-in-law of his own father, while Mrs. Jim Senior was stepmother of her own mother. But when they began to figure out the relationship of the children of the two families they began to show symptoms of dementia. In the first place, the children of Mrs. Jim Junior were half-brothers of their own mother. The children of Mrs. Jim Senior were half-brothers of Jim Junior, while the children of Mrs. Jim Junior were also stepbrothers to Mrs. Jim Senior.

The more the strange relationship was discussed the more points of relationship was discovered. Efforts on the part of the villagers to delve into the mysteries of the relationship brought on family disagreements and quarrels—even fights—and men who had taken the pledge "forgot it" in their efforts to discover new points of relationship.

An Excellent Book on Telephony.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the best books of its kind. As its title implies, it deals with electricity and magnetism as applied to telephony, and the subject is presented in such a clear manner that an understanding of it comes with little effort. The author, Mr. Cummings, is a practical telephone man, and in his daily work he has encountered many difficult problems. He analyzed and investigated them to find the causes and has, based upon this valuable experience, written a book that every telegrapher and telephonist should study. This is an excellent book for students, as it keeps the principles clearly before them. This book is now being used as the basis for the "Question and Answers," which are now appearing regularly in these columns. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, New York, at $1.50 per copy.

Every ambitious telegrapher reads and studies TELEGRAPH AND TELEPHONE AGE. Are you one of them?

Messrs. Blumenfeld and Stopford—Embryonic Editors from Missouri Who Did Not Need to be Shown.

BY WALTER P. PHILLIPS.

Referring to the biographical sketch copied into TELEGRAPH AND TELEPHONE AGE for July 16, it may be of further interest to know that an excellent article concerning Mr. Blumenfeld recently appeared in the London *World*. This was written by its editor, Francis Stopford. He and Mr. Blumenfeld first met in Kansas City in 1880, when that city, now developed into its butterfly existence, was in the form that is represented by the unostentatious grub. At that time Mr. Blumenfeld was a youthful operator in one of the telegraph offices and Mr. Stopford was driving a mule attached to the Main street line of cars.

The passing of thirty-four years often sees men fall from high positions to very lowly ones, but instances are rare in which a telegraph operator advances, in that space of time, to a position of such importance as Mr. Blumenfeld occupies, as the editor and a large owner of two London newspapers —the *Express* and the *Globe*—the latter, recently purchased, being the oldest paper in the British metropolis. Mr. Stopford's career has been scarcely less spectacular. From his commanding position behind a Kansas City mule he has inherited, by right of fitness, the editorial chair vacated by the late brilliant and world-renowned writer, Edmund Yates.

Mr. Blumenfeld wandered from Watertown, Wis., to Milwaukee, Chicago and Kansas City in search of suitable and remunerative employment, and found it. Mr. Stopford, after his graduation at Oxford, visited the United States to find himself, but the face of Fortune was unsmiling and as the street car business, in the only department that seemed to be open to him, was neither congenial nor noteworthy in respect of emolument, he returned to England in due course and eventually scored a distinct success in the difficult field of that particular kind of London journalism in which Thackeray, Dickens, Frederic Greenwood, Henry Labouchere, Edmund Yates, and others of their varied literary accomplishments have indulged, to more or less extent, and in a greatly modernized style, since the days of Addison, Steele, Bolingbroke and their contemporaries who followed the pursuit of creating polite literature. Mr. Stopford's article contains a good deal about Mr. Blumenfeld that Mr. Heyn's contribution to *Leslie's Weekly* did not cover, particularly the information that is contained in the paragraphs here given.

Mr. Stopford may not be especially elated by the change in his circumstances, for the English emotions are not easily stirred. One of his countrymen, I have read, after listening to the recital of what had befallen a man who was wrecked and lived alone on a desert island for five years, commented, in even tones: "Must have been an extremely uneventful sort of life, really." But if Mr. Blumenfeld had been told, in 1883, when he was blacklisted by all the telegraph companies as a late striker, who had various elements of danger concealed about his person, and was hunting for work, with all his heart and soul—had he been told, then, that he would live to be mentioned, in the eleventh edition of the conservative and high-toned Encyclopedia Britannica, as a great English editor and tariff reformer, I imagine that he would have winked his other eye. Notwithstanding his most delightful sense of humor, I am confident that a forecast of what he was coming to, in days like these, would have been regarded as a joke having that air of mystery and improbability about it that changes mirth into sadness and makes countenances which, under ordinary conditions, are as smiling as the morn, take on funereal and forbidding aspects.

FROM MR. STOPFORD'S ARTICLE.

It is not wise to take life too seriously. Even less wise is it always to speak of politics with a grave and solemn face. There is laughter of things as there are tears. Of all the editors of the great London dailies, not one lives up to this excellent philosophy more consistently than Mr. Ralph D. Blumenfeld, editor-in-chief of the *Daily Express* and chairman of its company. Whether a man agrees or not with the political opinions of that paper he will buy it just to chuckle over its last cartoon, or to laugh at its newest *bon mot*. Rivals who affect to ignore it cannot resist stealing the lightnings of its wit.

Mr. Blumenfeld was born with printer's ink in his veins. His father was a newspaper proprietor in Wisconsin; he himself pied type before he could read. The printed word had never any glamor for him; instead, from his youth upwards he learned to reverence and respect it, and also he came to know how if you want to hit a newspaper reader hard between the eyes with a word or a phrase you must always use the right sort of type. This early training stood him in good stead when he started out to view the wide world on his own account, with a pen in his right hand and a quick wit behind his laughing eyes. He wandered south to Kansas City, then east to New York City, and in a little while crossed the Atlantic, and four-and-twenty years ago became the London correspondent of the *New York Herald*. Since that year, except for a brief period in Paris on the staff of the same paper, England has been his home and London his workshop.

Ten years have now slipped away since Mr. Blumenfeld became editor of the *Daily Express;* it was then under the control of Mr. C. Arthur Pearson, and when that gentleman severed his connection with daily journalism, his chief lieutenant, Mr. Blumenfeld, who had more and more discharged the duties of captain of the ship, naturally, and, as it seemed inevitably, was chosen to his place.

This promotion gave pleasure not only to his friends but to his colleagues, for R. D. B., as he is invariably called by every member of the *Express* staff, has the gift of leadership. He is a good fighter and a good comrade, and it may be said without contradiction that there is to-day no chief

in Fleet street who is more genuinely popular with his men in all grades of duty. The man in the street when he glances at his morning paper probably never stops to consider what a wonderful and complicated organization is that which is responsible for its daily appearance. In every newspaper office there are a dozen or more different departments, each of which considers itself IT. Nor would any proprietor and chairman have it otherwise, so long as the idea is lived up to, but it needs a light touch and a strong sense of sympathy and humor to keep them all working together at concert pitch without playing on the baser feelings of envy, slander, and intrigue.

Mr. Blumenfeld has even been strongly of the opinion that an English daily paper cannot hold its own which is tepid on politics. For it to be neither hot nor cold on this topic is to court the fate of the church at Laodicea. Since he has been in control he has always taken a bold and aggressive Unionist policy—a policy which has commended itself to the public, for the circulation of the paper has increased by leaps and bounds. It is not forgotten that when Mr. Balfour retired from the leadership of the Opposition, and his successor was to be appointed, the public first read of a certain dark horse of the name of Bonar Law in the columns of the *Daily Express*. So little was Mr. Bonar Law known in those days outside the inner councils of the party, that people laughed at the suggestion. The future proved that the *Express* was the best-informed paper in London of the day. Mr. Blumenfeld was the first London editor to be selected for election by the committee of the Carlton Club in its whole history.

Just now the *Daily Express* is circulating by thousands the great fighting speech which Mr. Rudyard Kipling delivered at Tunbridge Wells. Mr. Kipling is a personal friend of Mr. Blumenfeld, who also numbers among his friends that other famous publicist, Mr. H. G. Wells. Mr. Wells lives at the Little Eastern Rectory, Essex, and the country seat, as his friends style it, of the editor of the *Daily Express* is Hill Farm, Great Easton. Some years ago Mr. Blumenfeld, who is a married man with a family of the ideal size—two sons and two daughters, a *parti carrée*—decided that country air was good for the children as it was good for himself and his wife on week-ends and holidays. He explored the wilds of Essex, and discovered a small farmhouse with a big barn. Detecting its possibilities, he bought it. Every year saw an old bit transformed and a new bit added, until gradually a delightful English home grew into being. Only those who have ever tried it realize the fascination of bending the centuries to their will, and building, without destroying, a modern home within ancient walls. To have everything in keeping he collected old furniture, and there is not to-day a more beautiful house of its size in Essex than Hill Farm.

But this weekly escape into the country has other advantages besides those of pleasure and health. It gives a busy man a chance to preserve a level mind and to laugh at his own foibles. An editor has to know so many things, that perhaps it is human for him gradually to arrive at the belief that he knows everything. But a half-hour's chat with a good old Essex yokel soon undeceives him, and he returns on Monday morning to his desk a chastened man, knowing that there are spheres of life, and of useful life, in the land where a daily paper is regarded of less value than a load of muck. The man who wants to be a living influence must not take himself too seriously, and no small part of the exceptional success which Mr. Blumenfeld has won in the land of his adoption and of his popularity with all classes of men arises from this very fact.

Western Union Neutral Relay—Its Construction and Operation.

The neutral relay used on quadruplex circuits by the Western Union Telegraph Company has two electromagnets, independently adjustable, both of which tend to attract the armature against the pull of an adjustable retractile spring. The lower or main-line magnet has short laminated cores and a double winding connected to four binding posts to allow the relay to be wired for differential or other workings. The upper or holding magnet has longer cores, with spools of small diameter, and a single winding, connected to two binding posts near the front of the base of the instrument. The contact carrier is of the spectacle type, and has interchangeable screws for limiting the play of the armature. One of these screws is fitted with a contact point and the other with an insulating stop, so that the local circuit through the armature may be operated on either the forward or backward strokes, as required. The instrument is mounted on a slate base on an iron sub-base. The resistance of each of the main-line coils is 350 ohms, and of the holding coil, 230 ohms. The instrument is designed to operate, with the main-line coils in series, on a normal current of fifteen milliamperes, and a minimum of three milliamperes. The normal current for the holding coil is fifty milliamperes and the minimum five milliamperes.

In adjusting this instrument the armature should not be brought too close to the main magnet cores. A sufficient air-gap should be maintained to prevent the armature from sticking or showing sluggishness of movement. The tendency to such faulty operation should be minimized by increasing the air-gap and suitably reducing the tension of the retractile spring, rather than by using a small fixed minimum air-gap and making all adjustments by means of the retractile spring. The tension of the spring, however, should always be sufficient to pull the armature smartly against its back stop whenever the magnetism excited by the "long end" of the distant battery or generator is reduced to the value corresponding to the "short end." The wider separation between the cores and armature will also lessen the amount of disturbance produced by the outgoing currents upon the home relays, as a result of imperfect balances, and tend as well to counteract the effects of earth currents, voltage inequalities or other irregularities which make an incoming current of one polarity greater or less than that of the opposite polarity.

The Telegraph in Canada.

BY N. W. BETHUNE, OTTAWA, ONT.

A considerable number of persons lay claim, with more or less truth, to having discovered methods of electric signalling. We do not mean those, such as Sir Thomas Watson, who, in England, as long ago as 1747, managed, as a mere electrical experiment, to send a current from a Leyden jar through earth and water, and along wires suspended in the open air on sticks; nor Chas. Morrison, of Greenock, Scotland, 1753; nor Lomond, in France, 1793, who had reached similar results, but more recent and more practical students and discoverers in electricity. After the discovery by Oerstedt, the Dane, in 1819, of the action of the galvanic current on a magnet, Laplace and Ampère in France suggested the application of it to telegraphic signalling. Schilling took hold of the matter, too, and his work forms the foundation of much of modern telegraphy. Half a dozen clever French scientists were working on the problem about the same time. Meanwhile, Faraday discovered the induced current produced by a helix of wire around a magnet, which fact Gauss, Weber and Steinheil bearing in mind, studied and planned till the last-named announced, in 1837, the completion of a recording telegraph that struck bells and made ink dots. Cooke, in England, produced about this time a needle telegraph, which seems to have been the forerunner of the various clever Wheatstone instruments, but both these men seem to have been forestalled by Morse, of America, who produced a rude model of his recorder in 1835.

The Morse telegraph is so universally used on this continent that some account of its introduction into Canada in 1846 will probably be of interest.

Mr. Orrin S. Wood, who died in New York five years ago, was the first superintendent of the Montreal Telegraph Company, and may justly be considered the "Father of the Telegraph" in Canada. At the time of his appointment in 1847 he was chief operator of the New York, Albany and Buffalo line, and had been connected with the business from its earliest inception. I suppose he might, in fact, be called the first professional operator in America, having learned the business from its fountain head, Professor Morse, and his colleague, Alfred Vail, in 1844, at Washington, D. C. I remember his account of having sent the inaugural speech of President Polk, in 1844, over the experimental line of wire from Washington to Baltimore, the first feat of the kind ever attempted. A temporary wire was strung to the Capitol and attached to instruments placed on a table in the rear of the group around the President. The speech was handed to the operator sheet by sheet as it was uttered, and slowly and laboriously "worked off" to Baltimore. It was a trial of speed between the railway, the steamboat, and the new agent in transmission. The latter established a reputation as a means of conveying intelligence with rapidity and at comparatively very small cost.

Mr. Wood came to Montreal from the United States about the beginning of March, 1847. One of his first duties was to form a class who should learn the art of telegraphing, in order to furnish operators for the new line. Many candidates presented themselves, and from them seven individuals were selected, of whom the writer had the honor to be one. I was the youngest of the class, and, in fact, though over eighteen years of age, my youth was considered a serious objection to admitting me, but this was got over in some way.

The names of these Canadian pioneers in the telegraph field are perhaps worth preserving. They were Coldstream Barry, John A. Torney, F. N. Gisborne, A. Morris, F. Boncher, J. G. Bethune and N. W. Bethune. The healing art was well represented among these aspirants for fame in the new and mysterious path, for no less than four of us in this class were medical students. Of these seven I am, as far as I know, the only survivor. F. N. Gisborne, superintendent of government telegraphs, was the last one who died. Our "school" was a room in the rear of the Merchants' Exchange in the Odd Fellows' Hall, in Great St. James street, Montreal, and was afterwards occupied as the office of the Montreal and Troy line. Mr. H. H. Whitney, afterwards the first president of the latter company, took great interest in their new enterprise, and was a very frequent visitor. He was present when the first batch of telegraphic instruments was received, for teaching purposes, and with the rest of us, was greatly surprised at their small size. It was with difficulty we could be made to believe they were anything but models, our previously formed and rather hazy ideas on the subject having led us to expect something about the size of an ordinary piano. The school throve, Mr. Wood being, in fact, an admirable teacher, and in the course of a couple of months we were considered passably fit for service. In the early part of July the line between Toronto and Montreal was completed, and on the fifteenth of the month I left for Port Hope, Ont., which was to be my station, and the first office to be opened east of Toronto.

Travelling even in summer in Canada was rather a slow business in those days. It took a day and a half to reach Kingston by stage and boat. At Kingston I stayed over a day to see Torney, who was busy fitting up an office in the city hall, and reached Port Hope by steamer on the morning of the eighteenth. Here I was received with open arms, everyone being on the alert for the inauguration of the new and wonderful agent that was to work so many changes in the business of the world. The following day Mr. O. S. Wood arrived from Toronto, accompanied by a one-armed American operator named Stevens, who was to take charge of the Cobourg, Ont., office. The twentieth witnessed the opening of the office at Port Hope, in which operation we were attended by much of the entire male population of the village, who stuck to us with unwearied assiduity throughout the day, exhibiting the liveliest interest in our every movement, and assisting when necessary in handling the wires, with a zeal and vigor that threatened at times to break things. When the instruments were finally connected, and communication actually obtained with

Toronto, words can but feebly express the astonishment and enthusiasm that prevailed, especially when a number of messages had been sent to friends in the "Queen City" and answers obtained in what seemed an incredibly short space of time. The excitement received a damper, however, or rather it was turned in an opposite direction towards evening, when a thunder shower came on and two sharp reports of lightning, springing from the primitive cut-out of that time to the ground wire, and sounding like pistol-shots, caused a stampede for the door, and a very speedy evacuation of the premises. On the twenty-first we opened the office at Cobourg, where we had the same scene of excitement and enthusiasm, everyone being eager to take a hand in the work, and rather impeding operations by their excess of good intentions, but everything passed off satisfactorily. We had a slight contretemps in the afternoon just after getting connection with Toronto, when an unexpected spat of lightning somewhat damaged our relay. This, however, was speedily repaired and a number of messages were sent and received, to the great surprise and delight of the crowd that packed the office.

All this was before the days of linemen or repairers, and the operators were expected to do any and every necessary work connected with their business. As the youngest and lightest of the party I was called on, naturally, to do the pole-work at Port Hope and Cobourg. Spurs or climbers had not been invented at that time. A long, light ladder, the upper ends of which were bent together, and terminated in a strong iron claw, was hooked to the top of the telegraph pole and strapped or lashed to its foot in an upright position. It required some practice to do one's work dexterously on this contrivance, and I cannot say that I relished my first experience in the aerial branch of the business, though it became more familiar in after days, but I managed to get through it after a fashion. The next day Mr. Wood left for Belleville, which office he opened, but closed temporarily, and proceeded to Kingston, which was ready for business about the twenty-fourth of July, and afterwards to Brockville, Prescott and Montreal, the latter office being put in connection in the early part of August. The first operator at Montreal office was F. N. Gisborne, though Mr. Wood himself took a large share in the office work. Mr. Gisborne removed to Quebec when our opening took place there some three months later, and was succeeded at the Montreal office of the company by H. P. Dwight, the late general manager of the Great North Western Company, who had in the interval been in charge of the office at Belleville. Mr. Morris, the ex-artist of our pioneer class, had been intended for that station, but did not prove a success.

His first experiences, especially in the direction of line mending, had caused us a good deal of amusement. He remained at Belleville for some time practising his art, and afterwards returned to Montreal.

Barry had charge of the Brockville office, where he remained till the following spring, and resigned to enter the service of the Montreal and Troy Company. My brother John was first operator at Prescott, but the work did not prove congenial and he returned to his medical studies. He was succeeded by a young American, whose name has escaped my recollection. Telegraph offices were opened during the fall and winter at Three Rivers, Cornwall and Oshawa, and at the end of the first year the company had twelve offices in operation.

This was the rather modest beginning of the Montreal Telegraph Company.

Port Hope, my first station, was in those days (1847) quite a small but pretty place. Its buildings were chiefly one and a half or two stories in height and very generally constructed of wood or rough-case. My office was in the second story of Gillett's Block, one of the few brick buildings which Port Hope boasted. It was thought at the time quite an imposing structure, the ground floor being occupied by the proprietor as a dry goods store and the upper flats let for offices. For some time I had a daily levee of sightseers, eager to witness the working of the new invention and to have all the wonders of the telegraph explained to them. Some of the older heads, especially people from the surrounding country, were very skeptical at first as to the genuine character of the "show," and a few even hinted at its being a (something) Yankee swindle and fraud, but these were few and far between. The general belief ran to the other extreme, people even occasionally bringing parcels to us for transmission. On one occasion, soon after opening the office, I saw a string of hatless individuals rush out of a hotel nearly opposite the office and make a bee-line for the entrance, headed by the landlord. They poured in tumultuously and with much angry vociferation, but I was relieved to find that their object was simply to decide a bet as to the time it would take to send a message to Toronto and get an answer back, the party to whom it was addressed having his place of business close to the office there. The landlord's contention was that it could be done inside of five minutes. This was rather a narrow margin for me, but it would not do to flinch from the test. The message was sent, the addressee found in his office, the landlord won his bet and the fame of the telegraph went up correspondingly.

After being at Port Hope for two or three weeks I was ordered to Toronto to assist Mr. Parsons, an American, who was the first operator there on our line. I travelled in an open stage through the night and found it a particularly long journey. The office at Toronto was in the rear of a small brick building on Front street, facing Brown's wharf. The line between Toronto and Buffalo occupied the front office. Their operator was a Mr. Bancroft, a very good fellow, while their superintendent, Sam Porter, well known among telegraph men of that day, had his headquarters at Toronto. One messenger did the delivery for both offices. My duties included, among other things, the charge of the battery, which had to be taken down and cleaned nightly and put up again in the morning. This was the Grove battery, then and for many years after in general use on telegraph lines. It was a powerful and effective form of battery,

but expensive and particularly troublesome to keep in order. The job was a very dirty one, involving a good deal of labor, and though I was not sorry for the experience, which was useful in after years, I must confess I was glad, after a time, to be relieved of this special "function." The Buffalo line was strung with copper wire, which worked well, but was subject to very frequent interruption. At first there used to be considerable chaffing between the two offices as to the merits of the respective lines, but gradually the superior strength and durability of the iron wire had to be admitted, and before long the Montreal Company's line came to be nicknamed "the old reliable."

After a month's stay in Toronto I returned to Port Hope. Before I left there was an addition to the Toronto staff in the shape of Ben Toye. He was a very little fellow, but very bright and most eager to learn how to telegraph. He soon excelled at operating, and was the inventor of the well-known Toye repeater. He was chief operator at Toronto for the Great North Western Telegraph Company, but died nine or ten years ago.

[Mr. Norman W. Bethune, formerly superintendent of the Ottawa Division of the Great North Western Telegraph Company, now retired, is, no doubt, the oldest living telegrapher in Canada. He was born in Montreal in 1828. He has a record of fifty-seven years of continuous service. He opened the first office east of Toronto in July, 1847, and served afterwards in different offices of the Montreal Company. In 1849 he was in charge of the Canadian portion of the Troy and Canada Junction Telegraph Company, and was removed to the Troy office of that company in 1850, where he remained for five years, returning to Montreal in 1855 as local manager of the Montreal office. In 1863 he was sent to Ottawa to prepare for the removal of the seat of government to that place, where he remained for forty-one years, and under his management the Ottawa Valley has been well covered with a net-work of lines. On his retirement on October 18, 1904, he was presented with a complimentary address and handsome cabinet of sterling silver as a token of the esteem in which he was held by his friends and fellow citizens. The Great North Western Telegraph Company, in whose service he had been for the past twenty-three years, has made him a liberal allowance for life.]

History of the Duplex.

The first to broach the idea of using one wire for the simultaneous transmission of two messages was Moses G. Farmer, about 1852. Dr. Gintl, director of the Austrian State Telegraphs, was, however, in 1853, inventor of a practical duplex system, which was the parent stem of the present differential systems. He used a differential relay, of which one coil was traversed by the line current, and the other by the current of a local equating battery of opposite polarity, the combined effect being to hold the armature of the home relay still, and thus subject to the action of the current coming from the distant station. It was very rudimentary, and was, in rapid succession, followed by the duplex systems and improvements of Frischen in 1854; Gintl, in a chemical duplex, which was practically operated in 1854 between Vienna and Linz; Nyström, of Sweden, in 1856, whose principal improvement was to maintain the connection between the line and earth always unbroken by means of a circuit-preserving key; Mr. W. H. Preece, of England, in 1855 and 1856; Siemens' and Halske's two-relay method; Zur Nedden in 1855, and Farmer in 1858. All of these different improvements, however, fell flat, chiefly because the time for them had not arrived, and the science of telegraphy was not developed to such an extent as to require a satisfactory system of duplex telegraphy. Hence, all these methods were looked upon merely as electrical curiosities. In 1863 the interest in this branch of telegraphy seemed to revive, and Maron, a Prussian telegraph inspector, effected another improvement, by which the receiving instrument was placed where it would not be acted upon by outgoing currents. Frischen, also, in 1863, improved his former method. In 1868 Joseph B. Stearns, of Boston, commenced a series of experiments with the duplex of Siemens and Halske, and was soon so successful that duplex telegraphy, which had now become a necessity, was roused from the torpor which had hitherto crippled it, and was rapidly brought into general use. He applied a transmitter in a local circuit, instead of the old key, and caused it to make the contact of the battery with the line before the interruption of the contact between the line and the ground. He made this transmitter act also as a sounder, so that the American operator, accustomed to hear his own sending, could be thus accommodated. He subsequently connected a condenser to the rheostat, forming an artificial line, and thus balanced the static charge which came from the line when the line was changed from battery to ground. Mr. Stearns also introduced his transmitter and condenser into the bridge system, where the receiving instrument is placed in the cross-wire of a system of circuits and resistances, arranged at each station on the plan of the well-known Wheatstone bridge. The receiving instrument is thus placed beyond the range of electrical impulses originating at its own station, while free to respond to those caused by the distant station. This is widely used and known universally as the bridge duplex. The success of Mr. Stearns spurred up many inventors, and duplex telegraphs, each having features more or less meritorious, were brought out by the following well-known electricians: Gerrit Smith; Vaes, of Rotterdam; G. K. Winter, of India; George D'Infreville, J. C. Wilson, C. H. Haskins, T. A. Edison, and others.

Mr. P. H. Fennell, manager of the Postal Telegraph-Cable Company of Texas, Shreveport, La., in renewing his subscription for another year, writes: "I have got the habit now and look for TELEGRAPH AND TELEPHONE AGE regularly on the first and fifteenth of each month, so don't let a single copy miss me."

How Cables are Made, Laid, Operated and Repaired.

(Continued from page 418, July 16)

HOW MESSAGES ARE FLASHED UNDER THE OCEAN.

The cable having been brought into the office and final tests completed, it is turned over to the company's operating staff for use in the transmission of cable messages.

One of the first theories advanced by electrical engineers for the operation of long submarine cables was that on account of their great unbroken length it required a battery of high voltage to force the currents through it. This theory, however, was opposed by the late Lord Kelvin (formerly Sir William Thomson), who claimed that a long cable could be operated by a current generated in a lady's thimble, which was later proved to be possible. The first transatlantic cable was operated by means of large induction coils and batteries with a potential of 500 volts or more. It is believed by many that this high battery power broke down the insulation of the cable. It only worked from August 17 to October 20, 1858, and carried 732 messages. It was impossible to send any signals through the cable after that date and it had to be abandoned.

In April, 1858, Sir William Thomson (Lord Kelvin) invented the mirror galvanometer, an instrument of high sensitiveness, which not only was the first instrument by means of which long submarine cables were successfully operated, but which made it possible to increase the speed of transmission five or six times greater than any other instrument.

The reflecting galvanometer, commonly known as the "mirror," was composed of a coil of very fine wire, in the center of which a very light mirror of about ¼ inch diameter, with tiny magnets cemented on its back, was centrally suspended by a silk fiber. A beam of light thrown on this mirror was reflected from it onto a scale several feet from the instrument. The passage through this coil of the received positive and negative currents tended to move the magnets to right or left, and the reflections of the mirror's movements were read from the scale. When there is no current passing through the cable the beam of light thrown upon the scale remains at rest at a zero point on the scale. As soon as a current is passed through the cable, no matter how weak, it causes the mirror of the galvanometer to move to one side, carrying the reflected spot across the scale. A double-current key is employed for sending the signals, one of which sends negative currents and other side sends positive currents to line. The positive currents represent the dots and the negative currents represent the dashes. Hence an operator sending the letter "A" would first press the left key representing a dot and then the right key representing a dash. These signals act upon the mirror galvanometer as explained, viz.: the light moves from the zero point to the left side of the scale (representing a dot), and then immediately over to the right side of the scale (representing a dash), corresponding with the manipulation of the keys at the sending end.

Operators soon became skilled in reading these movements of the light. While this system of reception proved satisfactory, there was one element of weakness about it which required improvement, namely, that once the flash of light representing the signal had passed, there was no record left to prove what was received, and consequently letters, or parts of letters, were sometimes dropped out by mistake. This led to the invention of the siphon recorder, by Lord Kelvin in 1870. This was the first instrument used on long cables that recorded

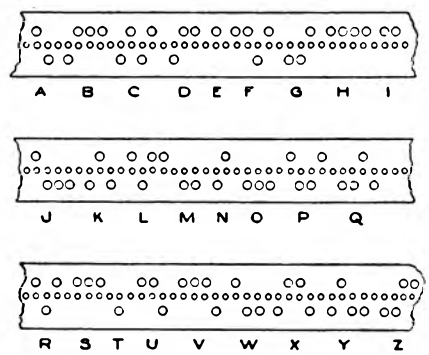

FIG. 1—SIGNALS AS THEY APPEAR ON A SLIP PERFORATED FOR USE ON THE CUTTRISS AUTOMATIC TRANSMITTER.

the received signals. This instrument is now used at nearly every cable office in the world except a few places in the West Indies, which still use the mirror galvanometer.

In the siphon recorder a light rectangular coil of very fine wire is suspended centrally between the poles of a powerful horseshoe magnet. A fine glass siphon, dipping into an ink-well, is suspended in front of this coil and attached to it by silk fibres. A narrow paper tape is drawn in front of the lower end of the siphon, and the movements of the coil communicated to the siphon by the silk fibres, are permanently recorded on the paper tape. As the

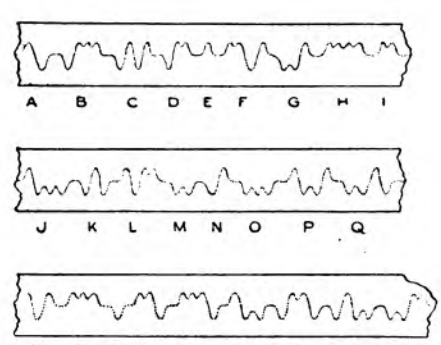

FIG. 2—SIGNALS AS THEY ARE RECEIVED AT THE DISTANT END.

coil moves from the right to the left, or vice versa, actuated by the electric impulses sent into the line, it carries the siphon with it, and it will thus be seen that the siphon, through which specially prepared ink is constantly flowing, will leave a record of the signals; that is to say, if the letter "A," consisting of one negative and one positive impulse is sent into the line, the siphon recorder will reproduce these impulses on a paper tape used to record the signals,

the siphon moving to one side of the tape when actuated by a positive current representing a dot, and to the other when actuated by a negative current representing a dash. So long as no current is passing through the line the siphon remains stationary in the center of the tape. The tape is kept constantly running under the siphon by a small motor, and to avoid excessive friction between the glass siphon and the tape a vibrator (invented by the late Charles Cuttriss, electrical engineer of the Commercial Cable Company) keeps the siphon constantly vibrating, thus avoiding continuous contact with the paper. Mr. Cuttriss was also the inventor of an automatic transmitter to replace hand-sending. A paper tape is first perforated by hand, each perforation representing a dot or a dash. This perforated paper is then passed through the automatic transmitter, the perforations permitting contact to be made between two contact points, which send either positive or negative currents to the line just as in the case of hand-sending. The advantage of this form of sending is that it insures uniformity of signals and much higher sending speeds than is possible by hand. Mr. T. J. Wilmot, deceased, who was also an electrical engineer of the Commercial Cable Company, invented another automatic transmitter. The transmitters of both Mr. Cuttriss and Mr. Wilmot are still in use in all parts of the world.

Since the invention of the siphon recorder no one has ever invented a mode of reception of long cable signals varying in principle to that of the recorder until Mr. John Gott, chief engineer of the Commercial Cable Company, invented, in 1912, a system by which ordinary Morse can be applied to the cables. *(To be Continued.)*

The James D. Reid Memorial.

The special committee of the James D. Reid Memorial in charge of negotiations with the sculptor, Charles Keck, New York, consisting of Messrs. Charles A. Tinker, David Homer Bates and Edwin F. Howell, with the approval of the chairman of the board, Charles P. Bruch, have duly executed the contract for the monument to be erected in the Mt. Hope Cemetery at Rochester, N. Y.

On the granite base will rest a granite column surmounted by a Scotch market cross, with a bronze wreath on four sides, and on the upper south face of the column, facing Mr. Reid's grave, a bronze bust of Mr. Reid in bas-relief.

On the front face of the monument there will be a bronze plaque with the following inscription:

JAMES DOUGLAS REID
Born Edinburgh, 1819
Died New York, 1901
A Pioneer of the Telegraph and Its First Superintendent.
Friend and Associate of Morse. A Kindly Gentleman of Beautiful Character and Stainless Life.
This Monument Was Erected Anno Domini, 1914, By Telegraphers, in Appreciation and Loving Memory of His Unselfish Helpfulness to Them.

The monument will stand eleven feet, nine inches high. The sculptor expects to have the plaster model of the monument completed some time in August and will be pleased to show it to any of the subscribers to the James D. Reid Memorial Fund if they will call at the studio, 40 West Tenth street, New York.

How to Save Money.

One of the most commendable traits of character is the habit of saving—judicious saving. It brings to the one practicing it a respect that no spendthrift can ever hope to receive from his fellow men.

Everyone connected with the telegraph and telephone should give the matter of saving a portion of his or her salary at regular intervals serious thought. The difference between saving and spending is independence.

For those who are honestly inclined to save some of their earnings the Serial Building Loan and Savings Institution offers advantages that should not be overlooked. This association was organized by members of the telegraph profession to encourage thrift and afford a safe place of deposit for their moneys. It has carried on this work for over twenty-five years, and is one of the soundest and most efficiently managed institutions of its kind. Its affairs are conducted by some of the most prominent telegraph officials, who give their time and thought without compensation for the good of the fraternity, and they have become expert at the banking business.

The association is conducted on the co-operative plan for the benefit of telegraph and telephone employes and that is why it is able to pay five per cent per annum to investors, who receive dividend checks semi-annually.

Everyone in the telegraph and telephone service should take advantage of the privileges offered by this association. By laying aside a definite amount each month, however small it may be, one soon gets on the road to financial independence. Mr. E. F. Howell, with offices at 253 Broadway and 16 Dey street, New York, is the secretary of the association.

New Book on Wireless.

The Elementary Principles of Wireless Telegraphy, by R. D. Bangay, has been issued by the Marconi Press Agency, Ltd., London, Eng. This book has been designed to meet the requirements of the large and continually increasing circle of wireless experimenters. As indicated by the title, it deals only with the principles underlying the subject, but a thorough knowledge of these principles is essential to amateurs, and the lucid exposition given by the author is in itself a justification of the enterprise of the publishers. It has 160 pages and 86 illustrations. Copies may be had of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price, $1.00 per copy.

Difficulties are things that show what men really are.

Utility of Wires on the Pennsylvania Railroad.

(Continued from page 424, July 16.)

The telephone current from either E or F entering or leaving at the middle of the repeating coils produces no inductive effect in the coils, because it travels in opposite directions in the two halves of the coil. Therefore the message from the stations

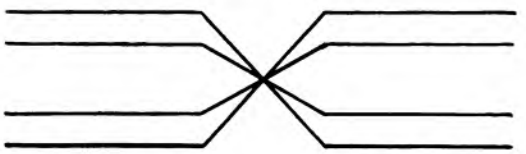

FIG. 29—PHANTOM TRANSPOSITION.

E or F is not heard at either A, B, C or D, just as the telegraph current in the simplex is not heard in the telephone.

Each physical circuit must, of course, be transposed for the usual reason, and, in addition, the phantom circuit requires transposition also. This is effected as shown in Fig. 29.

The presence of intermediate stations on a telephone line does not prevent using the line as part of a phantom circuit, for when so used the phantom message travels along both wires in the same direction and therefore will not enter the intermediate stations. Such stations will, therefore, not hear the phantom message.

Intermediate stations on the phantom circuit may be installed as shown in Fig. 30. Retardation coils A and B are placed in the physical circuits, and wires leave from the centre of these coils to the intermediate telephone station C.

The phantom telephone current going in the same direction in wires 1 and 2 will enter the re-

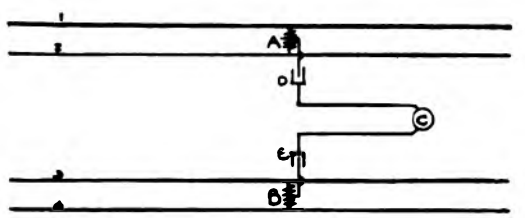

FIG. 30—CONNECTIONS FOR INTERMEDIATE TELEPHONE STATIONS ON PHANTOM CIRCUIT.

tardation coil A by both terminals simultaneously, encounter, therefore, a non-inductive resistance, and leave by its central wire, passing through C to the coil B and the return wires 3 and 4.

The telephone current in the physical circuit composed of wires 1 and 2 will not enter the retardation coil to any appreciable extent, as the coil opposes to a current entering by one terminal and leaving by the other an inductive resistance, and the telephone current being of high frequency would therefore be greatly impeded.

Condensers are sometimes inserted at D and E. These are convenient when it is desired to make measurements on one of the physical circuits, as they insulate the two physical circuits from each other. They are also of value in case one of the physical circuits becomes grounded, in preventing the other physical circuit from being disabled also.

In phantom lines, cables should be avoided as far as possible on account of their capacity. If cables are necessary, the variety known as "double-twisted pair" should be used.

The choice of a coil properly suited to the conditions of the line is as important in phantom lines as in simplex lines.

The phantom simplex is a simplex applied, not to a physical metallic circuit, but to a phantom circuit. The arrangement is shown in Fig. 31.

A and B are telephone stations connected by a metallic circuit. C and D are another similarly arranged pair. E and F are two telephone stations on the phantom circuit, composed of the two physical circuits just mentioned. Repeating coils are in-

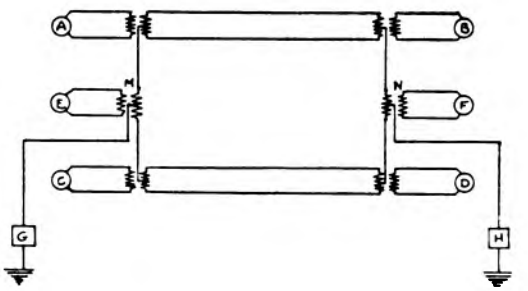

FIG. 31—THEORETICAL DIAGRAM OF PHANTOM-SIMPLEX CIRCUIT.

serted into the phantom circuit at M and N, and the ordinary simplex construction applied to these coils. This allows the introduction of telegraph stations at G and H, the circuit of which is completed by an earth return.

It will be noticed that the wire of this telegraph circuit is a four-fold divided circuit for the greater portion of its length, and is correspondingly low in resistance. Much more trouble is therefore likely to occur from earth currents than in the simplex, but it may be overcome in the same manner.

The presence of intermediate telephone stations on either physical circuit does not interfere with the workings of the phantom simplex. Interme-

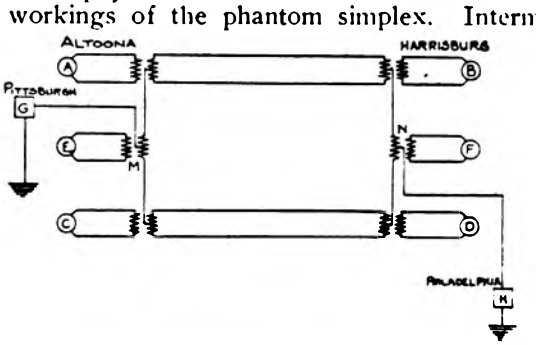

FIG. 32—THEORETICAL DIAGRAM OF PHANTOM-SIMPLEX CIRCUIT, WITH TELEGRAPH LINES LED OFF TO DISTANT POINTS.

diate telephone stations on the phantom circuit may be introduced just as in the ordinary phantom, but condensers should always be used in this case. (See Fig. 30.)

The telegraph offices G and H may be widely distant from the telephone stations on the phantom circuit. For instance (Fig. 32), the phantom circuit

may extend only from Altoona to Harrisburg, while the telegraph lines led off from it may extend from Altoona to Pittsburgh and Harrisburg to Philadelphia. It is, however, not practicable to insert telegraph offices between the telephone stations.

It must be noted that a four-fold line will produce four times as much leakage in damp weather as a single line, and extra care must be given to the insulation on this account.

(To be Continued.)

Telephones for Harvard's Stadium.

Using the telephone as an aid in managing athletic contests is an innovation recently put into effect at the New England intercollegiate track meet held in the Harvard Stadium at Cambridge, Mass.

A complete Western Electric magneto telephone system has been installed. The telephones are placed on wooden poles at various vantage points on the field, at the finish of the mile, the straightaway mark, the start of the 220 and 100 yard dashes, and in the press stand. The telephones are provided with leather carrying straps so that they

TELEPHONES ON HARVARD STADIUM.

can be readily carried to the field house at the termination of a meet. Twisted pair, copper-clad wire fastened to the top of the rim board running around the track makes it possible to connect the telephones at practically all points on the field.

The first trial of the telephone installation proved most successful in that it enabled the track officials to give orders and obtain information quickly and accurately in regard to the progress of events and so run off the contest with greater dispatch. By transmitting the results of each race or other contests to the press stand practically at the finish of the event, the work of the newspaper men was greatly facilitated.

RAPID WORK ON PERFORATOR.—On Christmas eve (December 24), 1913, Mr. Archibald Cruikshank, an operator in the Perth, Australia, office, perforated 1,062 messages in eight and a quarter hours, an average of nearly 129 messages an hour. This work was done on a Gell perforator.

The Telepost in the Senate.

The United States Senate, on July 17, passed a resolution creating a special committee of five senators "to investigate and report upon the merits of the telepost, now in operation between St. Louis and Chicago, as to word-carrying capacity, accuracy, economy, secrecy and general efficiency; as to its use in connection with the postoffice department, and as to any obstacles in the way of its extension, either in connection with the government, or otherwise." The resolution was amended by the committee on postoffices and post roads by adding the following: "And that the said committee is authorized to investigate and report upon the merits of the system of any other person or company that may offer or propose to perform the said service in connection with the postoffice department."

Improved Telegraph Key.

Mr. R. C. Brittin, of the Central Vermont Railway Company, Norwich, Conn., has invented a new telegraph key which cannot be knocked open accidentally. With the old-style key, it frequently happens that a book, or any other article, pushed against the side-switch lever will open the key without being noticed, but in Mr. Brittin's key the side switch is removed, and its function is performed by sliding the sending knob forward to close the circuit, and backward to open it so as to send.

Mr. Brittin has two of these keys in use in his office, and he says they are much easier to open and close than the old-style keys, and are giving excellent satisfaction.

Old Timers' Reunion.

A large attendance is expected at the thirty-third annual reunion of the Old Time Telegraphers and Historical Association and the Society of the United States Military Telegraph Corps, which will be held at the Hotel Baltimore, Kansas City, Mo., September 15, 16 and 17. Mr. George M. Myers, of Kansas City, is the president of the Old Time Telegraphers and Historical Association, and Col. William Bender Wilson, of Holmesburg, Philadelphia, of the Society of the Military Telegraph Corps.

The chairman of the hotel committee is Mr. R. L. Logan, superintendent of telegraph, Kansas City Southern Railway, Kansas City, Mo., to whom all hotel reservations should be addressed.

"DON'T WRITE, TELEGRAPH."—*The New Orleans States* publishes a page article on the dangers incurred by married men in writing love letters to other women, and gives some examples of recorded affection which figured in divorce and breach of promise suits. The advice is not to write, but to telegraph. It will be cheaper in the end.

MORSE PAINTINGS AT PANAMA-PACIFIC EXPOSITION.—Several paintings by Prof. S. F. B. Morse, inventor of the telegraph, will be exhibited at the Panama-Pacific International Exposition, to be held in San Francisco in 1915.

THE RAILROAD.

H. N. Stevens, aged seventy-nine years, one of the first telegraphers on the Central Pacific Railroad, died in San Francisco, Cal., July 14.

Railway Dispatch Systems.—Mr. E. R. Gill, of Yonkers, N. Y., is the inventor of an answer-back signal for railway dispatch systems. His signal is an audible one and is made by including an induction-coil primary in the local vibrating-bell circuit, the secondary of this coil being bridged across the line. This patent has been assigned to the Hall Switch and Signal Company.

Mr. Nicholas Roginsky, electrical engineer, assistant to the chief of the telegraph department, Moscow-Kavan Railroad, Moscow, Russia, and a member of the International Electro-Technical Commission, is in this country for scientific purposes, as is also Mr. W. Landsberg, engineer, assistant to the chief traffic manager of the same railroad system, who is in New York to inspect American railroads. Both gentlemen are at present looking into the moving of trains by wireless on the Lackawanna Railroad.

Wireless on the Lackawanna.—The Delaware, Lackawanna and Western Railroad Company, Mr. L. B. Foley, superintendent of telegraph, New York, began construction work on July 29 on a 400-foot wireless tower at Pier 1, Hoboken, N. J. When completed, which will be in about two or three weeks, a five-kilowatt Marconi wireless telegraph equipment will be installed. It is expected to maintain communication between this point and Buffalo with Scranton and Binghamton as intermediate offices. A similar equipment is in course of construction at Buffalo.

Death of J. B. Sheldon.

J. B. Sheldon, aged fifty-four years, superintendent of telegraph Union Pacific Railroad, Omaha, Neb., died in that city, July 29, as a result of an operation for mastoid. He was at his office up to July 24. Mr. Sheldon was a native of Canada and was appointed superintendent of telegraph of the Union Pacific May 6, 1908. He was one of the most progressive railroad telegraph superintendents and was president of the Association of Railway Telegraph Superintendents, 1912-13. He was highly esteemed by all who knew him.

Mr. Alex. Craw, Promoter of "Safety First."

Mr. Alex. Craw, claim agent of the Baltimore and Ohio and Baltimore and Ohio Chicago Terminal Railroad Companies at Chicago, a very popular railroad man and an old-time telegrapher, has been elected a member of the Public Safety Commission of Chicago and Cook County, organized for the advancement of the "Safety First" movement.

Mr. Craw commenced his railroad career as a messenger and then call boy at the general freight yards of the Erie Railroad Company at Jersey City, N. J., and, as such, he improved his spare moments by learning telegraphy. His next promotion was as operator at the roundhouse of the Central Railroad of New Jersey, at Elizabethport, N. J., where he remained a short time. He then accepted a position as operator for the Western Union Telegraph Company, at 195 Broadway, New York, where he remained a few years and resigned to accept a position as operator with a cable company at New York. Later he accepted a position with the Associated Press as operator and reporter. He longed to return to his first love, "railroading," and he was next found with the Peoria and Pekin Union Railroad Company at Peoria, Ill., as train dispatcher, where he remained a short time and resigned to accept a position as train dispatcher, first at Syracuse, N. Y., thence at Weehawken, N. J., for the West Shore Railroad Company, now part of the New York Central Lines. In a short time he was made manager of the general telegraph office of the West Shore Railroad at New York City.

When the claim department of the New York Central and Hudson River Railroad Company was first started, Mr. Craw was selected among one of the first to become a division claim agent, and he remained with the New York Central Lines until 1907, when he came with the Baltimore and Ohio Railroad as claim agent at Pittsburgh, Pa. In a short time he was transferred to Youngstown, Ohio, as claim agent, and in August, 1910, was appointed joint district claim agent of the Baltimore and Ohio and the Baltimore and Ohio Chicago Terminal Railroad Companies, with headquarters at the Grand Central Station, Chicago, Ill., which position he still holds.

Mr. Craw, since he has been located in Chicago, has made many friends in business and social circles. He is a member of the Old Time Telegraphers and Historical Association, a member of the advisory board of the Chicago Information Bureau, and a member of the Chesterfield Country Club, besides being a committeeman on the Public Safety Commission of Chicago and Cook County.

Book on Telephone Installation and Maintenance.

"Telephone Construction, Installation, Wiring, Operation and Maintenance," by W. H. Radcliffe and H. C. Cushing, jr., gives the principles of construction and operation of both the Bell and Independent instruments; approved methods of installing and wiring them; the means of protecting them from lightning and abnormal currents; their connection together for operation as series or bridging stations; and rules for their inspection and maintenance. Line wiring and the wiring and operation of special telephone systems are also treated.

Intricate mathematics are avoided, and all apparatus, circuits and systems are thoroughly described. The appendix contains definitions of units and terms used in the text. Selected wiring tables, which are very helpful, are also included.

The book, which contains 180 pages and 125 illustrations, is intended for electricians, wiremen, engineers, contractors, architects and others interested in the installation of telephone exchanges in accordance with standard practice.

The price is $1.00 per copy, and copies may be obtained of Telegraph and Telephone Age, 253 Broadway, New York.

MUNICIPAL ELECTRICIANS.

FIRE ALARM FOR SIOUX CITY.—A new fire alarm system is to be installed in Sioux City, Iowa. Forty boxes will be added to the present equipment, making a total of ninety boxes.

FIRE ALARMS IN LONDON.—As the result of a visit to America by two officials, the Fire Brigade Committee of the London City Council is considering the installation of a new system of fire alarms in London, subject to the completion of certain experimental work.

GROUNDING OF FIRE-ALARM BOXES.—The United States Bureau of Standards is co-operating with the grounding committee of the International Association of Municipal Electricians on the subject of grounding fire-alarm and police-signal boxes. Several fatalities have recently occurred due to ungrounded boxes and have shown the necessity for this form of protection. Many fire chiefs, however, oppose the practice of grounding on the score that the box ground too frequently renders the signal-box mechanism inoperative, owing to insufficient insulation between the box and the working parts. The subject will be discussed at the convention of the International Association of Municipal Electricians, to be held at Atlantic City, N. J., Sept. 15 to 18.

Convention of Municipal Electricians.

It is thought that the next annual convention of the International Association of Municipal Electricians, which will be held at the Hotel Isleworth, Atlantic City, N. J., on September 15, 16, 17 and 18, will be one of the most interesting and successful ever held by that organization. The location is one that is sure to bring out a large attendance, for business can be combined with pleasure very satisfactorily at that famous resort. Several interesting and practical papers will be presented and discussed, and the interests represented by the members will thereby receive great direct benefit.

The programme has not yet been announced, but the officers of the association are at work on it and hope to be able to publish it soon. Mr. J. W. Kelly, jr., chief of electrical bureau, Camden, N. J., is president, and Mr. Clarence R. George, city electrician, Houston, Tex., is secretary.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

Compare the fall of pressure with the flow or water through a pipe.

If a ten-volt battery be connected to a circuit with a resistance of ten ohms, what will be the value of the current and will this value be the same at all points in the circuit? Will the pressure be the same at all points?

If a voltmeter is bridged across this circuit at the battery terminals, what voltage will it indicate? If it is bridged across one-half of the resistance, what will be the voltage and if it is bridged across eight-tenths of the resistance what will be the indicated voltage?

(Page 39). Upon what principle does the action of a voltmeter depend?

Can the scale of a voltmeter be marked so as to indicate directly in volts the difference of potential?

Study the example shown in Fig. 8.

(Page 40.) In actual practice on testing desks, are the readings usually reduced to ohms?

How does the tester usually diagnose a case?

How does the tester specify the resistance of ground?

(Page 41.) What means are employed to measure resistance too great to be measured with a voltmeter?

For the highest resistance, such as insulation tests, what is the method employed for measurement?

What is the most convenient and accurate method of measuring resistance over ordinary ranges? Study Fig. 9 in this connection.

Referring to Fig. 9 on page 42 is it necessary to know the actual resistance of the arms A and B?

What is the important thing to know?

In the box type of bridge how is the battery usually connected and how is the galvanometer connected?

(To be Continued.)

Sound Amplifiers.

BY SAMUEL WEIN, NEW YORK.

After looking over the entire market for loud speaking telephone receivers, or, as they are better known, "sound amplifiers," it seems that none of the experimenters has understood the problem sufficiently to make a receiver free from metallic sounds, impaired articulation and to operate these devices on small currents.

It is my purpose to demonstrate a new principle in amplifying sound in order that some investigator may develop the details and produce a practical device.

A valve is constructed of two fine flat gratings, one forming the seat and the other the cover. The pitch of these gratings are the same. One of them forms the stationary element of the valve, and also forms part of the boundary of a compressed air chamber. The outer grating forms the valve cover, and is attached so that it can be vibrated in proportion to the variations in magnetism of a telephone receiver magnet. To this valve a horn or trumpet is attached. Should any sound, either vocal or musical, be created near a telephone transmitter, which is connected in series with this valve or relay, the fluctuating currents will separate these gratings in proportion to the original sounds.

In developing such apparatus, the following leading principles must be carefully observed. As a measure of the forces of momentum in the diaphragm of a receiver, and as a basis of calculation, the force of acceleration at the center of the receiving diaphragm (when conversation is being held) often amounts to 100 times gravity, the amplitude of the vibrations in this case being about 0.003 inches and the periodicity about 500 per second.

The energy required to vibrate a small hinged valve at a given number of periods per second, the movement being according to any given characteristic wave form, varies as the square of the amplitude of vibration, and also as the square of the frequency. It also varies as the integral of the mass multiplied by the square of the amplitude of oscillation or radius about the line of oscillation.

Again, assuming a musical note of 500 complete vibrations per second and a pressure of air at the valve of 72 inches of water column, the velocity of flux of the air through the valve opening, though theoretically about 500 feet seconds (through a well-shaped jet of considerable diameter) will practically pass through the very narrow lip opening, in the present case not exceeding 250 to 400 feet seconds, so that assuming a sine curve for the motion of the valve, at each opening of the valve from the nearly closed position to its return to that position, it will pass a volume of air in cubic inches numerically of the order of from three to five times the maximum cross section of the valve opening in square inches. In other words, the energy of the air passed at each vibration is much smaller than would be at first supposed.

To attain the maximum efficiency of energy of sound produced by a given energy imparted to the apparatus, it is desirable to keep the amplitude of motion of the valve and all moving parts as small as possible. On the other hand there is the fact that the velocity of the flux of air through minute apertures decreases more rapidly than does the opening when such apertures become very small, say about 0.001 of an inch or less.

The area of opening of the valve must be approximately proportional to the displacement, so as to correctly reproduce the sound wave, and the opening must not be too small, or else the effect of the decreased velocity of influx through very narrow openings will cause an impaired result and a distortion or muffling of the sound wave.

The pitch of the grating or opening must be as fine as sixty-six slits per inch and the width of each slit about 0.008 of an inch.

Such a valve may have twenty slits and twenty-one tongues. Each slit is 3-16 inch long, thus giving a total length of lip opening of $2 \times 20 \times 3\text{-}16 = 7\frac{1}{2}$ inches. Such a valve is very small in dimensions. The thickness of the tongue may be 0.015 at the roots, tapering to 0.003 at the tips, and if this is made of aluminum its weight will be $\frac{1}{4}$ of a grain.

The air pressure supplying one of these air valves may be from two to five pounds per square inch.

Wu Ting Fang and the Telephone.

Wu Ting Fang, former Chinese minister to the United States, in his book "America Through the Spectacles of an Oriental Diplomat," refers to the telephone as follows:

"Another thing inseparable from American business is the telephone. A telephone is a part of every well-appointed house, every partner's desk is provided with a telephone, through which he talks to his clients and transacts business with them. In all official departments in Washington scores of telephones are provided; even the secretary of the department and the chief of the bureau give orders by telephone. It goes without saying that this means of communication is also found in the home of almost every well-to-do family. The invention of a telephone is a great blessing to mankind: it enables friends to talk to each other at a distance without the trouble of calling. Sweethearts can exchange their sweet nothings, and even proposals of marriage have been made and accepted through the telephone. However, one is subjected to frequent annoyances from wrong connections at the central office, and sometimes grave errors are made. Once, through a serious blunder, or a mischievous joke, I lost a dinner in my legation in Washington. My valet received a telephone message from a lady friend inviting me to dine at her house. I gladly accepted the invitation, and, at the appointed time, drove to her home, only to find that there was no dinner-party on, and that I should have to go hungry."

Ralph D. Blumenfeld.

BY C. L. CLEVENBERG, NEW YORK.

The very interesting article in your issue dated July 16 of the career of Mr. Ralph D. Blumenfeld, publisher and editor-in-chief of the London *Daily Express,* recalls to me the names of some of the "boys" who worked with him in the eighties in the old Western Union office at the corner of Washington and LaSalle streets, Chicago, and who have since become prominent in business and telegraph circles.

Among others there was Orson Wells, who became a partner of John W. Gates, and now retired; H. D. Sturtevant and Charles G. Smith, now partners in prominent Stock Exchange firms; Dr. W. S. Manners, now assistant medical director of the Metropolitan Life Insurance Company, New York; George O. Perkins, now superintendent of telegraph of the Chicago and Great Western Railroad; Thomas Gibson, author and writer of financial literature New York; Charles Dean now agent for the Associated Press at Milwaukee, and F. R. ("Pud") Phillips, who has a large manufacturing business in Canada.

Of the chiefs in "CH" in those days, J. C. Barclay became assistant general manager of the company; W. J. Lloyd is general manager of the Mountain Division, Western Union Telegraph Company, at Denver, Colo.; W. R. Holligan became a member of the New York Stock Exchange; V. T. Kissinger is now superintendent of telegraph of the Burlington Road at Chicago; L. K. Whitcomb is division commercial superintendent, Western Union Telegraph Company, at Dallas, Tex., and John McRobie is general manager of the American District Telegraph Company, New York.

Amusing Telegraph Experiences.

Mr. J. F. Slack, chief operator, Western Union Telegraph Company, Fort Smith, Ark., relates some amusing experiences during his many years in the telegraph service. One happened some years ago while he was an operator at Sioux City, Iowa, when Charles Soule was manager. Matters had shaped themselves so that it was necessary for the operating force to make frequent raids on the counter, in order to secure money enough to tide them over an impending crisis. During one of these raids it fell to Mr. Slack's lot to wait on the counter for the prospective cash, when an elderly lady, and, supposedly, her daughter, entered the office. She presented a bird in a cage and asked, "How much will it cost to send this to Kansas City." It took him but a few seconds to regain consciousness, when he explained to her that she was probably looking for an express office, to which he obligingly directed her.

This experience was recalled by an incident which happened in the Fort Smith office one night recently, when an elderly gentleman, slightly under the influence of one of the many brands of "moonshine," approached the counter, and placing his foot upon the foot-rail, asked the counter clerk for a glass of beer.

Another recent incident was when a big fat negress approached the counter with the inquiry, "Is this the place where they make keys?" She must certainly have been looking for the person that put the "key" in whiskey, says Mr. Slack.

Outing of Philadelphia Postal Athletic Association.

The first annual outing of the Postal Telegraph Employes' Athletic Association proved a big success. Cloudy skies and murky atmosphere in no way dampened the enthusiasm of the members and their friends on Saturday, July 25, at Woodside Park, Philadelphia.

Eight features composed the racing programme. In the inter-department mile relay the different departments were routed by the messengers' team. Gold medals for first and bronze medals for second place were presented in the band pavilion at the end of the races by Superintendent C. E. Bagley.

One runner, Harry Lewis, was overcome in the mile relay, but was speedily revived by Dr. J. P. Lenahan.

Following the races a baseball game was played between the strong American Telephone and Telegraph team and the Postal team. From the moment the umpire said "Play ball," the Postal boys, who went to bat first, took the lead and were never headed-off.

Summaries:

Event No. 1. 50-yard dash; trial heat No. 1, won by J. Hardy; second, P. G. Murphy. Time, 5 1-5 seconds. Trial heat No. 2, won by B. J. Connelly; second, F. Hoban. Time, 5 2-5 seconds. Final heat, won by B. J. Connelly; second, F. Hoban. Time, 5 1-5 seconds.

Event No. 2. 75-yard sack race; won by H. Lewis; second, L. Castro. Time, 20 3-5 seconds.

Event No. 3. 50-yard dash (Ladies): Won by Katharine McLaughlin; second, Olga Falcon. Time, 5 3-5 seconds.

Event No. 4. 75-yard obstacle race, won by F. Hoban; second A. G. Carpenter. Time, 10 4-5 seconds.

Event No. 5. 100-yard dash; trial heat No. 1, won by J. Hardy; second, J. Sullivan. Time, 11 1-5 seconds. Trial heat No. 2, won by B. J. Connelly; second, F. Hoban. Time, 11 seconds flat. Final heat, won by J. Sullivan; second, B. J. Connelly. Time, 12 seconds.

Event No. 6. 75-yard dash, messengers, won by Sorokin; second, Vigatalone. Time, 10 seconds flat.

Event No. 7. One-mile relay, inter-department, won by messengers' team (McCullough, Castro, Leadbeater, Sullivan). Time, 5 minutes, 10 seconds; second, branch team (McCredy, Burke, Lewis, Peters). Time, 5 minutes, 15 seconds.

Event No. 8. One-mile relay, messengers, won by team No. 2 (Owens, Gaitzman, Silverman, Sorokin). Time, 4 minutes, 50 seconds; second, team No. 1 (Marcolongo, Vigatolone, Logan, Goldfield). Time 4 minutes, 55 seconds.

General committee: F. P. McElroy, chairman; D. Logan, secretary; W. V. Madden, baseball; E. M. Price, track; C. W. Kofink, E. M. Barnes, Wm. Miley.

Judges: C. E. Bagley, J. H. Wilson, R. C. McCredy.

Among those present were J. E. Zecher, manager, Atlantic City, N. J.; W. P. Phillips, manager, Reading, Pa.; R. W. Jackson, manager, Wilmington, Del.; A. S. Wier, representing brokers; A. G. Strickland, American Telephone and Telegraph Company; C. S. Huver, electrical bureau.

New York Telegraphers' Aid Society.

The quarterly statement of the New York Telegraphers' Aid Society, for the quarter ended June 6, is as follows:

RECEIPTS.

Balance on hand March 6	$25,951.54
Receipts	1,859.33
Total	$27,810.87

DISBURSEMENTS.

Death benefits	$300.00	
Sick benefits	1,174.21	
Expenses	206.90	1,681.11
Balance on hand June 6		26,129.76
Total		$27,810.87

RELIEF FUND.

Balance on hand March 6	$6,487.67
Receipts	118.36
Total	$6,606.03

DISBURSEMENTS.

Balance on hand June 6	$6,452.03
Disbursements	154.00
Total	$6,606.03

Mr. J. E. Rowe, Western Union Telegraph Company, Atlanta, Ga., writes: "The coming of the AGE has always been looked forward to by me, and the reason is, that the news items and the articles have a peculiar habit of striking a responsive chord in that most complex of human mechanisms—the telegrapher."

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 571 to meet the claims arising from the deaths of R. P. Peake, at North Sydney, N. S.; G. G. Lilly, at New York; N. B. Ross, at Enfield, N. H.; W. R. Moffet, at New York; R. A. Furr, at New York; D. B. Scott, at Moncton, N. B.; J. D. Mason, at New York.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Senator W. L. Ives has returned from a trip through New York State, in excellent health.

Mr. Philip Kinman, district commercial manager, 1398 Broadway, was, on June 28, married to Miss Frances Kaiser, former manager of the 1363 Third avenue office. The honeymoon was spent at Niagara Falls. Mr. Kinman's associates in the commercial department presented the couple with a handsome rug.

UTICA WESTERN UNION

Manager F. E. Howell is absent on a vacation.

BAY CITY, MICH., WESTERN UNION.

This company's office in this city is one of the finest in the State. It is located on the principal thoroughfare and the equipment is of the latest pattern. Mr. A. A. Patterson is the manager. On the staff is an operator who is thought to be the smallest telegrapher in the country. His name is Harvey Butler and he began as a messenger about three years ago. He became an operator in due time and now works the Detroit duplex in a first-class manner. He is eighteen years of age, forty-six inches high and weighs seventy-two pounds. He handles about 250 messages a day.

Telegraph and Telephone Age

No. 16. NEW YORK, AUGUST 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

The Gulstad Relay.

We frequently receive inquiries for information regarding the Gulstad relay which has come into prominence recently. The following description of the instrument taken from the *Post-Office Electrical Engineers' Journal*, of London, England, will be read with interest:

The Gulstad relay is becoming more frequently used on the underground and submarine circuits of the English Post-Office. It is a polarized relay and is constructed on similar lines to the Post-Office standard relay, but in addition to the movable bridge carrying the adjustable contacts which govern the play and bias of the armature, the electromagnets are also adjustable by means of a screw, and can be made to give a variable air-gap between the poles of the electromagnets and the armature.

The relay is wound with two sets of coils, termed "main" and "auxiliary." The main, or line coils, have a resistance of 1000 ohms when joined in "series." A switch is provided at the back of the instrument by means of which the coils can be readily joined up in multiple when desired, and they then have a resistance of 250 ohms.

The auxiliary coil has a resistance of 300 ohms; it is divided into two sections, and is connected to three terminals at the back of the relay, the resistance between each pair of terminals being 150 ohms. If a current enter by the center terminal of the auxiliary coil and leave by the two outer ones it will act differentially. The auxiliary coil is provided so that a local current may be introduced into the apparatus with the object of making the relay more sensitive, and converting it into an instrument able to record signals which have a varying zero line, such as those obtained from long underground or submarine cables.

With proper connections, and with suitable resistances and capacities in the various coils and condensers, the armature of the relay will vibrate when no current is passing through the line coils.

The object to be attained is first to make the relay vibrate through the action of the current in the auxiliary circuit at approximately the same speed as the reversals of the distant Wheatstone transmitter. The two systems, line and local circuits, should have such a relationship that the line current shall have the effect of stopping the vibrations for a certain length of time, depending upon the signal that is being transmitted, *i. e.*, a dot or a dash. Of course these remarks apply equally to the "spacing" as well as the "marking" currents.

One of the reasons for want of sensitiveness in an ordinary relay is the magnetic attraction between the armature and the nearest pole-piece of the electromagnet; so that although a current may cease and even be changed in direction, some little time will elapse before the reversed current will have risen sufficiently in value to cause the armature to move towards the opposite pole-piece of the electromagnet.

The action of the current in the auxiliary coils of the Gulstad relay is opposed to that of the line current, and if the two currents be nearly equal, then directly the line current falls sufficiently the auxiliary current will cause the armature to move to the opposite side. Thus the relay becomes very sensitive, and will respond much better to the variations in the line current; in fact, it might almost be said that the relay anticipates, as it were, the action of the line current.

The condenser between the relay and ground, in addition to affecting the timing of the current in the auxiliary circuit, assists materially in securing good contacts. When the relay tongue makes contact with a battery stop the charging of the condenser momentarily confirms the action of the line current, thus ensuring a good contact, and when the line current is diminishing in value prior to being reversed, and the auxiliary current causes the tongue to move away, the discharge of the condenser will move it quickly in the required direction.

Sparking due to induction from the line or leak is neutralized by a condenser connected with the tongue, and in order that this condenser may not in itself give rise to sparking or sticking at the tongue contacts a small resistance is placed in series with the condenser. Speaking generally, this has not been found necessary on the English land lines and both items have been omitted.

The rise and fall of the currents in the auxiliary circuit may be brought into harmony with those

in the line by watching the effect on the signals due to altering the various resistances and capacities.

Telegraph and Telephone Patents.

ISSUED JULY 21.

1,104,062. Wiring System for Telephone Exchanges. To F. R. McBerty, New Rochelle, N. Y.

1,104,065. Detector for Wireless Apparatus. To B. J. Meissner, Washington, D. C.

1,104,073. Detector for Wireless Telegraphy and Telephony. To G. W. Pickard, Amesbury, Mass.

1,104,256. Apparatus for and Method of Receiving Electric Waves. To R. Goldschmidt, Darmstadt, Germany.

1,104,257. High-Frequency Generator. To R. Goldschmidt, Darmstadt, Germany.

1,104,451. Telephone Automatic Trunk Selecting System. To M. Setter, Chicago, Ill.

1,104,605. Telephone System for Trains. To H. E. Barber and J. W. McFarland, Cherry Tree, Pa.

1,104,610. Receiver for Telephones. To G. N. Blanchard and O. G. Minzenmayer, San Francisco, Cal.

1,104,712 and 1,104,746. Wireless Telegraph or Telephone System. To W. A. Shepard and A. E. McKechnie, London, England.

ISSUED JULY 28.

1,104,956. Telephone Operator's Equipment. To W. G. Blauvelt, New York.

1,105,029. Automatic Commutator for Radiotelegraphic Plants with Indirect Excitation. To E. Girardeau, Paris, France.

1,105,066. Telegraphic Transmitter. To J. J. Comer, Santa Monica, Cal.

1,105,194. Selective Mechanical Operator. To E. R. Gill, Yonkers, N. Y.

1,105,329. Cable Telegraphy. To I. Kitsee, Philadelphia, Pa.

1,105,344. Telephone System. To E. R. Corwin, Chicago, Ill.

1,105,345. Telephony. To E. R. Corwin, Chicago, Ill.

1,105,346 and 1,105,347. Telephony. To M. L. Johnson, Chicago, Ill.

1,105,348. Telephone System. To C. A. Bals, Chicago, Ill.

1,105,436. Police and Fire-Alarm System. To G. L. Hughes, Chicago, Ill.

1,105,485. Intercommunicating Telegraph or Telephone Device. To A. C. Carlson, Butler, Pa.

1,105,490. Telephone Exchange System. To E. E. Clement, Washington, D. C.

1,105,491. Electrical Selective Switch. To E. E. Clement, Washington, D. C.

1,105,492, 1,105,545 and 1,105,589. Telephone Exchange System. To E. E. Clement, Washington, D. C.

1,105,563. Telephony. To M. L. Johnson, Chicago, Ill.

1,105,564. Telephony. To C. A. Bals, Chicago, Ill.

No Stock Quotations.

Owing to the closing of the New York Stock Exchange and the consequent suspension of stock transactions, no quotations are available.

PERSONAL.

MR. J. W. HAYES, a well-known old time telegrapher, now editor of the *American Telegrapher*, of Los Angeles, Cal., is in New York in the interest of his magazine. He is also visiting other points in the interest of his periodical.

MR. FREDERICK PEARCE, the well-known electrical manufacturer of New York, returned from Europe on August 4. Mr. Pearce was fortunate in leaving Glasgow just before the war talk became serious. Many other electrical and telegraph people of the United States, who were not so fortunate, are now bottled up in England and on the Continent.

Mr. G. H. CORSE, JR., an old-time telegrapher of New York, and at various times identified with the service in other sections of the country, now and for the past few years general passenger agent, San Francisco Overland Routes, with headquarters at Yokohama, Japan, was in New York a few days ago on a trip of business and pleasure and called on many old friends. Mr. Corse will return to Japan on the steamer "Manchuria," sailing from San Francisco on August 26.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, is again at his desk after a rest in Massachusetts and Rhode Island.

MR. W. I. CAPEN, vice-president, New York, left on August 12 for Colorado and the Pacific Coast on a business trip.

MR. C. F. LEONARD, superintendent, New York, is taking a two week's rest from his duties. During that time he will make a trip to Lake George and Lake Champlain.

MR. C. E. BAGLEY, superintendent, Philadelphia, Pa., was an executive-office visitor on August 10.

MR. W. B. DUNN, assistant secretary of this company, recently completed twenty-five years of service with the company. He began on June 30, 1889, as a messenger boy. He was appointed to his present position in September, 1910.

MR. C. SHIRLEY, assistant traffic manager, New York, has laid business cares aside temporarily, and is resting along the shores of Lake George.

MISS E. A. PATTERSON, of the general manager's office, New York, is at Lake George for two weeks.

MR. L. C. MCCORMICK, manager at Detroit, Mich., is planning to make a trip to New York soon. He will be accompanied by his family.

MR. F. C. LACEY, manager of the Mackay Telegraph and Cable Company, at Houston, Tex., was a recent executive office visitor.

MANAGERS APPOINTED.—Managers have recently been appointed as follows: C. C. Flint, Rock Island,

Ill.; R. F. Lambert, Adrian, Mich.; Miss M. A. Swan, Lafayette, Ind.; E. E. Evans, Ellinwood, Kan.; Andrew A. Blaschak, East Liverpool, Ohio; C. P. Cobb, Henderson, N. C.; Miss Rose Benner, Grinnell, Ia.; V. L. Tillis, Boca Grande, Fla.; Chas. W. Northrop, Towanda, Penn.; LaVesta M. Eldridge, Elko, Nev.; O. F. Schulz, of Tacoma, Wash., at Portland, Ore.; A. R. Wilson, of Salem, Ore., at Tacoma, Wash.; D. D. Wilson, at Salem, Ore.

POSTAL BASE-BALL.—The "Postal Blues" defeated the "Western Union Day Letters," at Springfield, Ill., by a score of 10 to 5.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president of the company, returned to his office for a day or two this week to attend to important business. Mr. Carlton has been enjoying a well-earned rest on his yacht.

MR. L. MCKISICK, assistant to the president, recently visited Dallas, Tex. When he returned to New York he brought his family with him.

MR. W. A. SAWYER, district commercial superintendent, recently arranged to establish independent offices at LeRoy, Oswego, Lockport and several other places in his district. Fifty per cent of the former joint offices in his district have been established on an independent basis.

THE MOTHER of Mr. W. A. Sawyer, superintendent, New York, died in New Haven, Conn., August 9.

MR. J. S. CALVERT, district commercial superintendent, Richmond, Va., was a recent executive office visitor. While in New York he attended the outing of the Morse Electric Club on August 31.

MR. A. S. BRADLEY, district commercial superintendent, Minneapolis, Minn., has had a corner of his quarters photographed on postal cards, which he is mailing to his friends.

MR. L. K. WHITCOMB, district commercial superintendent, Dallas, Tex., has been retired on a pension.

MR. FRANK KITTON, of the electrical engineers' office, accompanied by his wife and daughter, has returned from the Adirondacks, where a two-week's vacation was enjoyed.

MR. C. W. CARVER, formerly division auditor, Denver, Col., has been transferred to the office of the comptroller at New York. A farewell banquet was given him on his departure, and he was presented with a traveling bag.

MR. W. L. JACOBY, vice-president of the American District Telegraph Company, New York, is entertaining a party of friends on his yacht.

MR. J. MCROBIE, general manager of the American District Telegraph Company, New York, is back again at his desk after a business trip which took him through Virginia, Ohio, Michigan and Illinois.

MR. C. A. BOWEN, district wire chief, Atlanta, Ga., has been transferred to Memphis, Tenn., as wire chief, to succeed Mr. A. M. Tuttle, transferred to Lynchburg, Va., as repeater man.

MR. W. E. HERRING, former manager of the Postal Telegraph-Cable Company of Texas, at San Antonio, Tex., has been appointed manager for the Western Union Telegraph Company at the same place, vice F. H. Austin transferred to Dallas.

MR. W. E. LUKENS, assistant chief operator, Cincinnati, Ohio, has been appointed chief operator in place of L. E. Moores, deceased. Mr. Lukens was born in Columbia, Ohio, February 28, 1868, and entered the telegraph service in Cincinnati, in June, 1883, as check boy. He has filled positions as utility man, assistant wire chief, way chief, day wire chief, second assistant trunk chief, repeater chief and assistant chief operator, now becoming chief operator.

MR. J. E. PALMER, of Pittsburgh, Pa., accompanied by his wife, is visiting his two sons in New York. Mr. Palmer has been identified with the Western Union service at Pittsburgh and in the West for the past forty-four years. His two sons, George E. and J. R., are also identified with the same interests in New York.

MR. W. L. MCARTHEY, formerly manager at Mount Vernon, Ind., has been promoted to a similar position at Wabash, Ind., vice C. H. Lacey, resigned. Mr. McArthey is succeeded at Mount Vernon by Mr. C. W. Carr.

MR. H. C. GREEN, of Rushville, Ind., has been appointed manager at Warsaw, Ind., vice Mrs. C. M. Druckamiller, resigned.

MR. HARRY HASSINGER, formerly cashier at Terre Haute, Ind., has been appointed manager at Gary, Ind., vice Mr. A. E. Simpson, resigned.

MRS. MABEL E. BRUBECK has been appointed cashier at Terre Haute, Ind.

H. H. BEARD, aged fifty-seven years, operator at Columbia, S. C., died suddenly at his key, June 19. He was manager at Yorkville, S. C., for thirty-six years before going to Columbia.

MANAGERS APPOINTED.—A. A. Jeunet has been appointed manager at Franklin, Pa., E. J. Reidy at Bradford, Pa., G. T. Harris at Uniontown, Pa., J. W. Hmiel at Geneseo, N. Y., vice D. F. Lewis, resigned on account of ill health; F. H. Cooley at Easton, Pa.

THE PLANT DEPARTMENT headquarters at Jacksonville, Fla., have been given up, and the work of the second and third districts of the Southern Division has been consolidated, the headquarters being at Atlanta, Ga. Mr. J. C. Duane has been appointed district plant chief at Jacksonville.

NEW BOSTON OFFICE.—This company has leased, at 175 Congress street, Boston, Mass., ample space for a modern telegraph office. The building is splendidly arranged for a main operating room and Boston will have an up-to-date equipment as soon as the engineers complete their work.

AN OFFICE was opened at Sea Girt, N. J., on July 20, on account of the New Jersey State Encampment.

THE DAYTON, OHIO, main office has been completely remodelled. The commercial department occupies the entire ground floor and the traffic department part of the second floor. The company's wires throughout the city have been placed underground and the poles removed.

THE NATCHEZ, MISS., office was recently remodelled and refurnished. Mr. F. B. Washington is manager; J. K. Durbin and Guy Campisi, operators, and Miss Hazel Lee, clerk.

NEW ORLEANS OFFICE.—The operating department of the New Orleans office was recently moved to new and modern quarters on the third floor of the same building. The old operating department occupied the second floor for over half a century.

INDEPENDENT OFFICES have been opened at New Brunswick, N. J., and Ithaca, N. Y.

Outing of the Morse Electric Club.

The summer outing of the Morse Electric Club, New York, was held on Saturday, August 1, at College Point, Long Island, with an attendance of 160, the president of the club, Belvidere Brooks, and many of the officials of the Western Union Telegraph Company, being present. The day was an ideal one for the affair, and everyone had a good time. The trip through the harbor to College Point, on the cable steamer "Western Union," which the Western Union Telegraph Company placed at the disposal of the members, was a delightful one.

The opening event of the afternoon was a game of baseball between the clerks and operators. It was hotly contested and won by the operators with a score of 6 to 0. A prize of $10 was awarded the victorious team.

After the baseball game several races were run.

The seventy-five-yard dash was won by W. C. Merly; F. J. Sheridan, second; A. M. Lewis, third.

Seventy-five-yard dash, open for all—H. Lupka, first; E. A. Reilly, second; G. B. Daniels, third.

440-yard dash, open for all—W. Eymer, first; I. Reipstein, second; G. Lewis, third.

Seventy-five-yard dash for fat men—J. Cashman, first; M. J. Hayden, second; J. F. Nathan, third.

Seventy-five-yard dash, special—T. J. Farrell, first; J. L. Brady, second; P. E. Grogan, third.

At seven o'clock all hands, with large appetites, sat down to dinner, during which they listened to excellent music and singing rendered by employes of the Western Union Company in Mr. F. E. d'Humy's office. At the conclusion of the dinner prizes were awarded to the winners of the afternoon games, and useful and valuable articles were distributed among the members by lot.

Among those present were: E. Ademic, F. T. Albert, C. W. Aldrich (Buffalo, N. Y.), F. H. Austin, W. J. Austin, L. D. Beall, B. Beardsley, J. W. Behre, B. F. Benson, J. A. Berry, D. H. Blake, R. K. Bonell, J. S. Bradbury, J. L. Brady, T. M. Brennan, G. Brigott, R. D. Brixey, Belvidere Brooks, M. J. Brooks, J. Bruna, J. S. Calvert (Richmond, Va.), P. J. Casey, J. Cashman, J. T. Carberry, A. R. Carmichael, T. F. Clark, A. O. Cloker, T. Conaty, J. W. Connolly, A. J. Colier (Jersey City, N. J.), W. J. Conkling, F. E. Coyle, G. B. Daniels, J. A. Dierks, B. Dowd, Lewis Dresdner, F. C. Duey, H. Durland, T. W. Dykeman, S. M. English, W. Eymer, A. M. Fancell, T. J. Farrell, G. W. Fascher, A. Fels, A. M. Fisher, W. A. Fishman, F. E. Fitzgibbon, J. H. Fleming, T. E. Fleming, W. S. Fowler, W. Franklin, D. C. Frazer (Hoboken, N. J.), N. Griffin, F. D. Giles, J. J. Gilroy, N. Goldman, D. Graham, M. M. Green, M. Green, E. P. Griffith, P. E. Grogan, D. Gross, J. F. Hackett, S. F. Hackett, F. C. Halstead, N. B. Hall, M. W. Hamblin, C. A. Harvey, W. Harvey, M. J. Hayden, H. Herman, L. Herrmann, J. A. Hill, T. H. Hodder, W. A. Hoffman, E. G. Hohenstein, H. Holzman, T. F. Hull, C. A. Impemba, G. Irving, J. E. Jenkins (Buffalo, N. Y.), J. Johnson, F. L. Kellogg, C. A. Kilfoyle, F. J. Lantry, A. M. Lewis, G. Lewis, B. Lieberwitz, F. W. Lienau, A. Lister, H. Lupka, C. B. McCann, J. McConnell, J. McCusker, J. L. A. McDonough, A. J. McGivern, J. F. Maguire, N. Maresca, W. Marshall, W. H. Martin, W. C. Merly, C. A. Meyer, H. P. Moser, C. E. Muerling, C. H. Murphy, C. J. Murphy, R. J. Murphy, J. F. Nathan, T. L. Nathan, J. C. Nelson, T. J. Nilan, M. J. O'Leary, H. W. Petrie, M. E. Pierce, R. Pierson, D. M. Polak, M. S. Polak, W. S. Porch, W. J. Quigley, W. J. Quinn, C. E. Rafford, R. Raphael, M. W. Rayens, S. Reiss, C. Reiser, I. Reipstein, B. H. Reynolds, M. H. Reynolds, L. Ribler, E. A. Riley, J. J. Riley, G. Roehm, H. Rosenburg, W. A. Sawyer, A. G. Saylor, F. J. Scherrer, G. Schreiner, W. A. Schudt, F. J. Sheridan, D. Silverman, J. Simons, J. Simmonds, T. G. Singleton, T. Skidmore, C. J. Skidmore, A. J. Skiffington, G. F. Smith, G. F. Stainton, P. J. Sullivan, T. R. Taltavall, H. Tepe, L. Vanderbilt, J. B. Van Every, H. F. Van Every, D. E. Van Orden, J. Veitch, M. P. Vrabel, A. O. Wallis, J. Wenderth, O. L. Whiteneck, J. C. Williams (Brooklyn, N. Y.).

Postal Telegraph-Cable Company of Texas.

TEXAS CHANGES.—Mr. W. L. Jones, general manager, The Postal-Telegraph-Cable Company of Texas, Dallas, Tex., reports the following service changes: Mr. Samuel G. Mullen, chief operator at San Antonio, Tex., has been promoted to the position of manager, vice W. E. Herring, resigned. Mr. F. J. Kalb, night chief, succeeds Mr. Mullen as chief operator, and Mr. F. H. Bell has been appointed night chief. Mr. Charles J. Parker, former manager at Temple, Tex., has been appointed manager at Sherman, Tex., vice P. R. Napier, resigned. Mr. J. E. Custer has been appointed manager at Denison, Tex., vice W. F. Spung resigned.

MR. ULRIC ROQUEMORE has been appointed manager for the Postal Telegraph-Cable Company of Texas at Crowley, La., vice H. F. Birdsong, resigned.

THE CABLE.

P. J. PHALEN, an operator at the Canso, N. S., cable station of the Western Union system, died June 27.

TO DISPOSE OF CABLE SHIP.—The Government of the Philippine Islands is considering the proposition of disposing of the official cable ship, the "Rizal," and purchasing a boat that may be operated more cheaply.

GERMAN CABLES CUT.—The German transatlantic cables were cut on August 5 between the Azores and Enden, and the Commercial Cable Company and the Western Union Telegraph Company announced that they could not accept messages for Germany.

CABLES CENSORED.—On account of the European war the Western Union, Commercial and French Atlantic cables have been placed under censorship abroad, and all messages must be written in plain English or French. The Pacific Cable has also been placed under censorship.

NEW CABLE SHIP.—The French Transatlantic Cable Company recently finished the fitting out of a new cable ship, the "Edouard Jéramec." This is the first cable ship built in a French shipyard, and will be employed in the repair of the company's cables, including deep-sea cables, in the North Atlantic. She will be stationed at Halifax, N. S., replacing her predecessor the "Contre-Amiral Caubet," which has been in service seventeen years.

THE COMMERCIAL CABLE COMPANY announces that it will accept cablegrams for transmission via San Francisco, Cal., to Russia in Asia and Russia in Europe. They will be subject to censorship, delay and sender's risk. They must be written in one plain language—Russian, French, English or German. The rate from New York to Russia in Asia is $1.62 and to Russia in Europe $1.72 per word. From San Francisco the rates are $1.50 and $1.60, respectively.

THE EUROPEAN WAR has affected the cable business, and the commercial community will be heavy losers as a result of having to discontinue the use of cipher and code in cablegrams. The sending of such messages has been prohibited by England, France, Germany, Russia and all countries involved in the war. Cablegrams for points in Great Britain and Europe must be written in plain English or French, and each message must be fully addressed and signed. Strict censorship has been established in all these countries. Messages for Servia, which is at war with Austria, are forwarded in a roundabout way, through Russia, Roumania and Bulgaria.

CANADIAN NOTES.

MR. J. D. WOOD, assistant traffic chief, Great North Western Telegraph Company, Montreal, Que., died July 4.

GOVERNMENT TELEGRAPH LINE.—The Dominion Government is building a line from Lake Saskatoon, Alta., to Fort St. John, B. C.

Canadian Telegraph Statistics.

The capitalization of telegraph companies operating in Canada for the year ended June 30, 1913, as reported by the companies, says the *Canadian Railway and Marine World*, was $202,468,041.32, of which $160,342.873.32 was in stocks and $42,125,168 in funded debt, these figures being practically the same as in the previous year. There is no capital liability attached to the Canadian Pacific Railway, Timiskaming and Northern Ontario Railway and Dominion Government telegraph services. The total cost of real property and equipment was returned at $185.907,353.75, an increase of $1.757,676.75 over the amount for the previous year. The total revenue from operation was $6,095,212.90, an increase of $879,041.98; while the operating expenses were $4,034,480.43; the net operating earnings being $2.060,732.47. The ratio of operating expenses to gross revenue was 66.84, as compared with 65.83 for the year 1911-12. The pole mileage for the year was 43,048.49 miles, and the wire mileage, 152.918.99 miles, against 40.785 pole mileage and 167,939 wire mileage reported for the previous year.

The number of land messages transmitted was 11,176,753 against 9,252.540 in the previous year. Cablegrams sent were 877.534 against 768,559.

The number of employes reported was 6,006 against 4,828 in 1911-12. Of the first number, 2,885 were operators, 2,693 males and 192 females. The salaries and wages were $2,962,159.13 against $2,703.032.09; the total salaries and wages for 1912-13 being equal to 73.4 per cent of the operating expenses, compared with 76.7 per cent in the previous year.

THE TELEPHONE.

A TELEPHONE CABLE is to be laid between Sweden and Germany. Each state will pay half of the cost.

TELEPHONE EXTENSION IN CHINA.—The Chinese Government has decided to establish telephonic communication between Shanghai and Nanking.

NEW TELEPHONE HEADQUARTERS IN CINCINNATI.—The Cincinnati and Suburban Bell Telephone Company, Cincinnati, Ohio, has opened its new building at Fourth and Hammond streets. This will be the future home of the company's main exchange. The building cost nearly $1,000,000 and is modern in design and equipment. Its architectural features are handsome and striking. The main operating room, where a switchboard costing $200,000 is being installed, will not be occupied until November 15. Mr. B. L. Kilgour is president and general manager, and Mr. R. T. McComas assistant general manager of the company.

TELEPHONE MERGER IN OHIO.—The Ohio State Telephone Company has been incorporated with a capital stock of $25,000,000. This company comprises fifteen independent companies whose merging into one was sanctioned by the Ohio State Utilities Commission. The property of the new company consists of sixty-four local exchanges in Ohio, including systems in Cleveland, Columbus, Toledo,

Dayton, Youngstown and Canton, having more than 95,000 stations. In addition, the company has long-distance systems utilizing over 30,000 miles of line wire, which serves not only the sixty-four exchanges, but substantially all the independent properties of the state. The president of the company is to be Mr. Samuel G. McMeen, the well-known telephone authority and now president of the Columbus Railway, Power & Light Company; and vice-president of the Clark Management Corporation.

Telephone Pioneers' Convention.

The fourth annual convention of the Telephone Pioneers of America will be held at Richmond, Va., October 29 and 30, with headquarters at the Jefferson Hotel. The first day of the convention will, as usual, be devoted entirely to business, and the second day to entertainment. The president of the Pioneers is Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, and the secretary is Mr. Henry W. Pope, 26 Cortlandt street, New York.

The first convention (organization meeting) was held at Boston, Mass., November 2 and 3, 1911; the second convention at New York, November 14 and 15, 1912, and the third at Chicago, October 16 and 17, 1913.

RADIO-TELEGRAPHY.

Messrs. W. A. Winterbottom and Paul C. Kast, who recently resigned from the service of the Commercial Cable Company at New York to enter that of the Marconi Telegraph-Cable Company, were handsomely remembered by their office associates. Mr. Winterbottom was presented with a fine travelling bag, and Mr. Kast received a silver-mounted pen, suitably inscribed, and also a very handsome set of engrossed resolutions, expressing regrets at his departure and good wishes for the future.

Change of Title.—The title "The Marconi Press Agency, Limited," London, England, has been changed to "Wireless Press, Ltd.," and the capital of the company has been increased.

British Capture a Wireless Station.—The British forces have captured Togoland, the German colonial possession in Western Africa, including the large wireless station there. The station has a radius of communication of 3,000 miles.

Wireless to Steamers on Voyage.—The Marconi Wireless Telegraph Company announces that through its high-power stations at South Wellfleet, Mass., and Poldhu, Cornwall, England, messages might be sent to transatlantic steamships during their entire voyage across the Atlantic Ocean.

Wireless for Telephone Cable.—The telephone cable between the three largest of the Faroe Islands has for some years been nearly useless, and the authorities have submitted a petition to the Danish Government for the establishment of a wireless service between the islands instead.—*Electrical Review*, London.

The Atlantic Communication Company, which operates the Telefunken wireless system, has offered to the United States Government to serve as a medium between this government and Germany as soon as the station at Tuckerton, N. J., is in commission, which will be within a few days. Secretary of State Bryan is considering the offer.

Wireless Telegraphy and the Solar Eclipse.—The Committee for Radio-telegraphic Investigation of the British Association states that on the occasion of the total solar eclipse on August 21, five high-power wireless telegraph stations in Europe will each make a series of special emissions to provide facilities for the observation of strays, and for the measurement of the strength of signals.

Radio Operators Penalized.—The department of commerce is penalizing commercial radio operators who are violating the regulations governing their service. The secretary of commerce has just suspended for six months the commercial first-grade radio operator's license held by a ship operator, as a penalty for sleeping on duty at sea, and subsequently denying that he was asleep. Mr. L. R. Krumm is chief radio inspector in charge at New York.

Wireless Under Censorship.—The United States Government has placed naval officers in charge of the six leading wireless stations along the Atlantic coast to act as censors and thus preserve the neutrality of the United States in transatlantic radio communications. The stations include those at Sayville, L. I., Tuckerton, N. J. (Telefunken), Cape Cod, Mass., and Portland, Me. (Marconi). Messages will be censored by the American officers in charge, and when they are sent the naval operator at the stations will "listen-in" to see to it that they are sent in censored form.

Wireless and Neutrality.—In order to insure the neutrality of the United States Government in the European war in the matter of wireless communications the customs department and the bureau of navigation have established a patrol in New York harbor to prevent the use of their wireless apparatus by vessels in the harbor. Lieutenant C. S. McDowell, in charge of the wireless experiment station in the navy yard, visited a dozen wireless plants in New York, Brooklyn, and in New Jersey, and warned the operators against sending out any information that violated the neutrality regulations. Some of these plants had interfered with the wireless service on the battleship "Florida" and at the navy yard. In some cases the Government officials found it necessary to seal the wireless apparatus on the ships while in port.

Wireless in Place of Cable.

Several months ago, says *The Wireless Age*, cable communication between the United States and Nassau, Bahamas, was interrupted and the wireless station at Miami, Fla., was called upon. According to Mr. P. H. Burns, superintendent telegraph department of the Nassau Government, the wireless service rendered since May 1 has been entirely satisfactory and the Nassau officials have decided to give the wireless service one year's trial. If it proves as satisfactory it is planned to adopt it exclusively in

place of the cables. It is understood that all negotiations for repairs to the present submarine cable or the installation of a new one have been called off. In this connection it should be explained that the cable referred to is a comparatively short one. It is laid between Jupiter, Fla., and Nassau, Bahamas, a distance of about 220 miles. The air-line distance from Miami, Fla., where the wireless station is located, to Nassau is about 190 miles.

The Belmar Wireless Station.

The Belmar, N. J., station of the Marconi Wireless Telegraph Company of America, now being completed, is one of the largest in the world, and, perhaps, the most important link in the Marconi world-wide wireless chain.

The operating building is eighty-two feet long. It contains the manager's and engineer's offices, and a large store room and coat room. The room containing the tuning apparatus runs the full depth of the building and is connected by a message chute with the receiving room adjoining.

Near by is the charging room for small accumulators and the main operating room, with five large tables, which, when fully manned, will require thirty operators. All messages received and transmitted from this station will be handled automatically, most of them being received at the Broad street and Madison Square offices of the Marconi Company in New York. Similar arrangements have been made for filing Wales station messages in London, thus placing the two greatest cities in the world in direct communication by transatlantic wireless.

The masts, of which there are six, are 300 feet high, and the aerials carried on them stretch westward almost a mile.

For the comfort and convenience of the large staff of operators and engineers necessary to maintain the twenty-four hour service at Belmar, the company has erected a large fireproof two-story hotel. It is built of dark red ornamental brick, with lighter red tile roof. It is a city block long and contains forty-five bedrooms. The dining-room has seating accommodations for fifty persons and many more can be taken care of whenever necessary. The kitchen is equipped with every modern aid to the culinary art, and is in charge of a French chef. The refrigerating plant has a capacity of 600 pounds of ice per day.

Twelve acres of the 600-acre tract are planted with garden truck and taken care of by experienced farm hands.

The manager and the engineer in charge have separate cottages of artistic design and finish, to correspond with the hotel, each having attractive terraces and verandas. These cottages are furnished very comfortably and tastefully by the company. They are electrically lighted and steam heated.

The entire undertaking has been carried out on an elaborate and substantial scale, and every comfort and convenience has been provided for the staff. Tennis courts and grounds for other games have been laid out for the benefit of employes.

Mr. T. J. Howlett, who had charge of the restaurant of the Postal Telegraph-Cable Company at 253 Broadway, New York, will have charge of the Belmar hotel.

Facts Worth Knowing.

MOTION OF THE EARTH.—The earth moves through space 68,000 miles every hour, and, at the equator, revolves on its axis at the rate of about 1,000 miles an hour.

FIRE.—Fire cannot burn without air. A fire can be extinguished at the start by throwing over it a blanket, rug, coat or any article of thick material, thus excluding the air.

DELICATE WEIGHING MACHINE.—At the National Bureau of Standards in Washington there is a weighing machine with balance so sensitive as to register the decrease in weight of a piece of metal when moved two inches farther from the earth.

TEMPERATURE SCALES.—To convert a given reading on the Fahrenheit scale to its equivalent on the centigrade scale, subtract 32 degrees and divide the remainder by 1.8 (or multiply it by the reciprocal of 1.8 which is 0.5556). To convert a given reading on the centigrade scale to its equivalent on the Fahrenheit scale multiply it by 1.8 and to the product add 32 degrees. The two constants represent the ratios of the two temperature scales, viz.:

$$1^\circ \text{ F.} = 0.5556^\circ \text{ C.}$$
$$1^\circ \text{ C.} = 1.8^\circ \text{ F.}$$

PRESSURE OF WATER.—To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .5 (.5 is approximately the pressure of a column of water one foot high and of one square inch in area, allowing for friction). Example: What is the pressure of a column of water 25 feet high, in a pipe 12 inches in diameter? The area of a pipe 12 inches in diameter is 113 square inches, therefore multiply $113 \times 25 = 2{,}825$.

ELEVATION.—An easy and accurate method of determining the elevation of a hill, mountain or any other point, above the level of the sea, is to ascertain the temperature of boiling water. Place a thermometer in a kettle of boiling water and note the temperature. At sea level the temperature of boiling water is 212 degrees Fahrenheit; at an elevation of 550 feet it is 211 degrees; at 1,100 feet it is 210 degrees, and so on, each drop of one degree in temperature representing a rise in elevation of 550 feet. A table can be easily constructed on this basis. The city of Quito, in Ecuador, is 9,541 feet above sea level, and water boils there at 194.2 degrees.

TELEGRAPHERS' CRAMP IN ENGLAND.—It is reported from London that telegraphers' cramp is increasing at an alarming rate in England. This is attributed to the system of "speeding up" which has been introduced in the telegraph service.

How Submarine Cables are Made, Laid, Operated and Repaired.

(*Continued from page 442, August 1.*)

One of the most remarkable and valuable devices used in long cable transmission is the invention by which it is possible to duplex, or send and receive two messages at the same time over one wire. Although the invention of duplex telegraphy as applied to submarine cables was made in 1873, the first transatlantic cable was not duplexed until 1878 (by Dr. Alex. Muirhead and H. A. Taylor). All long cables are now duplexed. The principle of duplex telegraphy is briefly as follows:

A signaling current sent from the battery A enters the circuit at the apex B and divides, half going to the line C and the other half going to an artificial line D. The artificial line is an arrangement constructed so as to represent an exact counterpart electrically of the actual cable. Thus

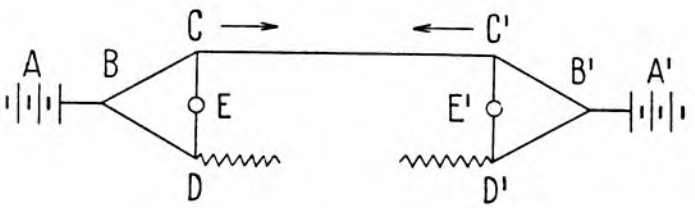

DIAGRAM ILLUSTRATING PRINCIPLE OF SUBMARINE CABLE DUPLEX.

the current which passes into the artificial line D meets the same resistance and other obstacles as it meets in the actual cable. E represents a siphon recorder on which the signals received from the other end are recorded. It will therefore be seen that signals sent from A divide at B and meet the same obstacles at C and D. Consequently no current passes between C and D, and the recorder at E will not be affected by the current sent from battery A. Therefore the recorder at E, unaffected by the signals sent out from its own station, is responsive to signals arriving from the distant end.

In the operation of long submarine cables a battery of low voltage is used. The Commercial Cable Company does not use more than sixty volts for operating its main Atlantic cables. There are a great many technicalities in the operation of these cables which would require too much space to describe here, but the foregoing is a general description of the manner in which cables are operated. The Commercial Cable Company was the first Atlantic company to adopt the Brown and Dearlove cable relay, an instrument which made it possible to couple up two sections of cable and to send messages from Europe to America or vice versa without human translation between the sections. Prior to the adoption of this instrument messages had to be manually relayed at the intermediate stations.

The Commercial Cable Company has also adopted the recent invention of B. S. Heurtley, by means of which the quality of signals and speed of operation are considerably improved. This is an instrument of greater sensitiveness than the siphon recorder. One of the drawbacks to the employment of highly sensitive instruments is the fact that such instruments not only magnify the feeble signaling current but also magnify all the vagrant electric disturbances in the line. It is well known that the earth is a huge reservoir of electricity, and that great electric waves are constantly passing through the earth. These waves at times become so strong that currents are induced in the cable which seriously affect the signals.

The Commercial Cable Company's Atlantic cable stations at Far Rockaway, L. I., Canso, N. S., and Waterville, Ireland, are considered to be three of the finest and most perfectly appointed cable stations in the world. They are fitted with the latest and most improved cable apparatus and with everything conducive to the efficiency of the Commercial Cable Company's system. At Canso, N. S., and Waterville, Ireland, the company has provided living accommodations for its employes, the married men being furnished with very comfortable private cottages and the single men with bachelor quarters. There is also a mess building for single men and a club house, library and entertainment hall at each of these two places.

The station building and equipment at Far Rockaway is the latest and most up to date of the three.

(*To be Continued.*)

An Excellent Book on Telephony.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the best books of its kind. As its title implies, it deals with electricity and magnetism as applied to telephony, and the subject is presented in such a clear manner that an understanding of it comes with little effort. The author, Mr. Cummings, is a practical telephone man, and in his daily work he has encountered many difficult problems. He analyzed and investigated them to find the causes and has, based upon this valuable experience, written a book that every telegrapher and telephonist should study. This is an excellent book for students, as it keeps the principles clearly before them. This book is now being used as the basis for the "Question and Answers," which are now appearing regularly in these columns. Copies can be obtained of TELEGRAPH AND TELEPHONE AGE, New York, at $1.50 per copy.

TELEGRAPH IN PANAMA.—The telegraph and telephone services of the Republic of Panama are to be improved, an appropriation of $143,350 having been made for that purpose. The telegraph system is owned and conducted by the government and a rate of one cent per word is charged to all parts of the Republic.

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, AUGUST 16, 1914.

Wireless Telegraphy in War.

The value to the world of wireless telegraphy has again been emphasized since the breaking out of the European war. The German steamers "Kronprinzessin Cecilie," with $10.000,000 in gold in her cargo, besides a large passenger list, and the "President Grant," with passengers, after having been gone from New York a few days were recalled, in view of the dangers of capture on the high seas. It was not known for some days whether these steamers had received the recall messages, but all doubt on this point was removed when the "Kronprinzessin Cecilie" and the "President Grant" arrived in American havens—the former at Bar Harbor, Me., and the latter at New York. Many German steamers are tied up in New York for fear of capture by English warships said to be cruising off the American coast. These include the greatest of all ships afloat—the "Vaterland."

The ability to apprehend a ship at sea in any part of the world will undoubtedly play an important part in the present disturbed conditions in Europe and will have to be reckoned with in the future.

With telegraph offices on steamers it is impossible to be out of immediate touch with the world, at sea, and, in emergencies, such as the present one. it is of the utmost importance for nations at war to have full knowledge of the whereabouts and control of their ships.

The American Morse Alphabet.

The discussion conducted in these columns since the first of the year in regard to the elimination of the spaced letters in the American Morse alphabet has very exhaustively thrashed out the pros and cons, and in every way has had an instructional and educational value.

The two telegraph interests in the United States, in whose hands lie the ultimate decision in the matter, do not seem to be ready to take the necessary action to bring about the change. We presume the Canadian companies feel the same way. There are many reasons for this. The principal ones are that the companies have no desire to disturb existing conditions. their methods and figures of comparison being based on the use of the shorter alphabet, which is an important factor in the management and operation of telegraph companies.

Everyone admits that if the telegraphs are ever taken over by the government, one of the first changes to go into effect will be the adoption of the continental alphabet. In fact, the government has already signified its intention to do this.

It appears that the betterment of the service that would result through the elimination of the spaced letters does not appeal to the telegraph managers as of sufficient importance to warrant the discarding of the old alphabet in use in the United States and Canada.

A good deal can be said for and against the proposal, and the entire subject really narrows down to a question of expedience. It would be easy enough to make the change in itself, but what would be the effect upon the telegraph business? This question is the one that concerns the telegraph companies more than any other.

Knowledge Leads to Advancement.

As a result of observation and study of electric science, the electric telegraph was invented. Yet it is not to be expected that even a considerable portion of those engaged in practical telegraphy should be expert electricians, but it is desirable that they should acquire and learn the rudiments at least of the science upon which their profession is based. However overcrowded the lower walks of the profession may become there is always a deficiency in the number of those who are properly qualified to fill the higher positions in the telegraph service, as circuit managers and the positions which require something more than ability as mere mechanical manipulators and readers of telegraphic signals.

That there is unfortunately a sentiment among telegraphers that only a superficial knowledge of the art is necessary, is well known. They aspire to nothing more in this direction than will suffice to enable them to transmit and receive messages, and draw such salary as may be accorded to them by their employers for their services. Anything be-

yond this they consider superfluous, and many rather pride themselves than otherwise upon the paucity of their acquirements. They regard any attempt to teach them more as absurd and undesirable, and are disposed to sneer at their fellows, who, with ambitious appreciation of what is required to become really proficient in their business, seek to acquire the knowledge which will qualify them for the proper and intelligent discharge of their duties.

New adaptations of the telegraph to popular service are constantly being made; the progress of electrical invention is one demanded by the age, and is rapidly being developed. It is from the intelligent and ambitious class of employes that the offices of honor and profit in the telegraph service are mainly filled. Besides this the rapid development of electrical science is creating a great demand for skilled electricians in other fields.

In electrical science there is always plenty of new discoveries to be made to maintain the interest of the student and investigator. There is always something new to be learned, and this, to the industrious and studious mind, makes it a very fascinating and absorbing subject. Operators should, however, carefully distinguish in their minds between what is requisite to become a good, capable telegrapher and the more scientific education which is necessary to become a good electrician.

War News and Telegraph Service.

Mr. Melville E. Stone, general manager of the Associated Press, New York, gave out the following statement on August 11:

"Advices to the Associated Press from London state that an increasingly rigid censorship is being imposed on all matter from Brussels. This increases the delay on such dispatches as are allowed to come through. The French Cable Company, which, except those with terminals in the British Islands, is the only direct line to Europe now in operation, has given notice that the congestion on its lines is such that all messages are subject to a minimum delay of forty-eight hours.

"In an effort to avoid this delay direct dispatches of the Associated Press from Paris are being routed through London, but the delay there also is very great. Dispatches which left Paris early yesterday are being received with a delay of from fifteen to seventeen or more hours, and other Paris dispatches have suffered even greater delay in transmission.

"There is absolutely no direct communication with Germany or Austria by any routing. A few censored dispatches are coming through via London, and these are recensored for transmission out of England. The Associated Press has been making every effort to communicate with Germany through the wireless companies operated from New York. On Sunday a message was sent to the Berlin bureau of the Associated Press, and the wireless company notified us that it had been received in Germany, but since then only fragmentary signals have been exchanged over that system.

"Inability to secure wireless communication with Germany since the cutting of the direct German cables at the outbreak of the war, and the increasing rigor of the London censorship, still further obscure what has actually transpired within the military zone."

Americans in Europe.

The war in Europe has brought much distress and inconvenience to thousands of Americans who were traveling on the Continent. Their traveling checks could not be cashed, and they had great difficulty in obtaining sufficient funds to meet immediate obligations. Besides this they could not secure passage home because of the suspension of steamer traffic by the principal Atlantic lines. Many of those who managed to secure return passage before the service was suspended had to leave without their baggage. The United States Government, however, has sent several million dollars on one of its warships to relieve the distressed Americans, and it is being arranged to charter steamers to bring them back home.

Among those now in England and Europe are several directly and indirectly connected with the cable and telegraph in the United States. These include Mr. Clarence H. Mackay, president of the Postal Telegraph-Cable Company, and sons; Mr. G. G. Ward, vice-president and general manager of the Commercial Cable Company, New York, and Mrs. Ward; Mrs. W. Y. Nolley, wife of Mr. W. Y. Nolley, manager of the office of the Mackay Telegraph and Cable Company at Dallas, Tex.; Miss L. W. Hunter, daughter of Mr. J. W. Hunter, of the Western Union Telegraph Company, Cleveland, Ohio; Mr. Andrew Carnegie, who spends the summers in Scotland, and Mrs. W. E. Gillmore, wife of Mr. W. E. Gillmore, formerly president of the various Edison companies, and well known to the telegraph and electrical industries, with her two daughters. Mrs. Gillmore and daughters are supposed to be in Coburg, Germany. Mr. Frederick Pearce, of New York, left England just as the war was breaking out. Mr. Sol. Davis, well known in New York, who accompanied Mr. Pearce to England at the last moment, concluded to spend a week in Berlin, and, it is presumed, that he is still there.

THE NEW YORK STOCK EXCHANGE was closed to stock trading on July 31, and has remained closed. This action was taken in order to prevent a panic in the prices of stocks, which threatened to result by the eagerness of European holders to realize on their holdings. There was a little uneasiness among savings-bank depositors the first two or three days after the declaration of war by Austria and Germany, but the banks took advantage of the sixty-days' notice clause in their by-laws, and thus headed off a movement which might have led to a financial panic. All fear has been allayed, and the situation is about normal.

The Universal Telegraph Alphabet.

BY WALTER P. PHILLIPS.

I have been reading, with great interest, the articles in TELEGRAPH AND TELEPHONE AGE about the adoption of a universal alphabet and it seems to me that W. D. Terrell, in your issue of July 16, has struck the keynote in saying the question might perhaps be settled by a concession on both sides. This is the most sensible thing that anyone has said thus far. I may be slightly prejudiced in Mr. Terrell's favor, because I have a compromise alphabet of my own which I would like to have considered. But I am not wholly without conscientious scruples relative to pushing things of my own if some one else has something better to suggest. My proposed alphabet is as fast as Morse and can be acquired in the course of one week. The reason for this is that I introduce no symbols with which the ears of Morse operators are not familiar. My idea is to substitute figures for the spaced letters and for L and express the figures that have been appropriated with letters, most of which are already in use by those who employ the Phillips' Code in their work. The changes that I believe would be acceptable in this country are these:

C 2
L 3
O 4
R 5
Y 7
Z 8
& 9

For these figures I would substitute tu for 2; tre for 3; fr for 4; fv for 5; sv for 7; ait for 8; and nin for 9. Any operator who will try this alphabet for a few days will find he can send it as fast as he can Morse. This fact was established, several years ago, by some of the finest operators the world has known, including P. V. DeGraw, E. C. Boileau, Thomas J. Bishop, Thomas R. Taltavall, and the late William H. C. Hargrave, Fred N. Bassett and Wilfred N. Gove. Their Morse records are among the highest that have ever been made. The advantages of these changes, as was clearly demonstrated, are that they eliminate all of the errors that are due to the spaced letters, whether they be few or many of them, and it will put an end to these irritating movements to adopt the Continental code. This change will never be made and chiefly for the reason that the Continental alphabet is slower and the telegraph companies want to get as much out of their wires as possible. The adoption of the Continental alphabet would mean the reduction in the number of words handled, every year, by millions upon millions. More wires would be required than are in use at the present time and the number of men now employed could not cope with the ever increasing amount of business without unnecessarily adding to the army of men that are called for in present conditions by the use of an alphabet that is being sent, every day, at a much higher average speed than the English and Continental operators achieve.

The telegraph having been invented by an American who made an alphabet of the utmost brevity which has stood the test of seventy years, why should Americans accept something in its place that would set us back forty years? "And why," you ask, "should the users of the Continental alphabet accept something in its place that would be new and strange to them?" The answer to that is that the spaceless alphabet that I now propose, for the second time during my variegated career, would enable foreign operators to send slower and with less effort and still make as good time as they do now with their longer letters and if they wished to increase their product all they would have to do would be to put on steam. But there is not sufficient steam in any man to make the time that American operators are making, under pressure, almost every day in the year—making it with such symbols as tw, for example, which stands for the letter "Y" while if used at all in American Morse according to Phillips' Code means "tomorrow."

When Cromwell Fleetwood Varley was here, in 1868, with a plea to have us adopt the Continental alphabet to the end that there would be but one in use throughout the world, he was shown by such senders as Patrick Henry Burns, M. C. Bagley, Fred Catlin, R. J. Hutchinson, E. M. Shape, Dixon F. Marks, W. D. Gentry, Albert Burkholder, Jesse H. Bunnell, Charles Smith, Henry V. Shelley, George M. Eitemiller, Joseph W. Larish, John Lapey, William E.Kettles, Albert S. Ayres, Michael J. Sherman, and hundreds of others, not all of whom by any means, as fast as those named were getting great service out of all our trunk lines—he was shown that with such facilities as then existed it would be absolutely impossible to handle the business with a slower alphabet than the one in use. I know for a certainty that General Eckert satisfied Mr. Varley that even if we had been willing to retrograde the demands were too heavy to be ignored and that in another decade we would have many more wires and larger forces of operators everywhere. It was obvious to this astute Britisher that he had made some unlooked for discoveries and he went back to England and stirred up the English operators. But though they did their best they were simply unable to come anywhere near the American records. They reminded me of the yachts that competed in a contest round the Isle of Wight, in 1851, for the cup known, now, for sixty-three years as the America's Cup and on which Sir Thomas Lipton has turned his beaming eyes in past years and who would have tried conclusions with us again this year, but for the war that is now shaking the civilized world from "this precious gem in silver set—this England" to the snow-clad steppes of Russia, and throughout the whole Western hemisphere, as well as in the remotest parts of the earth.

When it became apparent that the America had won the race referred to, a certain diminutive lady, with a grand manner, who was present and who was justified in being prejudiced in favor of British institutions of all kinds, inquired what boat was second and the sorrowfully spoken

answer was "Your Majesty, there is no second." The America had fifteen competitors and she won by eighteen minutes. The attempts by our English cousins to equal the speed of Messrs. Burns, Shape and Hutchinson were almost laughable. To have sent nearly 1,500 words in half an hour as Hutchinson did; 2,631 words in a full hour as Shape did, or 2,731 words in fifty-eight minutes, or thereabouts, as Burns did, would have been an impossible feat for them. None of them could have approached Hutchinson's achievement in less than forty minutes and to have sent as many words as Shape and Burns did would surely have put them in the class with the America's competitors for they would have occupied fully an hour and eighteen minutes. And when I say that, I am drawing it mildly.

I read, recently, that great records had been made abroad with the Continental alphabet. I dare say European operators have increased their speed, somewhat, in the past fifty years. But I am sure I don't know when it was or who the men were who outdid American telegraphers and put us all to shame. We are entitled to this information and in my judgment it should be forthcoming, if it exists. Who is the man who is responsible for the tardy circulation of this hitherto unpublished report of great telegraphic achievements by hands across the sea?

My dear friends, think this matter over.

Substitutes for spaced symbols and the letter L.

C 2
L 3
O 4
R 5
Y 7
Z 8
& 9

Substitutes for the figures stolen.

2 tu
3 tre
4 fr
5 fv
7 sv
8 ait
9 nin

Thrift as a Business Asset.

"One of the poorest classes in the United States is that composed of men who are earning from $2,000 to $4,000 a year. Among these salaried men thrift is almost as extinct as is the dodo." This is what a writer says in *World's Work* who has been making a study of economic conditions.

A credit man in Chicago declares that the poorest people with whom he comes in contact are the $10,000 a year men, who owe the butcher and the grocer, and all around are badly in debt.

The man working for wages or on a profit basis is more likely to regulate his affairs on a sound basis; but the salaried man, feeling a little security in the present, and finding his standards of living set not by those of his own financial circumstances, but by those with much larger incomes, keeps up socially by unwarranted expenditures based on his hope of an increase, or the success of some get-rich-quick scheme.

The forerunner of the American Society for Thrift was a "thrift club" for savings, started in 1912 in Chicago and New York. All employes of one company were eligible, and agreed to make weekly deposits of not less than $1, nor over $25. and a fine of ten cents a day for delinquency in making payments. To encourage the plan the company agreed to make a donation of fifty dollars each time the accumulated deposits of the club members reached the $950 point, the even $1,000 to be invested in first-class mortgage bonds bearing six per cent interest. With six per cent interest and the five per cent bonus and the penalties for delinquencies, the members are accumulating about fourteen per cent on their deposits, and greater gain is discussed in meetings where thrift in broader practice than saving is considered.

Large corporations have seen the deterrent effect on their business when employes were struggling under harassing financial burdens and debts. The United States Steel Corporation, the Metropolitan Life Insurance Company, the Postal Telegraph-Cable Company, Boston Globe, the Sears Roebuck Company have instituted various systems to encourage thrift among employes. A case is cited of an agent who has been depositing $1.18 a week since April 3, 1900. His account now stands at $2,523, yet his actual deposits were only $848.50. Another employe has been depositing $1 a week since February, 1900, and now she has a bank account of $2,186.35, the result of the actual saving of $719.

The New York Edison Company makes home-building an easy possibility for employes by selling shares on installments, and, as a result, many a man in its employ on a small salary is now the owner of his home and garden plot.

The Serial Building Loan and Savings Institution, New York, is an association of this character. It is efficiently managed by telegraph officials for the benefit of telegraph and telephone employes, and has enabled thousands of its members to obtain homes on easy terms. It is one of the soundest institutions of its kind.

These large companies find the thrift spirit among employes reacts for the good of the concern, as the evil of individual employes' careless mismanagement and prodigality before was felt all through the system.

AN OLD-TIME MESSENGER.—"You probably don't remember me," said the self-made man as he stalked into the office of a great financier with whom he had an appointment, "but twenty years ago, when I was a poor messenger boy, you gave me a message to carry—"

"Yes, yes!" cried the financier. "Where's the answer?"

The Universal Telegraph Alphabet.

BY ALEXANDER GRANT, ASSISTANT ENGINEER FOR TELEGRAPHS, MELBOURNE, AUSTRALIA.

I have been noting in the TELEGRAPH AND TELEPHONE AGE with some interest your advocacy for the adoption of the Continental telegraph code by the American telegraph authorities, and have been thinking that a little information regarding Australia's experience in this connection might be of some value.

It might be interesting to American telegraphists to learn that the telegraph was first introduced into Australia from America, and that the American code prevaled for some time. Difficulty was, however, experienced with the divided letters, particularly C, O and R, owing to the frequency of errors, and these were altered to . — — . . . — . — . . — . —, which action gave Australia a code of her own. This Australian modification of the American code held sway until about ten years ago, when the local administration decided that the Continental code was, taking everything into consideration, the best, and a date was named on which the new code was to be adopted by Australian telegraphists.

About three months' notice of the proposed alteration was given, during which time the operators were expected to acquire familiarity with the new language. I recollect that most of the period named was occupied by hurling invectives at the administration, and endeavoring to show the weaknesses of the new code, not forgetting the hardship which would be inflicted on the gray and bald-headed section of the staff.

However, when the appointed day arrived, nothing serious happened. The more zealous had practiced, while the careless had taken no heed. The latter, however, were, in the course of a few days, carried along with the new tide, and now very few thoughts are wasted on the old hybrid code. The initiation of the Continental code caused a temporary slowing down, but it was hardly appreciable.

An analysis will, of course, show that the American code is faster than the Continental, but this circumstance loses weight when it is remembered that special care must, in many cases, be taken to emphasize the translation of the divided letters. Moreover, the latter are unsuitable for certain valuable systems of machine telegraphy.

When universality and immunity from error are considered, the Continental code scores heavily, and, in this connection, it should be remembered that the public—whose interests should be paramount—are not concerned with the speed of transmission to the fraction of a minute, but are particularly anxious to have a correct translation of the original.

I trust that the American telegraph community will confirm the progressive reputation held by the great American nation, and, by adopting the Continental code, make it truly the "Universal" code.

Some men are always going to, but never do anything.

Loyalty of Military Telegraphers.

Throughout the war there were, all told, 15,000 miles of wire operated by the army telegraphers, and the service cost the government about $3,000,000. Twelve hundred operators were employed, and, although these operators knew all the secret orders emanating from the various headquarters and from Washington, directing the movements of troops, not one of them ever betrayed a trust.

In addition to the ordinary oath of allegiance, each operator had to pledge himself as follows:

"I do further swear that I will not reveal to any person or persons the contents of any dispatch, report or other communication, either directly or indirectly, that may come to my knowledge through my connection with the telegraph, in any manner whatever; that I will not reveal or divulge to any person or persons any cipher that may be given me for United States military purposes, and that I will faithfully keep secrecy and allegiance to the United States of America."

During the operations in front of Atlanta, in 1864, twenty miles of wire was kept in operation twenty-eight days by almost as many operators, half of whom were exposed to the enemy's fire while at work at their instruments.

At New Orleans the operators and linemen were not only in danger of being shot, but risked their lives almost daily, while trying to keep the submarine part of their system in working order.

The active service of the operators practically came to an end when they rushed a line of wire to Appomattox, over which the news of Lee's surrender was received at Washington within two hours after the event.

The lists of casualties and captures in the little corps, probably aggregating 332, establishes its military character.

In 1897 President Grover Cleveland signed an Act of Congress authorizing the Secretary of War to grant a Certificate of Honorable Service to all who had served in the "United States Military Telegraph Corps of the Army of the United States." Andrew Carnegie, the founder of the corps, proudly displays his certificate over the door of the library in his New York residence.

The telegrams supplying, reinforcing and moving the armies constituted a courier service unequalled in any war, ancient or modern.

The 15,000 miles of military telegraph lines constructed and operated in the theaters of the war by the corps, hundreds of whom were within range of the enemy's guns and often under fire, evidences a devotion and bravery that surely make its members worthy of comradeship with others of the army.

And the sole custodians of the cipher keys imparted a confidence in the corps never before or since reposed in so large a body of men, a confidence that was never betrayed.

Reminiscences of the Earliest Days.

BY HENRY H. WARD, EAST ORANGE, N. J.

Looking back at the development of electrical affairs from the early days of telegraphy, that which strikes me as most marvelous is that in a single lifetime an infant science has grown to robust maturity. To have taken even an insignificant part in the business transactions which were woven into this development is an experience of which I feel some pride.

Not from professors or scientists, but out of commercial telegraphy, it seems, that the entire science of electricity has grown. Of terms first in vogue there was a battery, a current and a wire. Soon instruments and methods of measuring the current were devised. Conductivity and resistance became definite expressions and the relation of one to the other was decided. A unit of value was adopted, and a fundamental law was entered on the text-book. The galvanometer and rheostat were brought into daily use; duplex and quadruplex instruments made; tone vibrations were transmitted and a harmonic system was developed.

Study of the elements of vocal sounds as a series of vibrations led to the imprinting of sound vibrations on wax cylinders and reproducing the same, and to the perfected telephone.

The dynamo was made and replaced liquid batteries. The dynamo proved to be more than a battery; it had resources for an enormous development of the electric science. To-day it produces light, heat and power. All this within one individual lifetime!

My service began at Springfield, Mass., in 1848. L. L. Sadler was superintendent of the line, and I have a vivid recollection of him. He was tall, thin, sedate, ministerial—for he was a retired clergyman. He knew the Morse alphabet and delighted to try his hand on the wire. It was difficult to read his sending, but his sig. — — ... could never be mistaken.

Sitting in the Springfield office during a heavy thunder shower he thought that more persistent effort would avail in getting off a message. Leaning over the instrument and calling one of the stations, a flash of lightning and an instant peal of thunder occurred, and a stream of sparks ascended close to the old gentleman's nose, ripping the relay from end to end. A large limb was thrown off from an old elm tree in Court Square, opposite the office. The marvelous equanimity of Mr. Sadler was undisturbed, and he drolly remarked that he guessed the magnet had gone.

A Mr. Hood, manager, was soon succeeded by a Mr. Hayden, whose spare moments were sometimes occupied in perusing sweet-scented billet-doux or making up replies.

Down the line, toward New York, names familiar in later days may be mentioned: Michael Sherman, at Hartford; George B. Prescott, at New Haven, who became well known in New York as electrician, and who shared in quadruplex emoluments.

In the other direction there was at Worcester, as manager, one called Professor Strong, who was said to have come from California, and who had a reputation already of being an electrician. He really had some practical ideas, and made, with his own hands, with strips of ivory and strips of brass, some acceptable switches to meet the needs of the office. This was probably about the first display of an office switchboard.

From Worcester a branch wire extended to Norwich and New London. At the former office the handsome, black-eyed "Sid" Fairchild was manager. His name became familiar in later years.

Daniel Smith, manager at New London, was a genial fellow. For economy he slept in his office. A curtain separated his sleeping quarters from the instrument. By reaching out he could answer at night, if necessary. The grove battery, at Worcester, supplied this line with current. In setting up this battery mornings, some fun was had in closing and opening the circuit several times, whereupon Dan would reach out and say .. .. ..

It was quite a pleasant trip by the train to Norwich, and by steamer to New London, getting supper aboard, and back by the return boat. With small salaries, this pleasure could not be indulged in often, but no money would be accepted in those days from a telegraph man.

In case of delays to trains or boats, the various offices were besieged by railroad superintendents and managers, and also hotel men to get news, and it was an unbounded pleasure for the operators to sit up all night, if necessary, to get the needed information for them. There were no formalities of an official kind at this period. The word "telegraph" would carry an operator anywhere, and supply a room and meals.

One evening there appeared in the Worcester office a person resembling a tramp of the present day, claiming acquaintance with the writer. He came from Springfield, and was traveling with a minstrel troupe, but hard times had made it necessary to ask for pecuniary assistance. Having been encouraged by the interview, he came again and brought several musical instruments, on any of which he was a perfect master. Getting a copy of the telegraph alphabet he became, in two days, a good operator. It was Frank Chase, known afterward as a fine operator, and also as a member of a church choir in Brooklyn.

In the earliest days there were employed in the large offices copyists to whom the messages were read from the paper by the operator. In Boston there was a Mr. Cummings, with a patriarchal beard, which distinguished him from the common herd. He did his work satisfactorily, but his associates remember him as a great fisherman who made up, in the office, splendid chowders. Another was a Mr. Saxton, a man of fine physique, who sat very erect, and with a pen attached to a long porcupine quill, made copies that were marvelously fine. His method and his copy had a great influence on those who aspired to good penmanship. Unless mention is made of this line of service it might drop into oblivion.

Moses G. Farmer was operator in the Boston office of the Bain Line, but shortly devoted himself

to scientific work and investigation. The Bain and the Morse Lines were merged, and, for a short time, the Bain alphabet was proposed for general use. All the operators were made to practice Bain, but, shortly, Morse was triumphant.

A man named Barnes undertook experiments with a multiple magneto machine. He believed that the vibrations which occurred in the revolution would overlap if sufficient rapidity was secured. He placed fifty to seventy-five helices on the periphery of a wheel three feet in diameter, and rotated it rapidly, but the breaks were always perceptible.

In establishing the Boston general office in the Post-office Building, a large room, on the fourth floor, was secured for the operating department. An official order was issued, requiring that ground wires running down the wall of the area must be insulated one from the other, which was done accordingly. Some of us smiled, but, of course, the electrical science was in its infancy.

L. L. Sadler, now acting as treasurer, had his desk at the remote end of the big room, where he wrote into books the figures of the monthly reports. He was grateful when I volunteered assistance, and, incidentally, I gained insight into a line of business other than operating. The theory of service in those days was to do all one could do in his employer's interest.

Making Splices on Twisted Pair Wire.

The Postal Telegraph-Cable Company has issued the following instructions for making moisture-proof splices on outside twisted pair wire.

Remove the braid covering for about four inches from the ends to be spliced, being careful to avoid cutting the rubber insulation. Remove the rubber insulation for two inches back from the end of the wire. Scrape the wire clean. Pare the rubber insulation down where it meets the bare wire similarly to sharpening a pencil. This requires the use of a sharp knife. Be careful not to nick the copper wire when removing the insulation, thus weakening it. Splice the bare ends with a twist joint of the same form used in splicing iron line wire. Squeeze the spliced ends of the wire in with pliers and remove any sharp edges so that they cannot later cut through the insulation.

Wrap the copper joint snugly with tinfoil. In an emergency clean tobacco package foil will do.

After the foil has been applied scrape the exposed rubber insulation to remove any film of grease and to slightly roughen it. Coat the entire length of the exposed rubber and tinfoil and an inch and a half of the braid next to each shoulder with rubber cement, which is supplied in tubes. The nozzle of the tube can be used to smear the cement uniformly over the entire surface. Care should be taken to avoid air bubbles. Do not apply the cement too thickly; two thin coats are better than one thick one, allowing the first one to become tacky before the second is applied. Be careful not to handle the rubber cement while it is drying.

After the cement is fairly dry wrap the entire joint with rubber splicing tape. Start wrapping the tape close against the shoulder of the braid and overlap the tape on itself at least one-half its width. When the other shoulder is reached continue over the braid for one and a half inches, then reverse and wrap back to the shoulder where started and continue for an inch and a half over that shoulder. Stretch the tape as applied so that it will bind itself closely and exclude air. Finish the wrapping by turning the loose end in towards the joint and by squeezing the coating all over to make the tape unite.

Next apply friction tape over the rubber tape to replace the braid that was removed. This tape should be applied with a half lap and be drawn up snug; the best way to apply tape is to rotate the roll backwards so that the tape can be well drawn up. Start to apply the friction tape an inch beyond the end of the rubber tape. Cover the rubber tape and an inch beyond, then continue backwards to the starting point, applying a second layer. Paint the finished joint with cable paint. Joints should be made so as not to overlap each other.

New Printing Telegraph System.

Dr. George A. Cardwell, of New York, the well-known inventor of printing telegraphs, has just completed a selective printing telegraph system which he claims to be the most finished product of all his inventions. It is very flexible in character and can be operated equally well on way or through wires. Any office on the line can be called up by means of a very simple selector. New York, for instance, desiring to send messages to Poughkeepsie or Hudson, will select those stations and operate them simultaneously or any number of stations on a division, and proceed with the dispatching of business, regardless of whether the operator is at the printing instrument at those points or not. The system is non-synchronous, and its operation is not thrown out by line troubles. It works on three impulses per letter, and requires little battery. The impulses are alternating, positive and negative, thus keeping the line clear.

In the key-board transmitter there are no wheels or other mechanism, the whole operation being performed by combination magnets. The mechanism of the entire system is remarkably simple, and no special training is required to operate it, other than to manipulate the typewriter keyboard. The messages are received automatically, whether there is anyone in attendance or not. By the aid of the selective feature the system is made very comprehensive.

No special typewriter is required for the receiving feature, any of the standard visible typewriters may be used. In this respect the system differs particularly from other printing telegraphs, which require specially constructed typewriters.

The system does not require continuous expert supervision; it can be maintained by any who can operate a typewriter, on account of its extreme simplicity.

Dr. Cardwell is getting up a transmitter with a transmitting capacity of 200 words per minute.

Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation.

In our issue dated April 1 we published the paper of Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn., on "A Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation," which was read before the American Institute of Electrical Engineers on March 13. The paper was discussed by several well-known telegraph and telephone engineers.

Mr. W. Maver, jr., thought that it was safe to state that if the telephone had been invented before the telegraph, and had been in use on railroads for train dispatching and the transmission of messages, up to the limit of distance of which it is capable, there would have been very little disposition on the part of railroad managers to displace the telephone by the telegraph, but when the telephone appeared the telegraph was well established on railroads, and its small cost and simplicity have served to give it the stability in railroad service that it has acquired.

"My experience on frequent occasions when I have had the option of using the telegraph or the telephone over distances ranging from 200 to 1,000 miles," he said, "has been quite favorable to the telegraph as a means of quick, reliable and intelligent communication between expert operators, chiefly due to an uncertainty as to certain words in telephone conversations, which frequently called for repetition. My observation of the operation of the telephone in some cases seems to indicate that when it is used regularly for questions and answers, the purport of which is generally understood by both speakers, conversation is easy. I have noticed this particularly in cases where the telephone is used as a means of communication between different sections of large manufacturing plants, where illiterate workmen exchange information freely concerning the work in which they are engaged. When, however, subjects foreign to this work are broached to them by telephone, they are often at sea. While it is true that Mr. Clapp quite properly stipulates a high factor of transmission efficiency for the telephone circuits for this railroad service, I believe that some, at least, of the success of this service between dispatchers, station agents and conductors may be due to their familiarity with the nature of the subject discussed, although, of course, the precaution of spelling out the words of train orders, letter by letter, and repeating back the order to the dispatcher, is almost a sure preventive of error.

The change from the telegraph to the telephone in railroad service is quite a radical one, and has to face the condition that the telephone, like the telegraph, is not directly a revenue producer for the railroad companies, and hence does not always receive the recognition that its importance in the actual operation of the railroad system warrants. Considering, however, the fact that it is only within the past two years that any railroad officials have had the temerity to authorize the substitution of the telephone for the telegraph as a means of communication in steam railroad operation, the progress thus far made in that direction is really noteworthy.

Mr. W. E. Harkness said the use of the telephone in the transaction of railroad business will be greatly increased in the future, and, in many cases, it will supersede the telegraph. There are, however, certain classes of railway communications which can be handled more economically by telegraph, so that we need not anticipate the complete elimination of the telegraph as a means of communication. Whether telegraph transmission in the future is to be performed manually or by machine remains to be determined, but this phase of the situation is at present receiving considerable attention.

It is interesting to note that the annual saving in overtime by the use of the telephone on the one division mentioned amounts to twenty-four per cent on the investment, also that the saving given does not include the saving in time of motive power nor the saving in coal consumption, which are two of many expenses which are indirectly affected. Unfortunately, these savings cannot be calculated in advance when presenting the advantages of the telephone to the railroad management.

It has been found that the train dispatcher operating by telephone is under less strain than one operating by telegraph, and can handle practically double the amount of work he has been handling by telegraph. This, in some cases, has resulted in the extending of his district, as mentioned by Mr. Clapp. The savings in salaries alone in such a case will approximate $5,000 annually, which is equivalent to twenty-five per cent on the first cost of the telephone circuit over the two districts covered.

While the cost of telephone line construction is nearly double that of the corresponding class of telegraph construction, it must be remembered that the facilities for communication have been more than doubled. In the first place, the speed of transmission has been increased. The average railroad Morse operator does not send over twenty-five to thirty words per minute, whereas by telephone the same man will transmit at the rate of fifty to seventy-five words per minute, the latter rate being in excess of the maximum manual Morse record. One factor having a bearing on this matter, which differs from that of a commercial basis, is the greater length of railway messages.

Secondly, in addition to the two wires being used for telephone conversation, they provide an additional telegraph circuit at an expense of not over $100 for auxiliary equipment for simplexing the circuit; or if two parallel telephone circuits are available a third or phantom telephone circuit can be secured capable of good commercial transmission for distances up to 500 miles at an expense of approximately $500. In one case where this has been done, a saving of $100 per month has been made in long-distance tolls at one terminal alone, and no value placed on the time saved or increased use of the service. The telephone, for some time to come, cannot compete with the telegraph in handling messages over distances of 1,000 miles, or more.

While, at present, on the average railroad the

telegraph is more flexible from the standpoint of additional facilities and the ease with which circuits can be patched in case of emergency, this condition will gradually change as the number of telephone circuits is increased on each railroad. It is not anticipated, however, that the telephone will be able to compete with the telegraph when it comes to making up long roundabout circuits to reach distant points. For the average division, however, the same flexibility can be obtained by the use of adjacent circuits or an interchange of facilities by connecting railroads.

It is of interest to note that the difference in time taken by operators to answer a telegraph sounder call and a selective telephone call has, in some cases, been so pronounced as to occasion the installation of telegraph selectors on some railroads to improve the telegraph service. In fact, there has been a marked revival of selective telegraph calling in both railroad and commercial service.

Mr. R. N. Hill said the implied conclusions in Mr. Clapp's paper that the telephone has a sufficient margin of merit over the telegraph as a medium for the transmission of intelligence in railroad operation to warrant its somewhat greater cost, seems to be borne out by practice. We note, however, that in the comparison of costs of inside and outside plant, the facilities provided by a single telephone circuit composed of two No. 8 gauge copper wires, have been compared directly with the facilities provided by one iron telegraph wire working duplex or quadruplex, and it seems that it would only be fair to recognize the fact that one pair of telephone wires is capable of supplying a telegraph circuit in addition to the telephone circuit, and that this telegraph circuit may be duplexed or quadruplexed. Also, if there are two similar pairs of wires on a pole, properly transposed, we may obtain from them not only a train-dispatching and message circuit, but we may, in addition, obtain a third telephone circuit and a telegraph circuit; in other words, four circuits from the four wires. The cost of obtaining the additional telephone and telegraph circuit is only nominal.

Therefore, it would be more nearly fair to compare, as far as outside plant is concerned, the cost of one No. 9 A. W. G. wire with the cost of one No. 8 B. W. G. iron wire. On this basis the telephone will appear much more favorably in regard to initial cost.

Mr. D. P. Grace: Regarding Mr. Clapp's paper on the advantages of the telephone and telegraph, the most interesting thing to consider, perhaps, is that, in a measure, the dispatching circuit is an automatic system, in that the supervising operator or dispatcher uses the automatic mechanism for calling the operators along the line. As time goes on, it will be interesting to know how much more use is made of automatic apparatus in the general extending of the telephone system that Mr. Clapp predicts. There is a possibility that the automatic apparatus may be used at the terminals as well as in the dispatching along the line.

In many railroad systems where telephone circuits have been used for message purposes, there has been a great deal of trouble due to poor transmission. This has most generally been traced to the lack of knowledge on the part of railroad telegraph people in the operation of these circuits. They have assumed that they could be used much the same as telegraph lines, and have connected into the circuit many miles of rubber-covered wire and iron wire, and have even run these wires through many private-branch exchange switchboards, the result being that the transmission was very poor. Wherever there is an extended telephone system along a railroad, there should be, by all means, a thoroughly competent telephone transmission engineer, who can lay out the circuits and see that they are properly connected, so that good transmission will result.

Great economies would be possible in the handling of communications, in the handling of railroad trains throughout the country, if there could be some sort of combination or co-operation between the railroad companies and the telegraph and telephone companies. It is easy to see that one conduit line along the railroad tracks between the important cities of the country would furnish means of communication for all telephone messages and telegraph messages, train dispatching and the signal line service. If we are looking for economies in the handling of communications, I think that is one very fruitful field that is open to us.

Mr. John B. Taylor: One point that I want to raise is the relative ability of the telegraph and the telephone circuits to withstand disturbances from power lines. I ask if, in making reply, the author will express some opinion upon this subject, as well as upon the relative ability of the two systems to continue service through different atmospheric and wet weather conditions.

In some respects the telegraph has the advantage here, in that it is less sensitive to the extraneous currents, and, in other respects, the telephone seems to have the advantage, in that there is no definite current above or below which the instrument will operate or become inoperative. The transmitted current may be very small, and still be a good recognizable speech current, while, in the telegraph line, if it becomes small, it may entirely fail to actuate the instrument.

Mr. W. Lee Campbell: I want especially to call your attention to Mr. Clapp's suggestion that the use of the telephone in railroad service may be extended very much further than most railroad telegraph engineers seem to have contemplated up to date, by the railroads operating their own telephone plants at their terminal headquarters. I believe there is going to be a very large development along this line, and I believe that it will be a very great factor in converting the telegraph engineers and other railroad officials to the use of the telephone in the place of the telegraph.

(To be Continued.)

Experiments in Simultaneous Telegraphy and Telephony.

BY J. P. CHURCH, SUPERINTENDENT OF TELEGRAPH, WABASH RAILROAD, DECATUR, ILL.

A description of some recent telephone experiments made by me on our lines may be of interest to your readers. I do not know whether these ideas have been exploited before, but I have never seen anything just like them.

In the arrangement shown in Fig. 1, my idea was to use a differentially wound telephone receiver to

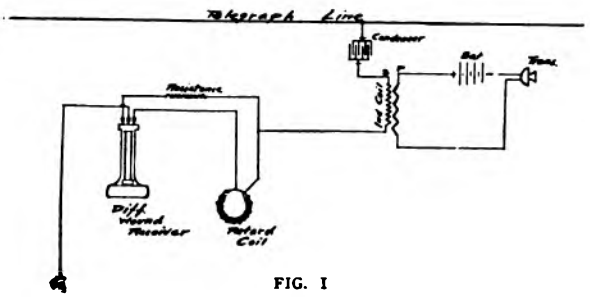


FIG. 1

neutralize the disturbance caused by the telegraph battery and induction from other wires, and thus eliminate the noise from the receiver. By inserting a retardation coil in one coil of the receiver to force the telephone currents through the other coil, so the talk would be heard and a non-inductive resistance in the other telephone coil to balance resistance of the retardation coil. I was able to reduce the noise in the receiver so that perfect talk resulted. A high resistance retardation coil and non-inductive resistance could be used by bridging the non-inductive resistance with a condenser which would pass the telephone currents around the resistance.

The transmitter circuit is the same as that of any telephone, and connection to line was made through a condenser in the usual manner. The regular howler call can be used with this arrangement.

In Fig. 2 I used two induction coils instead of the condenser and retardation coils and non-induc-

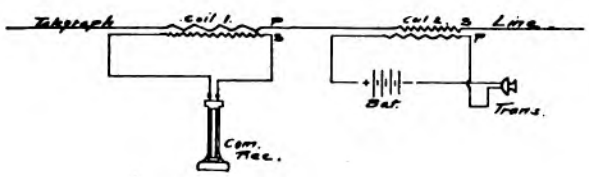


FIG. 2

tive resistance; also a common telephone receiver, instead of winding the coils differentially. The primary of the induction coil used for receiving and the secondary of the coil used to talk out are inserted in the telegraph line the same as an ordinary relay, while the receiver is connected to the secondary of coil 1, and the transmitter to the primary of coil 2. This arrangement makes a first-class composite circuit, and there is not an excessive amount of noise in the receiver. This may be eliminated by bridging the receiver terminals with a retardation coil, without materially reducing the transmission.

Both arrangements talk over into our dispatcher's telephone circuits, which are next to the wire upon which the experiments were tried between Decatur and Forrest, a distance of eighty miles. This cross-talk does not bother the dispatching circuits materially, but the talk can be heard when they are quiet. It might be reduced by placing retardation coils at Forrest and Decatur. We do not hear the talk from dispatching circuits in the composite telephone.

In the arrangement shown in Fig. 3, I am using one coil wound with three wires, the primary next to the core; one ohm resistance, line coils over the primary fifty ohms, and the secondary over line

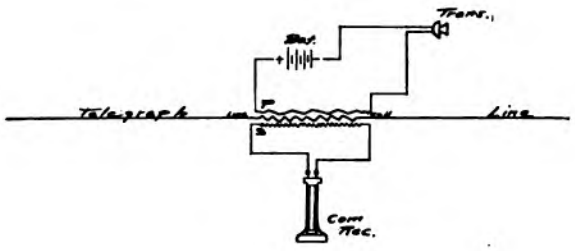


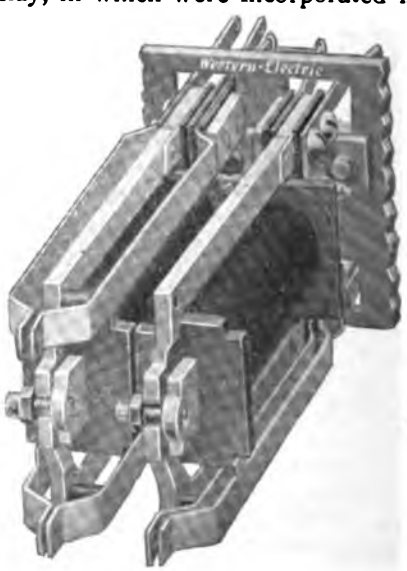
FIG. 3

coil 500 ohms. My idea was to reduce the current on line to prevent cross-talk and then multiply in the receiver to insure good transmission.

This arrangement talks somewhat stronger than that shown in Fig. 2, but it is necessary to open the home-receiver circuit by means of a push-button switch when talking, to overcome the reluctance of the coil when the secondary is closed. The cross-talk appears to be somewhat reduced by the lower capacity of the line coil.

New Telephone Relay.

During 1912 the Western Electric Company placed on the market a new line and cut-off telephone relay, in which were incorporated important



TELEPHONE RELAY.

advances in the telephone art. Over 60,000 of these relays are now in use in more than sixty different operating exchanges.

THE RAILROAD.

MR. P. F. FRENZER was appointed superintendent of telegraph of the Union Pacific Railway Company, Omaha, Neb., August 10, to succeed J. B. Sheldon, deceased.

MR. E. C. MANSON has been appointed superintendent of telegraph and transportation of the Oregon Short Line, Salt Lake City, Utah, vice B. F. Frobes, transferred to other duties.

MR. ROBERT H. LORD, thirty odd years ago one of Chicago's most brilliant telegraphers, and for the past thirty-two years identified with the railroad service, with headquarters at Chicago, was recently in New York, and made his visit the occasion to call on his many old friends, including the publisher of this paper, whom he had not seen in thirty-eight years.

HONORS TO THE LATE J. B. SHELDON.—J. B. Sheldon, superintendent of telegraph, Union Pacific Railroad, Omaha, Neb., whose death, on July 29, was announced in our issue of August 1, was buried on July 31. The funeral service was held at his late home, and floral tributes from telegraph men throughout the country surrounded the casket. Among the active and honorary pall-bearers were many well-known railway telegraph officials. Between 2:30 and 2:35 p. m., while the funeral services were in progress, every telegraph instrument at the Union Pacific headquarters was silenced, out of respect to the memory of Mr. Sheldon.

SIMPLEX TELEPHONE BLOCK ON THE SOUTHERN RAILWAY.—The Southern Railway Company is preparing to install a telephone block system to replace the present Morse telegraph system now in use on the Atlanta division between Macon, Ga., and Ooltewah Junction, Tenn., a distance of 225 miles, and part of the route of the Southern Railway's through trains between the West and Florida. The present telegraph block system consists of one telegraph wire. The telephone block is to consist of two wires. This arrangement is to be effected through the utilization of the present telegraph block wire and a telegraph message circuit, transposing the same in order to derive a through Morse circuit from the metallic telephone circuit. Each office on this block circuit will be equipped with two bells, one set on the north block and one set on the south block with the telephone so installed that it can be connected with either. The lines will be so arranged at the offices that when a block office is closed the line can be cut through by throwing the switch at the office to be cut out. As stated, the wires used for the telephone block will also be used for a telegraph circuit from Atlanta to Macon and for another circuit from Atlanta to Ooltewah Junction, into Chattanooga, Tenn. In order to take care of the heavy Florida traffic last winter, the telephone block was put into operation between Macon and Jesup and was found so satisfactory that it has now been decided to extend the system over the line between Macon, Ga., and Ooltewah Junction. The new system will be put into effect as soon as the changes can be made. The management has also authorized the installation of a simplex telephone block circuit between Monroe, Va., and Greensboro, N. C., distance 120 miles. This work will be commenced within the next ten days. Mr. W. H. Potter, Washington, D. C., is superintendent of telegraph of the Southern Railway.

MODERN METHODS IN TRAIN DISPATCHING.—The Western Electric Company has issued a handsomely gotten-up pamphlet, entitled, "Modern Methods in Train Dispatching." It gives a brief history of train dispatching and then discusses "telephone versus telegraph." This is followed by a list of railroads in the United States and Canada on which telephone train dispatching is employed, and reproductions of letters from various railroad telegraph superintendents endorsing the system. The half-tone illustrations of apparatus and plants are examples of the highest engraver's art and the whole pamphlet is an artistic production.

OBITUARY.

HIRAM D. ROGERS, aged seventy-nine years, well-known to the members of the Old Time Telegraphers' and Historical Association, of which he was a member, died at Boston, Mass., on August 4, of heart failure. Mr. Rogers was known to the telegraphic fraternity as the manufacturer of manifold and carbon paper and styluses. He was in business for over thirty years on Maiden Lane, New York. Mr. Rogers was an inventor of many electrical devices, including improvements on stock tickers. He was also the patentee of the underground system largely in use throughout the country. Mr. Rogers was a native of Cincinnati, Ohio. He began his business career along commercial lines, from which he retired to devote himself to telegraph matters. He constructed private telegraph lines, and was president of the Municipal and Counting House Telegraph Company, the first of its kind in the West. He established private lines of his own, and was the inventor of dial and printing telegraph instruments. Mr. Rogers was the first applicant on record in the West for the right to put electrical conduits in the streets of Cincinnati. While he was agent for the Gold and Stock Telegraph Company at Cincinnati he experimented with and brought manifold copying paper into successful use.

Book on American Telegraph Practice.

Every student of technical telegraphy should be familiar with modern practice in telegraphy—that is to say the systems and apparatus employed in its operation. The latest book on this subject is McNicol's "American Telegraph Practice." A careful study of this excellent work will give one a comprehensive view of the telegraphic art as practiced in America at the present time and a familiarity with its contents is about all a person need know about the subject to be an expert.

The book constitutes a complete technical course in modern telegraphy, including simultaneous telegraphy and telephony, and contains 498 pages.

The price of the book is $4.00 per copy. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MUNICIPAL ELECTRICIANS.

POLICE TELEGRAPH IN AUGUSTA.—A new police telegraph system is being installed in Augusta, Ga. Forty Gamewell boxes will be placed in position. Mr. W. C. Davenport is city electrician.

CONVENTION OF THE MUNICIPAL ELECTRICIANS.—As already announced the nineteenth annual convention of the International Association of Municipal Electricians will be held at Atlantic City, N. J., September 15, 16, 17 and 18. The headquarters of the association will be at the Hotel Isleworth. Mr. J. W. Kelly, jr., of Camden, N. J., president of the association, promises to have some excellent papers by well-known authorities, and is making every endeavor to bring out a large attendance of members. Mr. Clarence R. George, Houston, Tex., is secretary of the association.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

What is the difference between the box type bridge and the slide wire type as to connections?

What are the principles upon which the bridge depends for its operation?

Study carefully the relations of the various elements of the bridge apparatus as described in connection with Fig. 9.

(Page 44). What is the meter-bridge measuring instrument and what is its chief merit?

How is the scale of this instrument divided?

Why is it important to be exact in making the electrical connection with the German silver or platinoid resistance wire?

Study Fig. 10 in this connection.

How is the unknown resistance connected with the instrument?

Has the resistance R known or unknown value?

How are the battery and the head telephone connections made?

What is the object of using the head telephone?

Study the example (on page 45) of the use of meter-bridge.

Is the box type bridge made of any special design?

In what form are the resistances of the box type provided?

How are the coils of this instrument mounted?

Referring to Fig. 12 on page 47, how many coils are there employed in this instrument and how are they arranged? How many plugs are used in connection with this box type bridge?

(Page 46). In this rheostat how are the resistances arranged?

Study Fig. 12 in connection with the use of this instrument.

How are the coils in this device usually arranged with reference to their resistances?

What are the three precautions to be observed when using a bridge?

Is it advisable to use a stronger battery than is actually necessary?

In making measurements why is it important to close the battery circuit before closing that of the galvanometer?

(Page 49). What would be the effect on the results of varying the battery power?

(To be Continued.)

Operators' Wireless Handbook.

Operators' Wireless Telegraph and Telephone Handbook, by Victor H. Laughter, is an excellent work for those who wish to obtain a general knowledge of what wireless telegraphy and wireless telephony are, and how the systems work. It describes the various pieces of apparatus employed in wireless communication, and their uses, also the various wireless telegraph systems.

A short history of early wireless methods prepares the reader to better understand the later improved systems. The book contains many illustrations, the diagrams being especially clear, which makes them easily understood. The various systems and connections are thus portrayed.

The volume is devoid of mathematics to confuse the beginner. The price is $1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Utility of Wires on the Pennsylvania Railroad.

(Continued from page 444, August 1)

If trouble is experienced in ringing, the resistance of the ringing circuit should, if possible, be diminished. If a power generator is used this can usually be done by replacing the lamp ordinarily included in such a circuit by a lamp of lower resistance. With a hand generator the trouble is not so easily cured. Either the generator must be more highly geared, or else replaced by one producing a higher voltage.

The grounded line composite is a device for inserting telephones on a grounded telegraph line. The telephones may be inserted either in series or

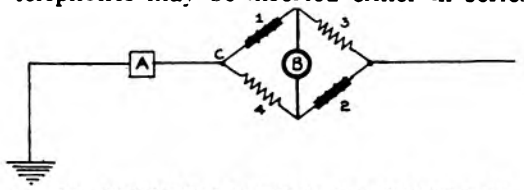


FIG. 33—THEORETICAL DIAGRAM OF GROUNDED LINE COMPOSITE CIRCUIT

in multiple. Various forms of composite telephone apparatus are on the market. One method of introducing the telephones in series is the device known as the telegraphone (Fig. 33).

In this figure, A represents a telegraph station and B a telephone station. Four coils of wire surround B as indicated, forming a Wheatstone Bridge arrangement. Of these four coils, 1 and 2 are wound inductively and 3 and 4 non-inductively. The resistance of all four coils must be equal, and may be about thirty ohms each. The telephone current in the line, on reaching the point C, does not divide equally between coils 1 and 4, as it is an alternating current of high frequency, and, therefore, greatly impeded by the inductively wound coil 1. It therefore passes through coil 4. For the same reason it will not enter coil 2, but passes through the tele-

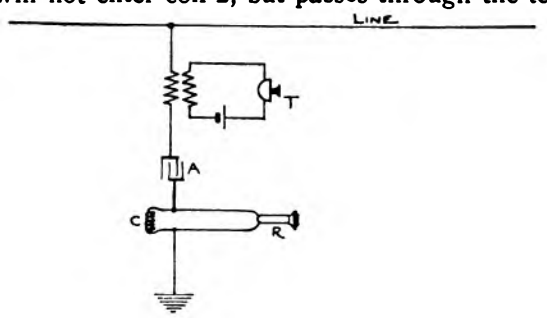


FIG. 34—INTERMEDIATE TELEPHONE STATION ON GROUNDED LINE COMPOSITE CIRCUIT.

phone apparatus B, and through coil 3 to the line.

The telegraph current in the line will, on the other hand, divide itself equally at C and traverse both branches of the rectangle, passing the telephone apparatus without entering, and uniting again in the main line.

Not more than five or six telephones should be inserted in this manner in a single line, and it is not practicable to have more than four or five telegraph offices in the line. With only two or three sets of telephones thus inserted, a line up to 200 miles in length may be worked satisfactorily, provided, however, there are no intermediate telegraph offices between the telephone stations.

Signaling is effected by a howler instead of a bell. This is merely a telephone receiver provided with a horn to intensify the sound emitted by its diaphragm, and actuated by a rapidly intermittent current, producing a harsh musical note.

The inserting of telephones by bridging may be carried out as shown in Fig. 34.

A condenser is inserted at A, to prevent the telegraph current in the line from passing to earth. The high-frequency alternating telephone current will readily pass this condenser. T is the transmitter and R the receiver, connected in the usual way, except that as a shunt to the receiver we have a retardation coil, C, made without a leading wire from its center, and provided with an iron core that may be pulled in and out to vary the inductance. This coil is inserted to reduce the noise in the telephone. Of course it reduces the telephone current also, but as the noise is usually the feebler of the two, it may be eliminated without seriously interfering with the telephone transmission. More-

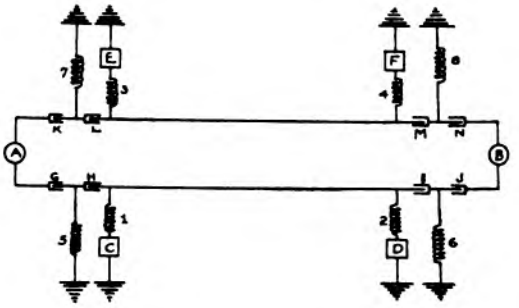


FIG. 35—THEORETICAL DIAGRAM OF METALLIC CIRCUIT COMPOSITE

over, an extra strong transmitting current may be used, if necessary, to make up for the sound lost in the coil C.

It is not practicable to continue a grounded telegraph line by means of a metallic circuit if the latter runs through a telephone exchange.

(To be Continued.)

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

TELEPHONE PIONEERS OF AMERICA, at Richmond, Va., October 29 and 30. Secretary, Henry W. Pope, 26 Cortlandt street, New York.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Atlantic City, N. J., September 15, 16, 17 and 18. Secretary Clarence R. George, Houston, Tex.

Reunion of the Old Time Telegraphers' and Historical Association and of the Society of the United States Military Telegraph Corps Postponed.

Secretary F. J. Scherrer, of the Old Time Telegraphers' and Historical Association, and Mr. David Homer Bates, secretary of the Society of the United States Military Telegraph Corps, on August 10 received the following telegram from Mr. George M. Myers, of Kansas City, Mo., president of the Old Time Telegraphers' and Historical Association:

"At a meeting of the Kansas City committee of the Old Time Telegraphers' and Historical Association held to-day it was the unanimous opinion that on account of the distressing conditions growing out of the European war the committee was requested to suggest that the executive committee carefully consider the advisability of postponing the meeting scheduled to be held at Kansas City, September 15, 16 and 17, and we advise postponement.

"(Signed) George M. Myers, president;
Edward Dickinson,
George W. Brownson, and
A. B. Richards,
vice-presidents."

The following reply was sent to president George M. Myers:

"Your telegram suggesting postponement of meeting of Old Timers' Reunion at Kansas City next month received. I will secure approval of four ex-presidents on executive committee, and notices to members calling off the meeting will be sent out in due course. Action taken meets with our approval here.

"F. J. Scherrer, secretary."

Serial Building Loan and Savings Institution.

A meeting of the shareholders of the Serial Building Loan and Savings Institution will be held at 16 Dey street, New York, on August 31, for the purpose of adopting an amendment to the by-laws, authorizing the board of directors to subscribe for and purchase shares in the Land Bank of the State of New York and to perform other duties set forth in the amendment.

The Land Bank of the State of New York is a State institution organized for the purpose of enabling savings and loan associations to make their business State-wide, to include within the area of their activities the rural, as well as the suburban and urban fields, and for the purpose of strengthening the associations by means of a central institution similar in character to the Federal Reserve Banks. To do this it is necessary that the source from which the funds of such associations are obtained shall have the widest possible range, without altering in any manner the scope and area and conditions for making investments. In order to reach the great stores of wealth that are looking for investment, the State permits savings and loan associations to issue debenture bonds, secured by their own first mortgages, and to market them through the medium of a central savings and loan institution, called the "Land Bank of the State of New York."

The banking law provides that the shares of this central institution may be subscribed for and owned only by savings and loan associations. Its minimum capital is $100,000, and at least ten associations, whose aggregate resources are more than $5,000,000 must become its incorporators.

This addition to the powers and privileges may be obtained by the associations by adopting a new by-law, and it is for the purpose of passing upon such a by-law that the shareholders' meeting of August 31 is called.

Milwaukee Commercial and Traffic Departments Baseball Game.

After continual practice every evening and Sundays for three weeks, the commercial and traffic departments crossed bats at Washington Park, Milwaukee, Wis., on Sunday, July 25. Everything went along finely for four innings, when both pitchers became somewhat tired, and both teams started in with two and three-base hits and some home runs, which finally ended in the ninth inning with a score of 18 to 15 in favor of the commercial department.

John Hayes, manager of the traffic department club, states that his aggregation of pennant winners could have won the game, but for the fact that some one had moved third base while he was making a three-bagger, so that he was unable to find it, and, consequently, lost the game. Arthur Haberstroh, manager of the commercial department winners states that Hayes was winded and was not in shape to run three bases.

The game created a lot of good feeling and everybody had a good time. It was attended by all employes, with their families, who could possibly be spared.

Mr. F. W. Martin, manager of the Postal Telegraph-Cable Company, Charlotte, Mich., writes: "Although I have only been a subscriber for a year I have become very interested in the articles you are printing on the technical side of telegraphy and you can depend on me to stick."

Mr. J. M. Clement, manager of the Western Union Telegraph Company, Waco, Tex., writes: "To be in the telegraph business without your paper would be like a ship without a rudder."

Typewriters.—Typewriters in the telegraph service are indispensable these days. Mr. D. A. Mahoney, who represents the Central Typewriter Exchange, 203 Broadway, New York, is a well-known operator, and has, for the past twenty years,

been making a specialty of selling rebuilt typewriters of standard makes to telegraphers all over the country. The Central Typewriter Exchange is, at the present time, making a specialty of selling all-capital Remington No. 6 and Underwood No. 4 machines, and has sold and rented 150 machines to Postal operators in and around New York City in the past few months. Mr. Mahoney gives his personal attention to all orders and operators may be assured that their interests will be well taken care of by him.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Wire chief C. E. Perkins has resumed his duties after an illness of several weeks.

P. L. Murphy and Wm. Ryan, operators, are at Bar Harbor, Me., helping out during the rush of business occasioned by the arrival of the steamer "Kronprinzessin Cecilie."

Manager L. E. Aarons, of White River Junction, Vt., spent the week end in his home-town, Boston.

A. B. Kurtz has returned from two months' vacation on Nantucket Island. He has been appointed assistant wire chief, relieving L. E. McAvoy, resigned.

The large amount of press-matter incident to the trials of the cup yachts, "Vanitie," "Defiance" and "Resolute," necessitated sending to Newport an additional force of men. Inspector W. A. Donovan and operators C. H. Hanson, H. B. Fuller, E. E. Fischer and T. W. McLean comprised this force, with district commercial manager W. G. Chase in charge. They remained two weeks and manager Dwyer, of Newport, expressed his satisfaction with the service rendered.

H. B. Fuller, James Reardon and "Hi" Finn, of this office, were assigned to handle the press during the tennis singles at Newport.

NEW YORK WESTERN UNION.

Mr. Frank D. Murphy, one of the old timers of this office, well known to the telegraph profession throughout the country, was recently asked why his name did not appear among those who transferred from 145 Broadway to 195 Broadway in 1875, and in July of this year to 24 Walker street, replied: "I came pretty near being one. The company moved from 145 Broadway, in February, 1875, and on March 10 I appeared in the new office at 195 Broadway as a 'raw recruit,' I have been plugging away at it ever since, and I imagine I will continue until Gabriel blows his trumpet. Now that 'old man Finnigan' and 'old man Kav' are not here I blow it for them."

Everyone here is now feeling quite at home in the new quarters and appreciates the convenient arrangement of the equipment, and everything is running smoothly. The location of the new office made necessary a rearrangement of personal matters as regards getting to and from the office, but these things are adjusting themselves.

The great abundance of light and air in the new office is much appreciated. At night the electric light is so soft and evenly distributed that there is no strain upon the eyes.

An excellent view of the harbor is obtained from the office windows and many of our "landsmen" are becoming quite interested in the big ocean steamers which move up and down the river majestically, particularly in these days of strife on the other side of the Atlantic. This building houses the largest telegraph and the largest telephone offices in America.

ST. LOUIS WESTERN UNION.

H. A. Emmons, of the office of the general superintendent of traffic, New York, and Mr. J. J. Welch, of the office of the division traffic superintendent, Chicago, Ill., were recent business visitors at the St. Louis Mo., office.

Telegraph and Telephone Age

No. 17 NEW YORK, SEPTEMBER 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Interconnection of Submarine Cables and Land Lines in the Philippines.

Owing to the numerous islands of the Philippine archipelago the telegraph system is necessarily composed of submarine cables and land lines, and when the islands came under the dominion of the American government the telegraph department undertook the problem of devising ways and means of interconnecting the cables and land lines.

Mr. Samuel W. Beach, of the Bureau of Posts, government of the Philippine Islands, Manila, P. I., under the authority of Captain Rush P. Wheat, superintendent of telegraph, has successfully met this problem and devised the apparatus illustrated and described here, the cables being operated on the open-circuit principle and the land lines closed circuit.

When at rest both transmitters are on their back contacts. There is no current on the open circuit (cable), 1, and therefore relay 7 is not magnetized and transmitter coil 16 is open, thereby closing contacts 30 and 44.

There is a steady current on closed circuit 29 which passes through the contact points at 30, thence via wire 28 to relay coil 24, magnetizing that relay and opening coil 18, thus throwing transmitter 3 open.

When a station on closed circuit 29 starts to send he first opens his key. This demagnetizes relay coil 21 which closes contact 20 and magnetizes transmitter coil 18, closing the contact 46 and throwing battery 11 into circuit. This closes the "open" or cable circuit, thereby making a false, or reverse, signal. This false signal upon reaching the station at the other terminal of the cable enters the apparatus there at 2, thence through 5 and 6 to relay 7, and thence through 8 to the ground at 9. This closes contact at 13 and magnetizes coil 16, opening contacts 30 and 44, thus opening the land line beyond, and creating a condition exactly the same as exists on the first named land or closed line, straightening out the signal into readable Morse.

Now then, the station which has its key open closes it to make the first signal. A reversal of these actions takes place; the first land line closing, the cable opening and the further land line closing.

The differential coil 23 is necessary when a current is flowing in from the cable to prevent the transmitter 3 from closing and thus throwing on battery 11 and increasing the current on the already electrified cable line.

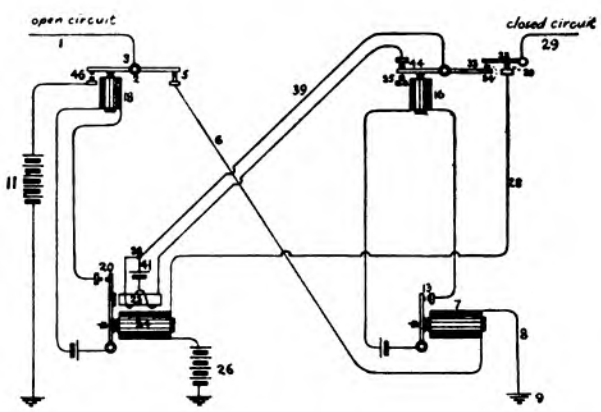


DIAGRAM OF CONNECTIONS.

Current enters from line 1 into transmitter at 3, through 5 and 6 to relay 7, closing contact 13 and magnetizing coil 16. This opens contact 30, throwing battery 26 off and demagnetizing relay 24.

This would close contact 20 and throw battery 11 into circuit 1, were it not that when contact 30 opened contact 44 does likewise. Opening contact 44 threw extra local line 39 open and demagnetized its half of the windings in the differential coil 23.

The other coil or winding in the differential coil 23 still remains in local circuit with battery 41 because the connection 38 is permanent. Thus the differential relay's armature, although the main relay coils are demagnetized, does not fly back to contact 20 because the differential coil became itself a magnet when one of the opposing coils opens, and contact at 46 is prevented.

35 is an insulated adjusting screw, and 34 is insulation between 32 and 33.

In the Philippines telegraph system at the time this data was supplied there were 287 insular government telegraph offices, including the wireless stations at Cuyo, Davao, Jolo, Malabang, Puerto Princesa and Zamboanga. The land lines total 4,155 miles of wires, and in addition there are 1,-

076 miles of deep-sea cables. This system is covered by fifty-five American operators, fifty-nine American linemen, 432 native operators and 264 native linemen, and a cable ship, the "Rizal."

Recent Telegraph and Telephone Patents.

ISSUED AUGUST 4

1,105,629. Four-Party Key. To A. F. Dixon, Newark, N. J.

1,105,761. Relay Sounder Attachment. To S. L. Dickson, Short Creek, W. Va.

1,105,811. Sequence Switch. To F. R. McBerty, New Rochelle, N. Y.

1,105,837. Signal-Receiving Device. To C. S. Rhoads, jr., Sandwich, Ill.

1,105,842. Substation Signaling Apparatus. To H. O. Rugh, Sandwich, Ill.

1,105,843. Control System. To H. O. Rugh, Sandwich, Ill.

1,105,920 and 1,105,922. Telegraphy. To L. M. Potts, Baltimore, Md.

1,105,924. Telephone. To E. S. Pridham and P. L. Jensen, Napa, Cal.

1,106,001. Telegraph Repeater. To G. L. Rawdon, Cleveland, Ohio.

ISSUED AUGUST 11

1,106,501. Call-Registering Telephone. To E. D. Fader, J. Tibb, and J. N. Tibb, Vancouver, B. C.

1,106,592. Telephone System. To F. E. Summers, Memphis, Mo.

1,106,655. Telephone Call Bell or Ringer. To W. Raisling, Chicago, Ill.

1,106,750. Telegraph System. To B. F. Thompson, Arlington, Md.

1,106,762. Electric Writing Telegraph. To E. H. Widegren, and R. A. Widegren, Alby, Sweden.

1,106,874. Wireless Apparatus. To P. L. Jensen, San Francisco, Cal.

1,106,875. Wireless Apparatus. To P. L. Jensen and E. S. Pridham, Napa, Cal.

1,106,922. Selector. To A. M. Bullard, New York, N. Y.

1,106,945. Antenna for Wireless Telegraphy. To N. J. Jeffries, Atlantic City, N. J.

1,107,024. Telephone. To L. S. and O. B. Boyce, Rockwell City, Ia.

1,107,133, 1,107,134, 1,107,135, 1,107,136, 1,107,137, 1,107,139, 1,107,140, 1,107,141, 1,107,142, 1,107,143, 1,107,144, 1,107,145, 1,107,146, 1,107,147, 1,107,148, 1,107,150, 1,107,151, 1,107,152, 1,107,154, 1,107,157. Telephone Exchange System. To E. E. Clement, Washington, D. C.

1,107,138. Automatic Telephone Exchange. To E. E. Clement, Washington, D. C.

1,107,149. Selective Apparatus for Systems of Communication. To E. E. Clement, Washington, D. C.

1,107,153. Electric Switch. To E. E. Clement, Washington, D. C.

1,107,155 and 1,107,156. Telephone Registering System. To E. E. Clement, Washington, D. C.

PERSONAL.

MR. GERARD SWOPE, vice-president of the Western Electric Company, New York, has returned from Europe, where he spent several weeks.

MR. MARION H. KERNER, a well-known old-time and military telegrapher of New York, has been confined to his home by illness for some time past, but his friends will be pleased to learn that he is now convalescing.

MR. BLUMENFELD'S GENEROSITY.—The London Daily Express, of which Mr. Ralph D. Blumenfeld, a former American telegrapher, is publisher and editor-in-chief, contributed $10,000 in aid of the stranded Americans in Europe.

MR. G. H. CORSE, JR., an old-time telegrapher of New York, and now general passenger agent of the San Francisco Overland Routes, with headquarters at Yokohama, Japan, was married in San Francisco, Cal., August 12, to Miss Frances R. Adams, daughter of ex-governor J. W. Adams, of Nevada. After spending their honeymoon in the Yellowstone Park, Mr. and Mrs. Corse will sail for Yokohama on the steamer "Manchuria."

MR. W. E. PERKINS, an old-time telegrapher, will be recognized on the film in the new photoplay, entitled, "My Friend from India," which is being shown in New York. He took a leading part in this play while it was on the stage, and scored successes all over the country. The author of the play, Mr. H. A. Du Souchet, is also an old-time telegrapher and well known in New York and California.

MR. B. A. WORTHINGTON, formerly president of the Chicago and Alton Railroad Company, with headquarters at Chicago, and a former railroad and commercial telegraph operator, together with his wife and daughter, were among the last to leave Vienna, Austria, after the breaking out of the war. Mr. Worthington's party was subjected to great indignities but managed to reach London, where they are now awaiting steamship accommodation to this country.

Old-Timers' Reunion Postponed.

As was announced in our August 16 issue, the reunion of the Old-Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps, which was to have been held at Kansas City, Mo., September 15, 16 and 17, has been called off on account of the disturbed conditions brought about by the European war. Mr. George M. Myers, the well-known old-timer and a prominent business man of Kansas City, is the president of the old-timers' organization. The executive committee will be called upon to select a place of meeting for the reunion of 1915 and choose officers.

A WISE DELIVERY CLERK instructed the messenger to deliver a telegram addressed to Gil & Pie Brothers and Company to Gillespie Brothers and Company. This error was not caused by the spaced letters in the telegraph alphabet.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. P. BRUCH, vice-president, is in Connecticut for two or three weeks on a vacation.

MR. G. H. USHER, general superintendent, Atlanta, Ga., called at the executive offices on August 20 on his way to Saratoga County, New York, where he is spending his vacation.

MR. C. F. LEONARD, superintendent, New York, has returned to his desk much benefitted by his rest.

MESSRS. C. E. BAGLEY, superintendent, and J. H. Wilson, manager, Philadelphia, Pa., were executive office visitors August 24.

MR. M. M. DAVIS, electrical engineer and chief engineer of telephones, New York, is resting at East Chatham, Mass. He will return to his desk on September 7.

MR. RUSSELL RICHARDS, son of superintendent A. B. Richards, Kansas City, Mo., was a recent caller at the executive offices. He expects to enter Columbia Law School this fall.

MR. F. W. DANFORTH has been appointed manager at Asbury Park, N. J., and Miss Alice S. Rice at Orville, Ohio.

MISS T. PARROTT, manager at Palatka, Fla., has been granted a temporary leave of absence. J. R. Lowrimore will be in charge of the office in Miss Parrott's absence.

IRWIN C. COOPER, aged fifty-eight years, manager of the Postal Telegraph-Cable Company at Trenton, N. J., died on August 18.

MR. EUGENE SHERWOOD of the Postal Telegraph-Cable office at Fremont, Ohio, has trained a turtle to do some wonderful things—for a turtle. It seems to know when Mr. Sherwood is catching flies for its consumption and climbs up on the float in the jar and holds its mouth open for the dainty morsel. Mr. Sherwood is so successful as a turtle trainer he ought to teach his pet to telegraph.

MRS. W. Y. NOLLEY, wife of manager Nolley of the Mackay Telegraph-Cable Company at Dallas, Tex., who was with a party of friends in Paris, when the war broke out, succeeded in reaching London without any of the discomforts experienced by others. Mrs. Nolley arrived in New York on the steamer "Campania" on August 22, and after a brief stay in New York, where she visited friends, returned to Dallas.

Moisture-Proof Splices in Cables.

The following instructions for making moisture-proof splices in rubber-insulated cables have been issued by the engineering department of the Postal Telegraph-Cable Company:

Remove the braid covering for about four inches from the ends to be spliced, being careful to avoid cutting the rubber insulation. Remove the rubber insulation for two inches back from the end of the wire. Scrape the wire clean. Pare the rubber insulation down where it meets the bare wire, similarly to sharpening a pencil. This requires the use of a sharp knife. Be careful not to nick the copper wire when removing the insulation, thus weakening it. Splice the bare ends with a twist joint of the same form used splicing iron line wire. Squeeze the spliced ends of the wire in with pliers and remove any sharp edges so that they cannot later cut through the insulation.

Wrap the copper joint snugly with tinfoil. Suitable tinfoil is furnished on requisition. In an emergency clean tobacco package foil will do.

After the foil has been applied scrape the exposed rubber insulation to remove any film of grease and to slightly roughen it. Coat the entire length of the exposed rubber and tinfoil and an inch of the braid next to each shoulder with rubber cement. The nozzle of the tube can be used to smear the cement uniformly over the entire surface. Care should be taken to avoid air bubbles. Do not apply the cement too thickly, two thin coats are better than one thick one, allowing the first one to become tacky before the second is applied. Be careful not to handle the rubber cement while it is drying.

After the cement is fairly dry, wrap the entire joint with a strip of pure gum tape. Start wrapping the tape close against the shoulder of the braid and overlap the tape on itself at least one-half its width on the insulation and two-thirds its width over the joint. When the shoulder is reached reverse and wrap back to the shoulder where started. Stretch the tape as it is applied, so that it will bind itself closely and exclude air. Finish the wrapping by turning the loose end in towards the joint and by squeezing the coating all over to make the tape unite.

Next apply a single layer of friction tape over the rubber tape to replace the braid that was removed. This tape should be applied with a half lap and be drawn up snug, the best way to apply tape is to rotate the roll backwards, so that the tape can be well drawn up. Start to apply the friction tape an inch beyond the end of the rubber tape. Cover the rubber tape and an inch beyond. Joints should be made so as not to overlap each other, and, when possible, should be spread over a distance of twelve to eighteen inches, so as avoid making the complete joint too bulky.

In making the splices be careful to make their length such that the strain will be distributed among all the conductors. If one is made too short it may pull out when the cable is being placed in position.

Close the complete joint by wrapping with a spiral of friction tape to draw the conductors closely together. Then wrap with two layers of cable tape well over on the original covering beyond each end of the joint. Paint each layer of cable tape thoroughly with cable paint as it is applied.

Mr. H. Morlan, manager of the Postal Telegraph-Cable Company at Salt Lake, Utah, writes: "Herewith check for $2.00 for the AGE. Always keep me on your live list."

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. A. G. SAYLOR, general manager, New York, is absent on a business trip. He will visit Boston and other New England points before his return to his office, which will be early in September.

MR. S. M. ENGLISH, general manager, Gulf Division, Dallas, Tex., who has been in New York for several weeks on special business, returned to Dallas on August 19, going by way of New Orleans by steamer.

MR. E. Y. GALLAHER, comptroller of this company, has returned to his office after a short rest from his duties.

MR. G. M. YORKE, general superintendent of plant, New York, is spending his vacation at Point Pleasant, N. J. He expects to return to his desk September 7.

SUPERINTENDENT W. A. SAWYER, accompanied by Mr. A. G. Saylor, general manager, New York, recently made a trip of inspection throughout Westchester county, N. Y., and several offices in Connecticut.

MESSRS. F. E. D'HUMY, H. W. Drake and G. R. Benjamin of the plant engineer's department, New York, have resumed their duties after a short rest.

MR. W. C. MERLY, of vice-president Belvidere Brooks' office, has returned from a trip to Colorado. He was accompanied by Mrs. Merly.

MR. M. B. WYRICK, of Dallas, Tex., division plant superintendent, has been advanced to the position of division plant superintendent of the western division, with headquarters at Chicago.

MR. J. G. HILBERT has been appointed division plant superintendent at Dallas, Tex., vice M. B. Wyrick.

MR. W. N. FASHBAUGH, general superintendent of traffic, New York, announces the appointments of Mr. Louis Casper and Mr. W. E. Bellman, of Dallas, Tex., to be traffic supervisors with headquarters at New York, and Mr. C. R. Fisher to be traffic supervisor with headquarters at Denver, Col.

MRS. CAROLINE LAVERE DOWNER, aged seventy-one years, widow of Alfred S. Downer, former manager of the Western Union operating department, New York, who died about twenty-five years ago, died at her home in New York, August 17. She is survived by a son, professor Charles Alfred Downer, professor of Romance languages at the College of the City of New York.

V. G. SHEARER, aged fifty-eight years, an old time telegrapher and in the service of this company at Jacksonville, Fla., died on August 10. He was born in Selma, Ala., and entered the telegraph service in 1873. He was traffic chief in the Jacksonville office from June, 1892, to June, 1894. His son, W. D. Shearer, is traffic superintendent in that office, and another son, V. G. Shearer, jr., is manager of the Live Oak, Fla., office.

NEW STOCK QUOTATION CONTRACT.—A new contract has been made between the Western Union Telegraph Company and the New York Stock Exchange regulating the use of quotations and giving the Exchange the right to designate who shall receive them. It applies to the Western Union service all over the country wherever quotations are now served or may hereafter be desired.

Old and New Western Union Headquarters, New York.

The accompany illustration shows the old Western Union Building at 195 Broadway, New York, and the location of the new building at 16 Dey street, which is now the company's headquarters, although the official address of the company remains 195 Broadway.

As already noted in these columns the old building on the corner, which has been the company

OLD AND NEW WESTERN UNION HEADQUARTERS, NEW YORK.

headquarters since 1875, is being torn down to make way for the new structure, which will be an extension of the present section at 16 Dey street, shown at the left of the picture. The completed building will be one of the most imposing "sky-scrapers" downtown New York, and one would naturally suppose that it will furnish ample accommodations for the company's executive officers for many years to come. But in these days of rapid business expansion it is perhaps not safe to be positive in making such statements, for the same thing was said of the old building when it was erected, and it was not many years afterward that it began to show signs of insufficiency of room.

Atlanta, Fourth Telegraph Center.

Mr. W. G. Peebles, manager for the Western Union Telegraph Company at Atlanta, Ga., made an address at the Rotary Club luncheon in that city on August 18, taking as his subject, "Keeping the Live Wires Alive." He showed that Atlanta was the fourth largest telegraph center in the United States.

"For the past four months," said Mr. Peebles, "the Western Union Company has handled in Atlanta an average of 1,080,238 messages per month, of which 191,792 originated in Atlanta, the largest percentage of which were revenue-bearing messages.

"The force under my immediate supervision, which is that of a commercial department, consists of the following: One manager, one assistant manager, forty-two clerks, eighty messengers, thirteen branch offices and three linemen.

"The traffic department is composed of thirteen supervisors, 210 operators and forty-four clerks.

"The plant department, of four chiefs, fifteen repeater attendants and nine other employes, making a total of 339 employes in the main office proper, eighty messengers and thirteen branch offices.

"The pay-roll necessary to meet the salary expense of these employes runs about $30,000 per month.

"We have employed in the city of Atlanta a total of 455 employes, from the general manager to the messenger boy. While I have not the exact figures per family, I believe that I am safe in saying that the Western Union feeds 2,500 people in this city who are directly dependent upon it for support."

THE CABLE.

Cables to South America Unrestricted.—The Mexican Telegraph Company, New York, connecting with the Central and South American Telegraph Company, announces that there are absolutely no restrictions of any kind to cable messages "via Colon," which is an all American route to South America, not touching the possessions of any European country.

The Pacific Cable Board has decided to lay a second cable from Bamfield, B. C., to Port Alberni, and an underground cable from Port Alberni to Parksville, and a submarine cable from Parksville to Nanaimo, the latter to make connections with the cables from Nanaimo to Vancouver, B. C. This will give the cable board an all-cable route direct from Australia and New Zealand to the mainland.

The Cable Situation.

One of the early effects of the European war on the cable companies was the announcement of the Eastern Telegraph Company and the Western Telegraph Company that the deferred plain language or half-rate service would be discontinued, also week-end letters. Similar announcements were made by the French administration and by the Great Northern Telegraph Company.

The Western Union Telegraph Company said that, with a view to minimizing the inconvenience to the public which would result from the complete withdrawal of these supplementary services, it was continuing them as far as practicable. All transatlantic messages taken at reduced rates for the present are, however, subject to whatever delay may be involved in their unlimited deferment to full-paid messages on hand.

The Commercial Cable Company announced that it would continue deferred plain language service wherever it was possible. At the present time deferred plain language cablegrams may be sent to Great Britain, Holland and Norway.

The Western Union Company's cable letter service is continued to its own offices in Great Britain. Beyond London service is slow but fairly reliable, except to Germany, Austria and Hungary.

Cablegrams to Japan, or via Japan, must be written in plain language, Japanese, English or French. They are only accepted at sender's risk, and are subject to censorship. Cablegrams to Italy must be written in plain French only. The Argentine Republic accepts international messages at the senders' risk, and they must be written in plain Spanish, French, German, Italian or Portuguese.

CANADIAN NOTES.

Printers on Canadian Pacific Telegraph Lines.—The Canadian Pacific Railway Company's Telegraph is now operating the Morkrum printer system between Montreal and Winnipeg, with repeaters at Sudbury and Fort William, total distance 1,415 miles. The distance between the different sections being 439 miles, 556 miles, and 420 miles. This company is also installing a similar system between Winnipeg and Moose Jaw, a distance of 398 miles. Mr. W. J. Camp, Montreal, Que., is assistant manager of the Canadian Pacific Railway Company's telegraph.

Canadian Pacific Telegraph Department.—The Canadian Pacific Railway now operates 13,800 miles of telegraph lines, 164 miles cable, 104,300 miles of wire, and 1,532 telegraph offices; and over three-fourths of its wires are used in commercial service. The length of the wires now in use is three times that recorded in the year 1900, and the number of offices is 50 per cent greater than in that year. The number of messages sent in 1913 was about 5,000,000, or three and a half times as many as in 1900. The company operates more than twenty long duplex circuits, including one from Montreal to Vancouver. Between Montreal and Bamfield, B. C., which is the terminal of the cable to Australia, a wire is leased to the British Pacific Cable Board and a duplex Wheatstone apparatus is used. The Morkrum printing telegraph has been used on this company's lines for two years and four duplex circuits worked by hand are in operation. Morkrum tape transmission duplex circuit was put into service on July 27 and another between Winnipeg and Moose Jaw on August 28. Telephones are now used by train dispatchers on over 6,000 miles of Canadian Pacific lines. Telephone equipments are carried on all trains.

Mr. T. C. Ashcroft, vice-president of the Security Bank and Trust Company, Memphis, Tenn., and an old-time telegrapher, writes: "I am a very busy man, but I always find time to read your excellent paper."

THE TELEPHONE.

MR. U. N. BETHELL, president of the New York Telephone Company, New York, is resting in the Adirondacks.

MR. E. D. NIMS, first vice-president and treasurer of the Southwestern Telegraph and Telephone Company, St. Louis, Mo., and Mr. J. S. McCulloh, general commercial superintendent, New York Telephone Company, New York, are in Europe.

MR. H. S. BROOKS, general commercial superintendent of the American Telephone and Telegraph Company, New York, who, with his family, spent several months in Europe, arrived at Quebec a few days ago on his way home.

MR. W. S. GIFFORD, statistician of the American Telephone and Telegraph Company, New York, has returned from Europe.

MR. GEORGE W. FOSTER, a well-known telephone official of Dallas, Tex., was in New York last week en route to Germany, where he intended to visit for a month or two. The war, however, caused a change in his plans, and he is now making a sea trip of twenty-two days on the steamer "Almirante" to Jamaica, Panama, Colombia, and other points in Central and South America.

NASSAU.—The telephone system at Nassau, Bahamas, is to be extended. The annual rates are: Private, city, $15; suburban, $20. Business, city, about $20; suburban, $25.

RECEIVER FOR INTERSTATE TELEPHONE COMPANY.—Application for a receiver for the Interstate Telephone Company has been made at Trenton, N. J. This company operates generally in central and south Jersey, and has a working agreement with the Keystone Telephone Company, Philadelphia.

TELEPHONE CENSORSHIP IN ENGLAND.—It is reported that a modified form of censorship has been established over the telephone system of Great Britain. No one is allowed to speak except in English, and those attempting to use any other language are at once cut off.

TELEPHONE SERVICE IN SHANGHAI.—The telephone service at Shanghai, China, is provided by the Shanghai Mutual Telephone Company, which now utilizes upward of 5,000 telephones. The company is building an additional exchange in the residential part of the city. The telephone instruments now used by the company were manufactured in Sweden, and are said to be far from being as satisfactory as those in use in the United States.

"Punch" Touches on the English Telephone.

"Dr. J. Sinclair," it is announced, "has been appointed chief medical officer to the post office," says *Punch*. The work involved must be peculiarly arduous, for, since it took over the telephones, the post office suffers from more complaints that any other public department.

The musical play, "Are You There?" which will shortly make its appearance at the Prince of Wales Theatre, will, we are told, consist in part of a satire on the London telephone system. If the general post office possesses an ounce of spirit there will, we should say, be some little difficulty in booking seats by telephone.

"It has been suggested," said the postmaster-general at a dinner last week, "that, when the London post office telephone system is in full working order, we should have our hair cut by telephone." As a matter of fact we have already heard people who declare that they have been fleeced by it.

Mr. Vail on Regulated "Monopolies."

The mid-July issue of the *Independent*, New York, contains an interview with Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, on the subject "What's Ahead for Business."

After defining the meaning of the word "Monopoly," Mr. Vail refers to the so-called industrial monopolies of the present day and cites as an example specialization in the making of boots and shoes and the resulting economies.

"If this is true of ordinary manufacturing," he says, "with how much greater force does it apply to public utilities such as railroads, power and light and telephone and telegraph systems, which may be said to be natural monoplies. Here there are the same advantages of economy and efficiency in operation on a large scale, and, moreover, the value of a utility system to the public is almost invariably in direct proportion to the universality of its service and the uniformity of the rates it charges for that service. The people of any city, for instance, may be much more conveniently served by one transit system than by two. When you take a street car you do not wish to be compelled to change cars and pay two fares to reach your destination. Similarly you may do your telephoning most conveniently if you are able to reach every other person through the same exchange or system of exchanges. This holds true in a greater or less degree of most other public utilities.

"Wealth is created not by driving labor and getting more work out of the individual, but by getting from the same or less amount of labor a greater production—and by utilizing or eliminating waste.

"Another important point," he continued, "is the question of uniform rates, which can only be had through a system covering a large and diversified territory. No utility can produce and deliver the same unit of service at the same cost in all parts of its territory. Uniform rates are based on average costs and this necessarily means that under some conditions these rates will appear excessive, just as under other conditions they will be really inadequate. A trunk line of railroad with its heavier traffic can transport freight at a cost that would be utterly out of the question on its branches. Yet the advantage of uniform rates to shippers is apparent.

"The utility, moreover, to give uniform rates must be protected from unfair competition. If a competitor, so-called, is permitted to supply its service only in the more favorable and profitable parts of a territory a manifest injustice is worked

upon the utility which is giving uniform rates over all parts of that territory, profitable and unprofitable alike. If the competitor, on the other hand, is compelled to give the same service at the same rates over the entire territory, you will have unnecessary duplication of plant and equipment for which the public must ultimately pay either in higher rates or loss to investors.

"I think, therefore, we are justified in saying that if any utility system is to give the public uniform rates and the most satisfactory, efficient and economical service, that utility must inevitably tend to combination and to a single system or—if you wish to call it that—monopoly.

"The companies comprising the Bell Telephone system were among the first of public service corporations to advocate state or government control and regulation of public utilities. We believe that this control or regulation should be by permanent quasi-judicial bodies, acting after thorough investigation and governed by the equities of each case; and that this control or regulation beyond requiring the greatest efficiency and economy, should not interfere with management or operation.

"We believe that these bodies, if they are to be permanent, effective and of public benefit, should be thoroughly representative; they should be of such character and should so conduct their investigations and deliberations as to command such respect from both the public and the corporations that both will without question accept their conclusions.

"We believe that the public would in this way get all the advantages and avoid all the manifest disadvantages characteristic of public ownership. I cannot make too emphatic my belief in the necessity of the highest possible standards for these Public Service Commissions.

"We of the Bell Telephone system are doing everything in our power to make a campaign for increased respect in the attitude of the public toward the Public Service Commissions. The greater respect in which these bodies are held by the public, the abler will be the men who will serve, and the greater the benefit they can be to the public, and the greater protection they can be to the public service corporations. No man is too large, no standard too high for these Commissions."

RADIO-TELEGRAPHY.

MR. G. E. CLARKE for the past twenty years identified with the Commercial Cable Company's service in London, and for the past three years in the same service at New York, has resigned to accept a position as manager of the Marconi Wireless Telegraph Company's city office, London, England. Mr. Clarke will sail for England early in September.

NO WIRELESS IN GRECIAN WATERS.—The Greek administration has suspended the use of radiotelegraphy by ships in her territorial waters.

TURKEY BANS WIRELESS.—The Turkish Government at Constantinople has sent a warning to the representatives of shipping companies that merchant vessels passing through the Dardanelles must dismantle their wireless installations and leave the apparatus behind them on shore.

TUCKERTON STATION CLOSED BY GOVERNMENT.—The Goldschmidt trans-Atlantic wireless station at Tuckerton, N. J., was, on August 24, ordered closed by the United States government because it was being operated without a Federal license. As the law forbids the issuance of a license to a station owned by a belligerent in the United States in times of war, the Tuckerton plant must remain closed. Under the law plant and apparatus operated without a license are forfeitable to the government in addition to the imposition of a fine of $500 on the owners.

WIRELESS IN GERMANY.—The latest statistics regarding the development of wireless telegraphy in the German Empire are up to the beginning of 1913. At the beginning of that year there were twenty-three coast stations and 376 ship stations. Of the coast stations, twelve were open to general traffic, ten with limitations, and one for official use. Of the ship stations, 237 were for public, 134 for official, and five for private traffic. The number of wireless telegrams sent from the shore to the ships in 1912 was only 5,312; in the contrary direction, 14,893. Between ships 7,242 telegrams were exchanged. This makes a total traffic in telegrams of 27,447. Receipts for the year totaled 250,000 marks. In these figures the German Protectorates are included.

The Marconi Company and Censorship.

Mr. John W. Griggs, president of the Marconi Wireless Telegraph Company of America, New York, and formerly attorney-general of the United States, has sent a letter to the Secretary of the Navy, Washington, in which he questions the legality of placing restrictions on the company's business. In a telegram to the Secretary of the Navy on August 12, Mr. Griggs protested against naval censorship of wireless stations, and asked the Secretary to cite the legal authority under which the Navy Department assumed the right of censorship.

In a later communication to the Secretary, Mr. Griggs stated that he had been unable to refer to any statute, treaty, or rule of international law which justified such an intervention on the part of the executive department with the business of his company, and asked that if there had been any authority justifying it, he would be glad to have it pointed out.

He was of the opinion that the transmission of radio-telegrams from the wireless stations of the Marconi Company in America to steamships or land stations of any of the belligerents is not unlawful under the statutes of the United States, and is not in violation of any rule of international law.

Before sending this letter the Marconi Company received permission from the Secretary of the Navy to remove the censorship which had been placed against its wireless station at Miami, Fla., supplying war news to the Bahama Islands for the information of the governor, whose residence is at Nassau, and censorship was also modified in connection with the dissemination of war news from other high-power stations.

Wireless in Polar Exploration.

The success of Dr. Mawson's wireless telegraph equipment, by means of which his base on the Antarctic Continent was kept in touch with the rest of the world through his other station at Macquarie Island, says *Electrical Engineering*, of London, directed a good deal of attention to the possibilities of wireless communication for polar exploration work, and it is to be hoped that the desired funds will be forthcoming so that Sir Ernest Shackleton's antarctic expedition can be provided with all they want in this direction. There is also much experimental work of interest that could be done if his party were able to establish fairly powerful stations at the two proposed bases, one on each side of the continent.

First of all, there is some question as to whether communication could be maintained at all between them, owing to the height of the mountain ranges intervening and the probable high degree of ionization of the air in polar regions, apart from the difficulties of maintaining high aerials in the violent winds that are experienced. There are many problems regarding the effect on wireless transmission of the extreme climatic and meterorological conditions that might be studied. It is to be hoped, too, that it will be found possible to devise a satisfactory sledging set within a practicable weight limit, but a good deal of experimenting will probably be required as to a suitable form of aerial and earth connection or its equivalent.

The Sayville Wireless Station.

The Sayville, L. I., wireless station of the Atlantic Communication Company (Telefunken system), which is figuring prominently at the present time in the question of wireless censorship, works direct with Nauen, Germany. The steel tower is about 500 feet high. The base of the tower is brought to a point, having a ball and socket at the bottom. The entire weight of the tower rests on a large glass insulator, and the tower is maintained in its position entirely by guy wires made fast to six large concrete anchorages, planted in a circle with a radius of 430 feet.

The main antennae, of the umbrella type, consists of twelve wires radiating from the top of the tower in two segments of six wires, each segment covering an arc of about 120 degrees. The ends of each antenna are connected through large bell-shaped insulators to steel wire ropes, and these ropes are attached to the tops and to the lower ends of wooden poles, so set up that they form a circle of approximately 2,300 feet in diameter around the tower.

The operating room and equipment are housed in a one-story building near the base of the tower.

Automatic tape transmission is used at this station. The reception of two messages simultaneously is accomplished by a device, which connects first one and then the other receiver to the antennae so that each receiver is in a circuit three or four times during the lapse required for a Morse signal. With the aid of this device and careful tuning three messages have been received simultaneously, one on a long wave and two on shorter waves. It is stated that there is no reason why, with the equipment of Sayville, it should not be possible to receive six messages simultaneously.

The Tuckerton (N. J.) station of the Atlantic Communication Company is only a receiving station. The Sayville station can receive and transmit, and the same can be done at the Nauen station, close to which the Atlantic Company has another station, at Eilvese, in Germany.

Death of P. V. De Graw.

P. V. De Graw, aged sixty-one years, a well-known, old-time telegrapher and former fourth assistant postmaster-general of the United States, died at his home in Washington, D. C., August 22, from the effects of a stroke of paralysis received several months ago.

Mr. De Graw was born at Princeton, N. J., February 1, 1853, and at the age of thirteen years entered the telegraph service as a messenger at South Amboy, N. J., in the office of the Camden and Amboy Railroad.

In 1874 he was elected as one of what was then characterized the "Big Eight" telegraphers, to man the first leased wire for the handling of press matter exclusively, that of the New York Associated Press, running between New York, Philadelphia, Baltimore and Washington. One year later he was transferred from New York to Washington and placed on the reportorial staff of the Associated Press, a position he retained until 1882, when Mr. De Graw went, with Mr. Walter P. Phillips, in the Washington Bureau, becoming manager of the Bureau upon the withdrawal of Mr. Phillips the following year.

In 1885 he accepted the Washington management of the United Press, and in 1886 was made the general southern manager of that organization, also filling the position of assistant general manager of the Southern Associated Press, the two organizations being operated south of Washington practically as one news agency.

After this he engaged in other pursuits in Philadelphia until 1901, when, desiring to again take up his journalistic life, he returned to Washington for the *Cincinnati Enquirer*.

When the Lousiana Purchase Exposition opened its eastern offices, Mr. De Graw was appointed Washington press representative, and later became eastern press representative.

The knowledge of telegraphy enabled him to do his greatest piece of reportorial work, the sending of the bulletin which announced the death of President Garfield, at Elberon, N. J., which he succeeded in getting to New York, and thence throughout the country forty-five minutes before his competitors could get a message on the wire.

At the expiration of his term as fourth assistant postmaster-general Mr. De Graw entered commercial business, and afterward became associated with insurance interests. At the time of his death he was vice-president of the Postal Life Insurance Company.

The Gridiron Club, of Washington, of which Mr. De Graw was a member, passed a resolution paying high tribute to the character of the deceased.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, SEPTEMBER 1, 1914.

Cables Benefitted by the War.

Before the embargo was laid on the transatlantic cables, prohibiting the use of cipher and codes in cablegrams, the average length of a cablegram was nine words. Now that plain language must be used and the names and addresses, as well as the signatures must be transmitted, the average length of a cablegram has increased to quite twice that number of words; on the other hand, the number of messages has decreased.

Since the beginning of hostilities in Europe the transatlantic cables have been operated at the fullest capacity. Thus the cable business is one of the very few that is deriving any benefit as a result of the war.

Code and cipher cable messages are now generally prohibited; the exceptions are those cables which lie between neutral countries.

War News Service.

Considerable public criticism is indulged in over the meagreness and obviously biassed war news published in the United States. The reason for this is due to that fact that all such news has to pass through the hands of many censors. The American press aim to be impartial and would be glad to receive news from all of the countries involved in the European war, but it is helpless and is compelled to take what the censors are willing to pass. The warring nations have prohibited newspaper correspondents accompanying the troops hence the little news given to the world originates with the military authorities and then passes through a rigid censorship all along the line to its destination. This explains why the news service is so unsatisfactory to the public, and the question is often heard "how and when shall we get the real news?"

Self-Adjusting Repeater.

One thing that those of an inventive turn of mind might apply themselves to with profit is a self-adjusting repeater. Because there is no practical apparatus of this kind after all the years of experience in telegraph invention is no reason why one cannot be produced. Often some slight change in a detail of an apparatus, the turning of a screw, or an accident to an instrument, will, to an open and alert mind, reveal hidden secrets.

A self-adjusting repeater would be welcomed by the telegraph companies. There is much loss of time in maintaining repeaters in good operative condition, and the main thing for inventors to keep in mind is to produce an apparatus that will accomplish the result, at the same time eliminating the loss of time. A device of this sort should adjust itself to varying weather conditions along the line and we believe it is possible to produce such an apparatus.

An instrument has recently been invented which notifies a way office on a line when he is out of adjustment. The principle involved is very simple indeed and its study and the practical operation might point out the way to the solution of the problem under consideration.

A self-adjusting repeater is only one of many things that could be profitably utilized by the telegraph companies. Many of the parts of instruments in general are susceptible of improvement, and it is surprising when one goes below the surface of things to learn how important little things sometimes are.

As to Censorship on Cables and Wireless.

The proposition to place American censorship on transatlantic cables met with opposition from the Commercial Cable Company, which argued that the cables differed in important respects from wireless telegraphy, upon which censorship had been placed. The matter is now under advisement by the Washington authorities.

President Wilson has modified the censorship rules as to wireless. The censorship at the German wireless station at Sayville, L. I., has been relaxed and only a partial censorship retained there. Under this arrangement the German Embassy is permitted to send code messages to its Government and receive cipher messages in return via the Sayville radio route, with the understanding that no unneutral messages are to be sent, and no messages are

to be sent in code, dealing with military matters, because such messages can be picked up by the radio apparatus of German warships in the Atlantic and translated from code by the commanding officers of those vessels.

Managing Men.

In his address to the graduates of the Naval Academy, at Annapolis, Md., the secretary of the navy informed the young men that their success in life depended less upon their technical knowledge than upon their power of manging men. The power of managing men is the primary element in successful administration. Successful administration is, in turn, a primary element in the progress of the world.

The science and the art of managing men depend upon, first: appreciation of the thought and feeling of the men whom it is desired to manage. This element embodies the quality of putting one's self in the other man's place. Understanding of the condition of the one whom it is desired to influence is to be secured. When this altruistic point of view is gained the administrator who seeks to manage men is to understand his own position and condition. He is to know the strong points and the weak of his own case. Having this understanding he should be able so to adjust these points to each other as to present them in a persuasive way. He is so to present the truth that it shall result in persuasion.

Besides the power of appreciation of his own and of his opponent's position, the man seeking to manage men is to exercise two special qualities: pleasantness and patience. The man who is to persuade other men is not to get mad. He is to remind himself of the old remark of the relative catching quality of molasses and vinegar. Morley, in his life of Gladstone, writes of a member of a Cabinet who had the virtue of being pleasant. This virtue is to belong to the modern executive. But, in addition to pleasantness, he is to have the power of waiting. He should not seek to secure results in undue haste. He is to be willing to adopt manifold means for securing his end, and he must be willing to take proper time for the use of these means. Gentle and constant pressure will bring forth, in his patience, the result desired, when the lightning of a sudden impulse might destroy his cause.

One War Effect.—Although the United States is at peace with all nations and are not directly concerned in the European war, business is much affected in many lines as a result of the disorganization of international commerce. The closing of the New York Stock Exchange was a precautionary measure and it has resulted in throwing out of work at least one hundred first class broker and private firm operators in New York City alone. This is only one of the many indirect effects of the war.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of Telegraph and Telephone Age, at $1.50 per copy.]

How is electrical energy converted into heat, and what are some of the practical applications of such conversion? (Page 49.)

Does temperature have any effect on electrical resistance?

What does the curves in Fig. 14 show?

What are the effects of temperature upon the resistance of carbon and upon the resistance of tantalum, as used for filaments for incandescent lamps?

What materials increase in resistance with increase of temperature and what materials decrease in resistance with increase of temperature?

What is the increase in the resistance of German silver for each degree increase of temperature, and what is the increase in platinoid?

Why is it important to have a low temperature coefficient for high resistance metals or alloys? (Page 50.)

Where an electric current has a choice of two or more paths in parallel in what proportion does it divide itself between them?

How is the current in each path calculated?

How is the combined resistance of the several paths in parallel calculated? (1) when the paths are of equal resistance, and (2) when they are of unequal resistance?

How may the value of a current in a circuit be varied? (Page 52).

What is a rheostat and what are its elements of construction?

What is a water resistance?

How is the resistance of such a device varied?

When incandescent lamps are used how may the resistance in a circuit be varied?

What class of resistance does a loose connection represent?

What substance is varied in its resistance by slight pressure?

Why is the magnetic telephone—the original telephone—not a practical instrument?

How was the difficulty due to weak current overcome?

How is a granular carbon transmitter constructed?

As the diaphragm vibrates under the influence of the sound waves produced by the voice what is its effect upon the current?

What is the problem of telephone transmission? (Page 53.)

Is there a perfect conductor—that is, one with no resistance; and is there a perfect insulator?

(To be Continued.)

Relays for Submarine Telegraph Cables.

BY SAMUEL WEIN, NEW YORK.

The problem of direct relaying from a long submarine cable to a land line has occupied the attention of telegraph engineers for several years, and many devices have been evolved to accomplish the purpose. On account of the delicate mechanism of

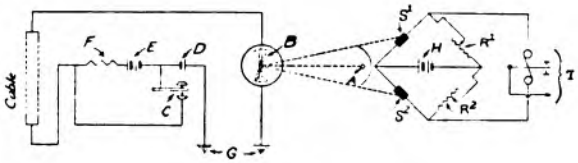


FIG. 1.

the cable receiving apparatus several experimenters have worked on the problem from the standpoint of eliminating friction in the moving parts in the translating device and many ingenious methods have been invented. An interesting example of how this is done is here described and illustrated.

Referring to Fig. 1 the ray of light A is concentrated by means of a parabolic mirror of the

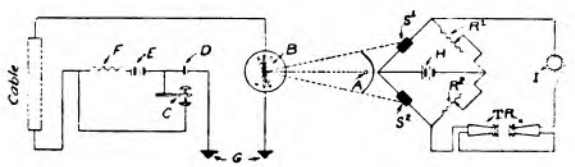


FIG. 2.

galvanometer B, which is deflected to the right or left by means of positive and negative currents and also by means of the key C. The deflection of the light to the left would fall on the selenium cell S^2, reduce its resistance and make a dot on the sounder T (this may be a relay); the deflection of the rays of light to the right would fall on the selenium cell S^1 and reduce its resistance, thereby producing a dash. The selenium cells and the sounder are

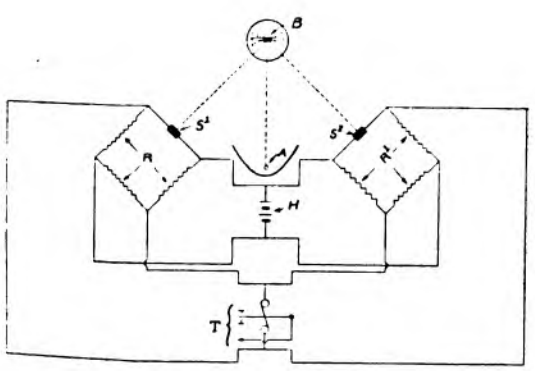


FIG. 3.

placed in the arms of a Wheatstone bridge of which the two resistances R^1 and R^2 are variable so as to adjust the circuit to a nicety.

Fig. 2 makes use of the same reference letters and operation but for the change of an interrupter I and a pair of telephone receivers T R. The sounds are heard in the receivers as in wireless.

Fig. 3 shows the two selenium cells placed in two separate Wheatstone bridges and operate in the same manner as before described. This device overcomes the inertia of the cells and operate very quickly when once adjusted.

Television.

In the new system of "seeing at a distance" devised by A. M. Low, selenium cells are used. The image to be transmitted is thrown onto a number of selenium cells through a lens. The resistance of each cell varies with the intensity of the light falling upon it. A roller provided with platinum contacts is driven by an alternating-current motor backward and forward over these cells, making contact with each cell in succession. At the receiving end there is a similarly driven roller moving over a number of contacts insulated from one another and arranged in the same fashion as the selenium cells. The motors at the receiving and transmitting stations are tuned to run in synchronism, so that the circuit is made between each selenium cell and the corresponding contact in the receiver in rapid succession. The current through each contact will thus be dependent upon the intensity of the light on the corresponding selenium cell. These currents are utilized to control magnetically the adjustment of a number of steel slats which admit light to squares in the same relative positions as the corresponding cells in the transmitter. The selenium cells are insulated by thin sheets of mica, and the roller and the cells over which it moves are immersed in kerosene. An induction coil is employed for supplying the transmitting current at a pressure of about 50,000 volts, as this has been found necessary on account of the thin film of kerosene which prevents complete contact between the roller and selenium cells. The total power required is about eighty watts for the sending and about fifty watts for the receiving apparatus.

Electrical Instruments and Testing.

We are frequently asked about the methods employed for testing telegraph lines for crosses, insulation, grounds, etc., and we invariably recommend Schneider and Hargrave's book, entitled, "Electrical Instruments and Testing." As its name implies, this book describes the instruments used in making tests and the tests themselves, and is up to date. It is well illustrated, and has very little mathematics—just enough to exemplify the work.

This is a book every progressive operator should possess, and, no doubt, it has been a stepping stone to advancement in many instances.

It is written in a very clear style by practical men for practical men. Mr. Jesse Hargrave, who wrote the chapters on testing, is a well-known telegraph engineer, and what he says on this subject is worth much to those whose duty it is to test wires, and to those who hope to occupy such positions in the future.

The price of this book is $1.15 per copy, which is a remarkably low price for so much information. Copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Peter Voorhees DeGraw.

IN MEMORIAM.

BY WALTER P. PHILLIPS.

Not many men have lived in my time who have been as highly esteemed as Peter Voorhees DeGraw, who passed away in Washington, D. C., on August 22. Mr. DeGraw was born in Princeton, N. J., February 1, 1853, and became a railroad telegraph operator at South Amboy, N. J., while yet a boy. Later he went to Philadelphia, and was an operator in the Continental Hotel office of the Western Union Telegraph Company, graduating from there, in due course, and entering the main office as a full-fledged operator while yet in his teens. I had known him for more than forty years—since the winter of 1872-73. At that time we worked the New York and Philadelphia night wire together, and his personality on the wire was as delightful as his telegraphing was ideal. An at-

THE LATE P. V. DE GRAW.

tachment grew up between us so strong that, as a sort of tribute to my seniority, he made a special trip to New York to make my personal acquaintance. We spent a charming afternoon together, and the friendship cemented then lasted as long as he lived. He was just twenty years old when he honored me with this visit, and a magnificent specimen of youthful manhood — a bright-eyed, clear-complexioned lad and decidedly good looking withal. Of the more than forty years that we were friends and correspondents, twenty odd of them were spent in close business relations—first in the Associated Press service at New York and Washington and later in the United Press service, in which he distinguished himself as the general southern manager, with headquarters at Washington. Beginning with the national conventions of 1884, he was always in evidence as one of the leaders in the work of reporting the proceedings up to and including the 1896 conventions, and, on every occasion, he made a distinct impression on all with whom he came in contact—telegraph and newspaper people, public men and all—as one who knew his business and was in love with his work. Everywhere he went he made new friends. Ambitious, efficient, the soul of honor, and a splendid man in his home life, as well as before the public, it could honestly be said of him as Halleck said of Drake: "None knew him but to love him, none named him but to praise."

Since the amalgamation of the United Press and Associated Press, in 1897, Mr. DeGraw had been active in various pursuits, and, for a time, he was engaged in commercial business in Philadelphia. Later he represented the Louisiana Purchase Exposition in the East, and filled several important newspaper engagements. During the eight years preceding the advent of the Wilson administration he was the fourth assistant postmaster-general, a position in which he added greatly to all the honors he had won in telegraphy, journalism and general business. Mr. DeGraw was very proud of his telegraphic achievements, and particularly of his having been among the first of the men selected—the "Big Eight"—to man the first wire ever leased for press work. This was in 1875, and the wire which ran from New York to Washington via Philadelphia and Baltimore was leased by the New York Associated Press. The following year the marriage of Mr. DeGraw and Emma Louise Doerr was solemnized in Philadelphia, and he began, almost immediately, to climb the ladder that took him, finally, to the shining heights of well-earned success. In all his ambitions and aspirations Mrs. DeGraw was his counsellor and coadjutor. From the winsome little lady of 1876 she developed, as the years passed, into the extremely capable, self-reliant and helpful companion who contributed, in a large measure, to Mr. DeGraw's continuing development. No greater praise can be given her than to say that she was, in every way, quite worthy of the husband by whom she was so dearly loved and whom he trusted implicity in all things great and small. May God soften the crushing blow that has fallen upon her and her bereaved and devoted son.

At the time of his death Mr. DeGraw was the vice-president of the Postal Life Insurance Company, to which organization he was bringing added strength and an increasing degree of prestige. He would have succeeded in the life insurance field, as he had in all the others he had entered, for he had the necessary qualifications, the energy and the following among men that contributes so largely to success in business.

Mr. DeGraw was so widely known that those who mourn his loss will be almost numberless, and rightly so. Indeed, I have never known a man of whom it might more fitly be said, as Mark Antony said of Brutus:

"His life was gentle; and the elements
So mixed in him that Nature might stand up
And say to all the world: 'This was a Man.'"

The Manufacture of Rolled Condensers for Telephone Use.*

BY W. C. FREEMAN

The earliest type of electrical condenser known to science was the Leyden jar, the design of which has remained practically unchanged to the present time. This type of condenser still has many uses, such as transmitting capacity for smaller wireless sets, standards of capacity, etc.; but the principal objection to it for commercial usage is its large size for a given capacity.

The next development in the course of time was the built-up condenser consisting of alternate sheets of tinfoil and glass or mica, which made a more compact and convenient condenser. For lower working potentials ranging from 0 to 1,000 volts, a condenser of this type, using a good grade of paraffined paper, will give entire satisfaction. The specific capacity of paper impregnated with paraffine is somewhat lower than that of glass or mica, but as paper can be obtained in thinner sheets, the lower specific capacity is more than offset by the closer association of the plates of opposite sign. The specific capacity for the various dielectrics commonly used in commercial practice is about as follows:

Dry air	1.00
Extra-dense flint glass	9.90
Dense flint glass	7.38
Light flint glass	6.70
Crown glass	6.96
Plate glass	6.10
Mica	4.60 to 8.00
Paraffined paper	2.8 to 3.80
Hard rubber	2.70

Built-up condensers are expensive to manufacture, regardless of the dielectric used, as all of the work of assembly must be performed by hand labor. A skilled workman can only build by hand a capacity of about two microfarads per day. For many purposes, such as in telephone work and in certain classes of radio-telegraph apparatus, the cost of built-up condensers would be prohibitive. To meet this demand, rolled paper and foil condensers are generally used.

The principal materials employed in making the rolled condenser proper are tinfoil, paper and paraffine. The paper used in nearly all condensers is commercially known as "rice paper." Most of it is of domestic make, although some special grades are imported. It is white in color, very flexible, of high tensile strength and very tough, with a hard glossy finish. It is without question one of the finest papers made, since the requirements are that it shall be free from all foreign deleterious substances and, furthermore, from the minutest holes, which are not readily discernible by the naked eye. Condenser paper is purchased in several thicknesses, varying from .0005 to .001 inch. It is put up on rolls of different widths, depending upon the finished dimensions of the condensers for which it is intended.

The "tinfoil" employed is not tinfoil in the narrow sense of the word, but a foil made from an alloy consisting of about ninety per cent lead and ten per cent tin. Such foil cannot be accurately gauged by thickness, but some idea can be gained from the fact that one pound of this foil will cover about 18,000 square inches of surface. In the preparation of foil, great care is taken to insure the purity of the product and freedom from grit, which would puncture the condensers when assembled and pressed. The foil, used with a given width of paper, is somewhat narrower to guard against contact of the edges of the adjacent turns. It is put up in continuous lengths on spools in the same manner as the paper.

Paraffine is not only used in the impregnating process to reinforce the insulating qualities of the paper, but also to raise the specific inductive capacity of the dielectric between the plates of the condenser. The specific capacity of paraffine depends to a great extent upon its temperature and ranges between 2.8 and 3.8, dry air being considered as unity. Pure paraffine is not used in all cases, owing to its low melting point, other substances being added to increase this point and to give greater hardness and mechanical strength.

The prohibitive cost of building up condensers of super-imposed plates by hand under former methods, has been eliminated by machines which enable the worker to turn out 100 condensers in the time taken to assemble one in the old way.

The machine is usually provided with six spindles arranged to carry the spools of paper and foil. This scheme provides for two layers of paper between the foil plates of the condenser. A mandrel of proper size for assembling the foils is provided, its size and form depending upon the type of condenser being made. These mandrels are made collapsible to permit easy removal of the partially finished condenser after the winding process has been completed.

Each spool is provided with a tension adjustment to insure compact and even rolling, and against injury to the foil, due to creasing. The lower spool of the foil is fitted with an alarm-bell circuit to indicate a possible breakage of that strip of foil during the winding, since it cannot be easily seen by the operator. The upper spool is not provided with this attachment, since it is constantly under the observation of the operator. The mandrel is equipped with a revolution counter alarm device to inform the operator when the required number of turns has been made, thus insuring uniformity in the capacity of the finished articles.

The first step in the assembly of the condenser is the winding of a few preliminary turns of paper, only, on the mandrel to form a core. This is done to avoid creasing to excess the inner layers of foil. Very thin strips of brass, about 1/4-inch wide and about an inch longer than the width of the foil, are then attached to each layer of foil with the long end projecting to afford a means of connecting the tinfoil to the terminals on the condenser case. The required number of turns to give the specified capacity are then taken, the ends of foil clipped and the paper given a few extra turns for protection against injury in handling. In some cases, the condenser terminals are placed midway in the foil strip to decrease the plate resistance and to avoid the resulting loss of power.

*From Telephony.

The condensers are then assembled in the pressing "jigs," and placed in perforated metal baskets. These baskets are immersed in a large cauldron of molten paraffine, a cover placed on the tank and the air exhausted until a certain vacuum is reached. This expels every trace of air and moisture from the condenser and allows the paraffine to flow freely into the interstices so that a perfect impregnation takes place. After remaining in the tank about one hour, the gibs containing the condensers are removed and placed in a hydraulic press, where they are subjected to heavy pressure, varying from .5 ton for certain condensers to twelve tons as a maximum for others. This process removes all excess paraffine and brings the plates together as closely as is possible. Before removal from the press, the jigs are locked by means of wedges and then set aside to cool thoroughly.

The partially completed condensers are now tested for capacity and insulation resistance at a voltage of at least double the working voltage. Any defective ones found are discarded before further time and money is spent upon them. The usual container consists of a can made from block tin with all seams soldered or welded to render the case moisture-proof. The containers are lined with pasteboard, the condenser placed in position and the case filled with paraffine. The terminals are next placed in position and the cover soldered on, after which a further test is made to check the capacity and insulation before placing in stock for shipment.

Universal Telegraph Alphabet.

BY STANLEY MAC NIDER, GUATEMALA.

After reading the discussions in the columns of TELEGRAPH AND TELEPHONE AGE regarding the substitution of the international telegraph code for the Morse code, I was reminded of a series of articles on the subject printed in the "Operator" of November 11 and December 30, 1882. The one in the November 11 issue was written by me. If in 1882 the question of trying to form a universal alphabet was actually animated, and really died a very hasty death, or, at least, reached oblivion remarkably soon after its birth, what will be the result of the late attempt? I feel that after thirty-two years of silence it is a semi-bitter Morse-l to place in our mouths to-day.

[Mr. Mac Nider sent us a postal card showing a group of Indians. On the card he wrote, "Do you think it would be worth the time to put the alphabet question up to this crowd? Blessed if I do not believe they would settle it as quickly as we have." —*Editor.*]

Easy Lessons in Technical Telegraphy.

The Correspondence School Lessons in Telegraphy which were printed in these columns from October 16, 1911, to April 1, this year have been published in book form, of a size suitable for carrying in the pocket. This book is a telegraph school in itself with the added advantage of portability. Every student and practical telegrapher should have a copy at hand for reference at any time. It is a real practical work and gives the student a solid foundation to build practice upon.

The first chapter deals with the simple mathematics necessary to apply to the facts and problems met with in every day practice. Then follow chapters on electricity, gravity battery, circuits, ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement, magnetism, electromagnetism, self induction, the induction coil, the relay, the local circuit, the key, Morse circuit, "earth's" switches and switchboards, single circuits in bad weather, line leakage, static induction, testing, testing instruments, repeaters, the duplex and the quadruplex.

The book is amply illustrated and the subjects are treated in the text in simple language, so as to make it understandable to the student. Each chapter is followed by a few review questions which are very helpful in keeping the memory fresh as the student progresses. Very naturally there is a great demand for this book.

The price of this excellent work is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

A NOVEL LIGHTHOUSE.—The new unattended lighthouse guarding the approach to the capital of the island of Guernsey, in the English Channel, to which brief reference has already been made in these columns, utilizes several novel features in providing a complete signal station for mariners at low cost. The rocks of the locality, although made extremely dangerous to navigation by the tidal currents and eddies sweeping over and around them, are small in area, and, instead of an ordinary expensive stone lighthouse, an eighty-foot tower, large enough to accommodate automatic apparatus, has been built on Platte Fougere, a rock submerged at low water. This tower supplies a light, a foghorn, and the first ocean telephone call station ever established. The structure itself houses electric motors, air-compressors, an automatic acetylene-gas plant, and a telephone, all the apparatus being controlled through a submarine cable from a shore station a mile and a quarter away. A selenium cell near the lantern is connected to an alarm bell at the shore station. If the flash every ten seconds is obscured by fog, or fails, the bell rings, and each blast of the syren is announced by another bell. The total outlay for the tower and its equipment was less than a fifth of what a stone structure would have cost, while the two operators on shore take the place of four lighthouse attendants.

Mr. G. H. Groce, of the Union Switch and Signal Company, Swissvale, Pa., writes: "The AGE is worth $2.00 per copy instead of that amount per year. However, the anti-discrimination tendencies of our present government are so pronounced that it might result in a congressional investigation committee being appointed if you charged me this without making the price the same to all others. To avoid the overworking of those heroes at Washington, I will therefore accept the paper at your price."

Sending a Telegram.*

After the passengers had gathered around the wrecked locomotive and helped the brakeman to swear a little, and the conductor had assured us for the hundreth time that we would reach the city without fail by 6:30 that evening, we all went into the station for the purpose of keeping warm, sending a few telegrams and badgering the poor station agent with questions.

My business was soon transacted. I sent the committee the cheering words that told them nothing short of a miracle could get me to Bosshaven in time to lecture that night, and then I ceased to worry, and resigned myself to grim Fate and the grimmer cigar which the train boy sold me. A veritable wrecker is the train boy. An accident that lays the train out for half a day is his fortune, because by some inscrutable law of disaster a wreck never takes place in a pleasant harbor, and trains never collide at a dining station. Here is something for our great thinkers to ponder upon.

While I puffed tranquilly away at the alleged cigar, I amused myself by watching my fellow passengers. Presently one man reached a long arm over the little crowd clustered at the operator's window and asked for a "blank telegraphic form," explaining that he wished "to send a telegraphic dispatch" to his family.

Now, when a man speaks of a "telegraphic dispatch" I always wake up and look at him, because the cumbersome title is all at utter variance with the spirit of the telegraph. It's too long. The use of it betrays the man who has little use for the telegraph. The more he uses the wire, the shorter his terms. The more nearly he can come to saying "msg" the more content he is. And he doesn't call for a "telegraphic form," he asks for a blank, black or red, as the case may be. And he never telegraphs anybody. He wires them. He doesn't explain to the operator what he wants to do with the blank. Presumably he wants to write a message. And as for the matters referred to in that "msg," and the party for whom it is intended, the operator will known all he wishes to know—and sometimes much more than you want him to know—soon enough.

So I watched this passenger write his "telegraphic dispatch." First he asked the operator:

"What day of the month is this?"

There was nothing unusual in that. All men ask that. It is the opening line in the regular formula of sending a "msg." You may know what date it is before entering the office, you may even have it impressed on your mind by having a note fall due on that day, but the moment you poise your pencil over the blank, the date flies from your mind like the toothache from a dentist's stairway. So when the man asked: "What day of the month is this?" I was not surprised. I courteously answered him as a cover to approaching his position, but he did not believe me. He repeated his question and made the operator answer. Then I knew he was very new at it.

He was a tall man, with long hair and a thin neck. He had a nervous way of licking his lips and then smacking them as though the ghost of a good breakfast still lingered about them. His pantaloons were just about as much too short as his hair was too long, and he wore a shawl. That settled him. He spoiled three blanks before he got a "telegraphic dispatch" written to suit him. But even that is not very uncommon. A man always uses stationery more extravagantly in another man's office than he does at home. Then he wrote every word in the body of the dispatch carefully and distinctly, but scrambled hurriedly over the address as if everybody knew that as well as he did, and dashed off his own signature in a blind letter style as though his name was as familiar to the operator as it was to his own family.

But even this is not uncommon. A man will write "Cunningham" so that no expert under the skies will tell whether it was Covington, or Carrington, or Cummagen, or Carrenton, and when the operator points to it and asks, "What is this?" the writer will stare at him in blank amazement for a moment, and then answer: "Why, that's my name!"

"Well, yes, I know that," the operator will say, "but what is your name?"

Then the man will gasp for breath and catch hold of the desk to keep himself from falling, and finally shout, "Why, Cunningham, of course!" and look pityingly upon the operator, and then glance about the room with a pained, shocked expression, as one who should say:

"Gentlemen, you may not believe it, and I do not blame you, but heaven is my witness—here is a man who does not know that my name is Cunningham!"

This is not unusual. Any operator will tell you that he has met Cunningham scores of times, and has morally offended him every time, by asking his name. Well, my tall man with the thin neck got along a little better than that, when he handed the operator the following explicit message:

Mrs. Sarah A. Follinsbee, Dallas Center, Iowa:

My Dear Wife—I left the city early this morning after eating breakfast with Professor Morton, a live man in the temperance cause. I expected to eat dinner with you at home. But we were delayed by a terrible railroad accident on the railroad, and I narrowly escaped being killed; one passenger was terribly mangled, and has since died, but I am alive. The conductor says I cannot make connection so as to come to Dallas Center this morning, but I can get there by 8 o'clock this evening. I hate to disappoint you, but cannot help it. With love to mother and the children, I am your loving husband.

Roger K. Follinsbee.

The operator read it, smiled and said:

"You can save considerable expense and tell all that is really necessary, I presume, by shortening this message down to ten words. We have no wire directly into Dallas, and will have to send this message, part of the way over another line, which adds largely to the cost of transmission. Shall I shorten this for you?"

"No; oh no," the man with the shawl replied, "I'll fix it myself. Ten words, you say?"

"Yes, sir."

*Robert J. Burdette in *Sunset Magazine*.

The tall man with the short pantaloons went back to the desk with his message. It was a stunner, for a fact, and the man heaved a despairing sigh as he prepared to boil his letter down to ten words. He sighed again after reading it through once or twice, and then scratched out "Dallas Center, Iowa," as though everybody knew where he lived. Then he erased "early" and drew his pen slowly through "breakfast with" and "in the temperance." Then he scratched over "dinner with" and went on to erase "and narrowly escaped." And so he went on through the dispatch. Occasionally he would hold it from him at arm's length after making an erasure, to get at the general effect. And at last, after scratching and erasing, and many sighs, he came to the window and said:

"Here is the telegraphic dispatch to my wife. I have not been able to condense it into ten words, and do not see how it can be done without garbling the sense of the dispatch, but if you can do it, you will oblige me greatly, as I do not wish to incur any really unnecessary expense."

And with that he handed the operator the following expunged edition of his original message:

Mrs. Sarah A. Follinsbee:

My Dear Wife—I left the city—this morning after eating—Prof. Morton alive—cause I expected to eat—you at home. But we were delayed by a terrible railroad accident on the railroad I—being killed—terribly mangle and since died; but I am —the conductor—I cannot—come to Dallas Center —but I can—I hate—mother and the children.

Your loving husband,

Roger K. Follinsbee.

The operator smiled once more, and in the tense, nervous way that grows out of his familiar association with the lightning, made a few quick dashes with his pencil, and without adding or changing a letter in the original message, shriveled it down to its very sinews, like this:

Sarah A. Follinsbee, Dallas Center, Iowa:

Left city smorning; delayed by accident; all right; home sevening.

"There, that is all right," he said in the cheery magnetic way these operators have. "Fifty cents, sir—only twenty-five cents if we had our own wire into Dallas, sir; we'll have one next spring, too; saves you several dollars, sir. That's right, thank you."

And the man with the thin neck and long hair went and sat down on a chair by the stove and stared at that operator until the rescuing train came along, as though he was a worker of miracles. And when he got off the train at the junction for Dallas, I heard him whispering softly to himself:

"S'follnbee—clish'n smorning—d'layed baxident —mall right—home safternoon. Rog."

And I knew that he was practicing his lesson, and had "caught on."

Mr. S. G. Smith, manager of the Western Union Telegraph Company, Youngstown, Ohio, writes: "I thank you for renewing my subscription to the Age. I do not think I could get along without it."

Need of Leaders.

The world needs leaders more than it needs any other breed of men. Every line of activity calls for leaders, every home, every business, every town, every nation. As long as there are people there will be plenty to follow. The demand is for those who can lead.

The greatest asset in leadership is courage. Cowards never lead. Leadership requires great patience. No one will follow an irritable or impatient leader. Leadership requires tact, fairness and confidence. One man cannot lead another who distrusts his leadership. Many other things are important, but these things are imperative.

A leader must inspire and wake up the sleeping powers in his followers. To be able to do this he must himself have a clean, consistent record. A man cannot command without authority; a man cannot stir other people without first having stirred himself and become his own master.

It is just as important to be a leader in your own home or town as to be a leader in your country. It is not the special station in which a man leads that makes his work important, but it is how he leads. This thing is true, that if you lead well in the little affairs of life you cannot keep from becoming a leader in the big affairs.—*George Matthew Adams.*

Telephone Troubles and Their Remedy.

An excellent book for practical telephone men is "Manual of Telephone Troubles," by W. A. Gibson.

The subject-matter covers every phase of telephone work, starting with a description of the simplest case of trouble, then taking up all other disorders that the telephone and telephone circuits are liable, at any time, to become afflicted with. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.75. Copies may be obtained of Telegraph and Telephone Age, 253 Broadway, New York, on receipt of price.

Mr. R. L. Lilly, of Birmingham, Ala., writes: "I am glad to say I am taking Telegraph and Telephone Age. I am greatly satisfied with it. It is worth double the subscription price to anyone interested in its contents."

Utility of Wires on the Pennsylvania Railroad.

(Concluded from page 476, August 16)

The metallic circuit composite is a device by which a metallic telephone circuit may be used also for two simultaneous telegraph messages. The principle is shown in Fig. 35. A and B are two

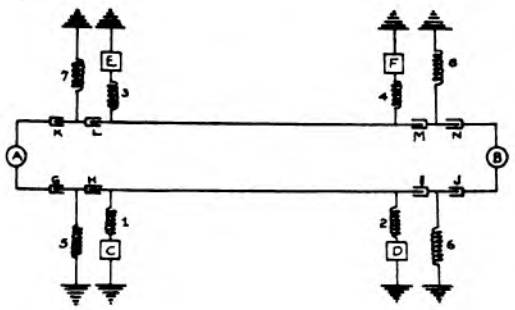


FIG. 35—THEORETICAL DIAGRAM OF METALLIC CIRCUIT COMPOSITE.

telephone stations connected by a metallic circuit. C and D are two telegraph stations in connection with each other, and E and F another such pair.

Condensers at H, I, L and M hinder the telegraph current from entering the telephone stations. Retardation coils at 1, 2, 3 and 4 prevent the telephone current from entering the telegraph instruments.

It sometimes happens that a small amount of the telegraph current will leak through the condensers H, I, L, M, which are supposed to stop it. To prevent this entering the telephone instruments the retardation coils 5, 6, 7 and 8 are introduced, and also the condensers G, J, K and N. The telegraph leak finds an easier path to ground through the retardation coils than through the condensers, and is thus diverted from the telephone instruments.

The method of signaling is rather complicated. The alternating current from the signaling apparatus, usually a hand magneto, actuates a relay which cuts out the talking apparatus and cuts in another alternating current from a different source, which may be a power generator. This latter alternating current before being sent out over the line is broken up by a vibrating interrupter so as greatly to increase its frequency, and is also raised in voltage by a step-up transformer. On reaching the other end of the line this current actuates another relay which cuts in a 16-cycle alternating current (locally generated) to do the actual ringing. Details of the connection are shown in Fig. 36.

Intermediate telephone stations are not practicable on account of the high voltage signaling current, which would have to be transformed down and up again at each such station.

Intermediate telegraph offices may be inserted as shown in Fig. 37.

A condenser at A in the line sends the telegraph current around through two retardation coils, B and

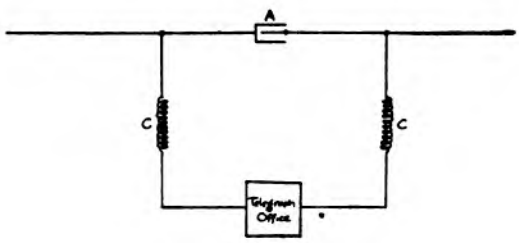


FIG. 37—INTERMEDIATE TELEGRAPH OFFICE ON ONE WIRE OF METALLIC CIRCUIT COMPOSITE.

C, and the telegraph instruments, while the retardation coils keep the telephone current to the main line where it passes the condenser.

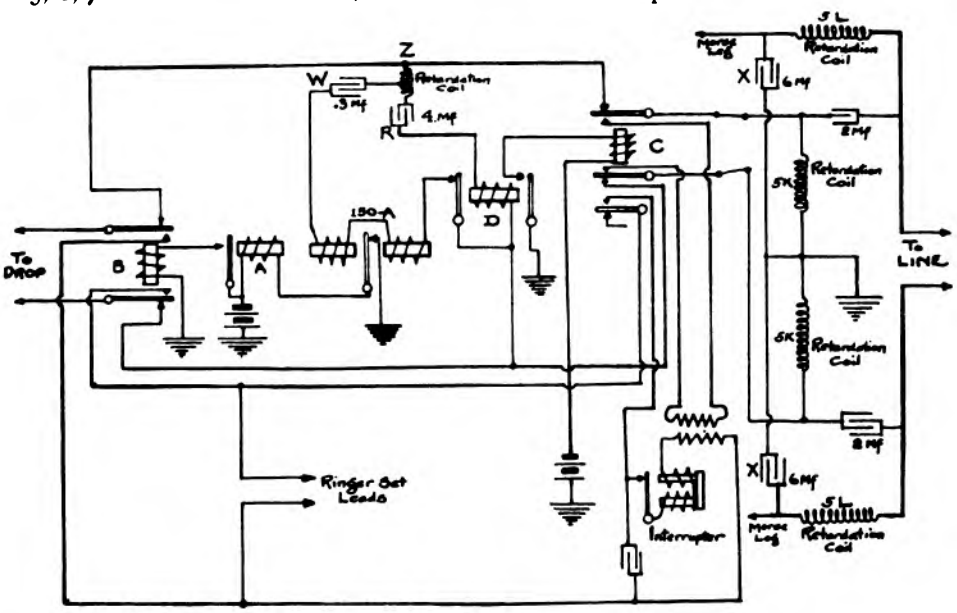


FIG. 36—WIRING DIAGRAM OF METALLIC CIRCUIT COMPOSITE.

Intermediate telephone exchanges are impracticable for the same reason that a single telephone station is impracticable.

Just as in the simplex, the telegraph lines may be extended any distance and in any direction beyond the composite zone before going to ground.

Metallic circuit telephone lines on either side of the composite zone may be extended through the

composite intermediate segment by regular switchboard connections. The ordering of cable to suit the conditions of any particular line is a matter that requires considerable care. The superintendent of telegraph is ready to supply specifications for cables upon information as to the conditions to be met on the line and the uses to which the cable is to be applied.

Cable sheaths are apt to suffer from electrolytic corrosion unless carefully looked after. This is caused by stray earth currents, usually from trolley lines, using the cable sheath instead of the ground as part of the return path. Although the cables are usually laid in non-conducting conduits, yet the inner surfaces of these conduits may be damp, and thus conduct the current to or from the cable.

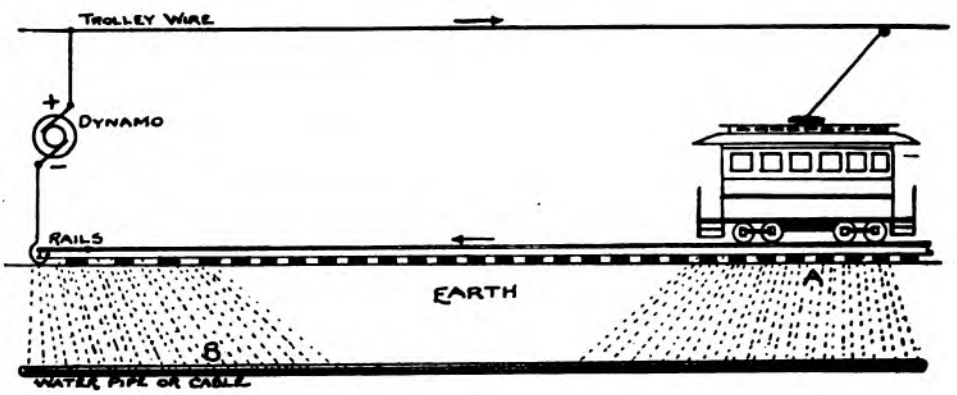


FIG. 38—ELECTROLYSIS, SHOWING PATH OF STRAY CURRENTS FROM TROLLEY LINES.

Whenever a direct current passes through water the latter is decomposed into its two gaseous constituents, hydrogen and oxygen, which make their appearance respectively where the current leaves and enters the water. Thus, when a current traverses damp earth it is carried by the water in the ground, and if it passes from this damp conductor to a cable sheath, hydrogen is evolved; and if it again leaves the sheath for the ground, oxygen is evolved. Hydrogen is harmless to the metal sheath, and in fact prevents rusting, but oxygen rapidly corrodes the metal. Thus in Fig. 38 we have corrosion of the cable at B and of the rails at A.

In consequence of the principles just set forth, as long as the cable sheath is negative to neighboring conductors there is no danger of corrosion. Frequent readings should be taken at the manholes to ascertain this, especially where the cable runs close to an electric railway. Where there are more cables than one, it is advisable to connect them together at frequent intervals to prevent currents passing from one sheath to another by other than metallic connections.

To keep the cable sheaths negative they are sometimes connected to the negative bus bar on the switchboard at the power house where the disturbing current is generated. The life of a cable may sometimes be prolonged at the expense of large ground plates connected by feeders to the cable sheath and inserted at points along its route.

Where a cable is found positive to neighboring car rails the cable is sometimes connected directly to the rails, although this is not always the best thing to do.

No set rules for the preservation of the cable sheath from electrolysis can be given. The superintendent of telegraph will be ready to give assistance in this line when called upon.

Railroads and the Telephone.

The railroads of the United States could not handle the immense amount of business which goes over their lines if they were not equipped with telephone service, says the *Telephone Review*. A large railroad freight transfer station is a busy place, with many telephones and all of them constantly in use straightening out tangles and keeping the shipments on the move. But a new benefit provided by the telephone to the public and the railroads has been discovered by one of the largest transfers in the East.

All the railroads in the United States send freight to the station, and there are many misdirected packages or bills of lading. This station, therefore, started to collect telephone directories of the principal cities of the United States, and when, for example, a way bill reads 'John Smith, Wilmington, Del.," and the package is marked "Wilmington, N. C.," the telephone books of these two cities are consulted. Usually this determines the destination and the shipment is promptly forwarded, but if the consignee has no telephone, the goods which he may need are often delayed for a long time until the shipper furnishes the correct address. The telephone insures prompt service in every way.

HUMMING OF WIRES.—A new reason has been given for the humming of telegraph wires. Professor Field, of the University of Ottawa, Ont., says that it is due to the vibrations of the earth, which are transmitted to the wires through the poles.

TELEGRAPHS IN BUENOS AIRES.—The government of the province of Buenos Aires, Argentina, has received an offer for the renting of the provincial telegraphs by a company to be formed, with a capital of $5,000,000. The profits would be divided between the government and the shareholders.

Type 403 Cell
400 Ampere Hours'
Capacity

EDISON BSCO PRIMARY BATTERY

Modern instruments make possible a high grade of transmission, provided the current supplying source measures up to the requirements of the service.

A feature very essential to good transmission is a battery of low and uniform internal resistance. The increase and decrease of current flow in the talking circuit should result only from the movement of the diaphragm. If the internal resistance of the battery varies, it impairs the transmission. If the resistance is high, there is a fluctuation in voltage when the position of the diaphragm calls for an increase in current flow.

This is one reason why the demand for Edison Primary Cells is increasing in telephone plants of the better class, low and uniform internal resistance being a characteristic of the Edison Battery in which it outclasses all other primary cells.

Type 202 Cells in Steel Tray

Why not install a trial set and note the difference in service and life as compared with other batteries.

Catalog on request.

The cheapest form of battery energy.

Thomas A Edison

THOMAS A. EDISON, Incorporated

247 Lakeside Avenue **Orange, N. J.**

THE RAILROAD.

MR. G. A. CELLAR, superintendent of telegraph, Pennsylvania Lines West, Pittsburgh, Pa., was an executive office visitor August 17.

MR. E. C. KEENAN, general superintendent telegraph, New York Central Lines West of Buffalo, with headquarters at Chicago, Ill., was a recent New York business visitor.

EASTERN DIVISION MEETING.—The November meeting of the Eastern Division of the Association of Railway Telegraph Superintendents will probably be held in New York this year. Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., is chairman.

SIMULTANEOUS TELEGRAPHY AND TELEPHONY FOR RAILROADS.—In our issue dated August 16 we printed a contribution from Mr. J. P. Church, superintendent of telegraph, Wabash Railroad, Decatur, Ill., in which he described some experiments made by him in simultaneous telegraphy and telephony. It would be an excellent thing if all experimenters were as ready to tell the world what progress they are making as did Mr. Church, but such a result is too good to be hoped for. For various reasons experimenters will not reveal their work to the world. Of course this is perfectly proper, but it would be a great benefit to the world if men had sufficient confidence in one another to entrust the results of their investigations to others without fear of being deprived of the fruit of their labor. Mr. Church is doing good work for the railroads and it is hoped that he will succeed in evolving a system that will be superior to any yet developed.

E. C. Manson, Superintendent Transportation and Telegraph, Oregon Short Line, Salt Lake City, Utah.

Mr. Edward C. Manson, whose appointment as superintendent of transportation and telegraph of the Oregon Short Line, Salt Lake City, Utah, was announced in our issue dated August 16, was born at Dayton, Ohio, January 21, 1865, and entered the telegraph service at Columbus, Ohio, in September, 1880, as an operator. He is essentially a railroad telegraph man, having filled the positions of station agent, train dispatcher, chief train dispatcher, train master, assistant superintendent, division superintendent, general superintendent, assistant general manager, finally reaching his present position.

What a Telegraph Operator Should Do to Assist A Train Dispatcher in Getting Trains Over the Road.*

BY FRANK F. WATSON.

There are many things a telegraph operator can do to assist a train dispatcher in getting trains over the road. One of the most important things is that an operator get the required amount of sleep at home (not on duty), so that his mind shall be clear and alert that he may not only be able to copy the dispatcher's orders rapidly, but also be able to grasp the dispatcher's idea as to how he wishes his orders carried out.

* Buffalo, Rochester and Pittsburgh Employes Magazine.

It has been my experience that when a train stops for some cause, other than meeting orders, if the dispatcher is immediately notified of the reason for such stop, often he may be able to change his orders and move the opposing train several sidings farther on, thereby avoiding unnecessary delay.

When an operator is holding a 19 order, and the dispatcher has not yet given him the block for the train represented in this order, he should watch the approach of this train carefully, that he may notify the dispatcher as soon as the train is in sight. Get the form D from the dispatcher, put your orders, form D and messages on the hooks, get out on the platform, give them a hand on signal, so that the crew will be out to get the order without stopping the train. As soon as the operator has handed the orders on the head end, let him watch the running gear closely to see that there are no wheels sliding, brake beams dragging, broken flanges or any other defective equipment. Hand the order on the rear end of train and don't forget to count the markers. "O. S." this train at the exact time it passes your station. An operator should be very particular when reporting trains arriving and departing from his station, to give the exact time, so that the dispatcher can figure on meeting points closely.

At points where there is a water tank the operator should keep posted on how many feet of water there is in the tank, so as to notify the dispatcher in case he wishes to run an engine to your station hurriedly for water. Be sure that you notify him the number of feet of water in this tank so he may know how many engines may take water before the tank is empty. Figure a 300-class engine takes about two feet of water from the average water tank.

It is my opinion that it would be a great help to the dispatcher if every operator would familiarize himself with the exact mechanism of the dispatcher's telephone. It has been my pleasure, many times while in the service of this company, to be able to repair the dispatcher's wire by replacing a burned-out fuse with a piece of old wire, tightening a loose connection, putting on a new battery or otherwise being able to detect wire trouble in my own office. Had I not been able to detect such minor troubles, it would have been necessary to call a lineman from some far-off terminal perhaps, and the office, and possibly part of the division would have been crippled for hours and probably many of the trains kept at a standstill. If any of you boys were ever in the dispatcher's office when some trouble of this kind occurred and the division tied up for hours and then finally get the wires repaired and see how hard the dispatcher had to work to get his trains moving again, the operator not posted on this subject, would certainly feel that the effort or rather the knowledge was worth while.

It is the common error of many to attribute the success of others to some particular talent or original superiority of mind, but everything which we see with admiration in the world or of which we read with delight, has sprung from perseverance which has been exerted in its pursuit. Let constant vigilance be the watchword of every operator in helping the dispatcher get trains over the road.

MUNICIPAL ELECTRICIANS.

LIEUTENANT W. J. MILLER, a member of the Brooklyn (N. Y.) telegraph bureau for the past twenty-two years has been retired on account of illness.

CALLING VOLUNTEER FIREMEN BY TELEPHONE.—The Jefferson County Telephone Company, Fairfield, Iowa, operates an interesting fire alarm system which involves the use of master switching keys. In Fairfield there is a volunteer fire department and it is essential that all members be notified of a fire promptly and positively. A small cabinet has been installed in the operating room of the exchange. It contains two master switching keys and a regular ringing and listening key. The lines to the firemen's homes are brought to the master keys and then to the regular line equipments on the switchboard. When a fire is reported the operator throws the two master keys, thereby cutting off the firemen's lines from the switchboard. She then uses the regular ringing key, throwing it into the ringing position which rings the telephones in all of the twenty homes of the firemen. After signalling in this manner she throws the key into the listening position and gives the firemen the location of the fire. This arrangement has several advantages, as it provides a very rapid means of calling the volunteer fire department, and it eliminates the chance of an operator neglecting to call one or more members of the department. She rings all of them by operating a single cam key, and talks to all of them by the same means.

OBITUARY.

JOHN A. WATSON, an old-timer, identified with the Pennsylvania Railroad Company, at Pittsburgh, Pa., died on August 11.

E. T. YEARSLEY, aged sixty years, for twenty-five years in charge of the Pennsylvania Railroad's telegraph office at Pittsburgh, Pa., died in that city August 16.

TUNIS J. POWELL, aged eighty-three years, president of the American District Telegraph Company of Brooklyn, N. Y., died at his home in that city, August 19. Prior to becoming president of the American District Telegraph Company, thirty-five years ago, he was connected with the Western Union Telegraph Company.

TELEPHONE CATALOGUES.—The Western Electric Company has just issued a catalogue of magneto telephones and supplies, also one on telephone cords. They are attractively gotten up and well illustrated.

THE SAN FRANCISCO TELEGRAPH TOURNAMENT OF 1915.—A committee, composed of representatives of the Western Union and Postal Telegraph-Cable companies, together with representatives from the various railroads, press associations and brokerage firms, has been organized at San Francisco, Cal., for the purpose of promoting a telegraphers' tournament, to be held in that city during the World's Fair, next year. The exact date has not, as yet, been decided upon. It is the plan, however, to conduct the tournament along the same lines which made the Boston tournament a success. The organization is known as the Panama-Pacific International Telegraphers' Tournament Association. and Mr. E. Cox, chief operator for the Postal Telegraph-Cable Company at San Francisco, is chairman.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

TELEPHONE PIONEERS OF AMERICA, at Richmond, Va., October 29 and 30. Secretary, Henry W. Pope, 26 Cortlandt street, New York.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Atlantic City, N. J., September 15, 16, 17 and 18. Secretary Clarence R. George, Houston, Tex.

Mr. C. W. Pearson, an old-time and military telegrapher of New York, on August 21 writes: "Enclosed find $2.00 for my subscription. It is just fifty years ago to-day that I was captured by General Forest at Memphis; I am, however, still in the ring and able to go again, if necessary. [Our records show that Mr. Pearson, when captured by General Forest's soldiers, was sent to Andersonville prison, from which he escaped later. His career as telegraph operator during the civil war is a very interesting one.—*Editor.*]

Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation.

(*Concluded from page 460, August 16*)

Mr. M. H. Clapp: Referring to Mr. Maver's statement, in stating as a disadvantage the slowness of the telegraph when discussing a subject over a wire, I imagine that this is largely due to the way one has been trained. I have never discussed many subjects at length over the telegraph, however, I have discussed very satisfactorily many matters over the telephone for long distances. I have always had the impression that the telephone provides a quicker method than the telegraph.

As to the matter of saving, I spoke of $100 a month, but I did not mean to imply that this was the only saving; it was given only as an illustration of possible savings. Unfortunately, a great many of the savings made possible by the use of the telephone on a railroad are more or less intangible and hard to express in figures. This $200 I mentioned is an illustration of the tangible saving which we figured out in a special case.

Referring to Mr. Harkness's statement in the matter of flexibility of the telegraph over the telephone, I had more in mind circuitous routings rather than any condition on the division. I appreciate very thoroughly that, by having a large number, or a reasonable number, of telephone circuits on a division, the system can be made practically as flexible as the telegraph.

I also appreciate that selectors have been used very successfully on telegraph circuits. However, they do not appear to be so generally in use—at least it would seem that the telephone had so many advantages over a telegraph circuit with selectors, that their use in connection with the telegraph has not been considered except in a few cases.

Referring to Mr. Hill's remarks in my reference to the necessity of a special telephone circuit for the use of employes along the line, I had more in mind, this: Where the booths or cabinets in which telephones are placed are being used very frequently, and are stationed every half mile or so, I do not believe it good practice to provide means (even with a switch) of cutting in a telephone on a dispatching circuit. It would, no doubt, be better to provide separate circuits and terminate the circuits in various private-branch exchanges along the line.

Referring to the use of the automatic system on the railroads, I believe that it is entirely practicable, especially in shops and terminals, where the number of telephones that do not need outside connection is large. There is one disadvantage, as I see it, however, in placing the automatic system in general use on the railroad—it is pretty hard to arrange a plan for connecting the long-distance lines to the automatic line.

Relative to power line disturbances affecting the telegraph and telephone, it has been my experience that power lines, electric light lines for example, affect the telephone a great deal more than they do the telegraph. In some cases it requires special study in order to avoid the inductive disturbances.

W. Lee Campbell (by letter): Mr. Clapp infers in his response to the discussion of his very interesting paper that there is some difficulty in the way of connecting automatic intercommunicating systems installed in railway terminal headquarters with long-distance telephone lines, or railroad message telephone circuits. I wish, in justice to the manufacturers and users of automatic switchboards, to make it perfectly clear, that such switchboards can be, and have been, for many years, connected to long-distance lines just as readily as manual switchboards have been. Calls from automatic switchboards to long-distance lines and vice versa are made by the thousands every day.

Mr. Donald McNicol, by letter, said: The extensive employment of the telephone for the purposes cited, during the past eight or nine years, furnishes conclusive evidence that the telephone method more satisfactorily meets general railway requirements.

The points I wish to touch upon relate to the so-called "message" circuits, and to the efficient operation and maintenance of telegraph lines and equipment, with the object in view of increasing the usefulness of the telegraph.

It is quite possible that the general application of the telephone to take care of the service for which it is best adapted, has diverted attention from the possibilities in the way of increased efficiency of the telegraph.

It is stated in the paper that telegraph operators are scarcer now than formerly, and that the grade of men in this service is below that of the men engaged in the work a few years ago. My understanding is that the available supply of telegraphers has been, during recent years, considerably above the demand, and, so far as ability is concerned, it is well known that the average telegrapher to-day can handle at least twenty-five per cent more messages per hour than were handled by the average telegrapher of a decade or two ago. It is further stated in the paper that the opportunities which the present-day telegrapher has to enter other fields of activity are much more frequent than twenty or thirty years ago. With reference to the situation here presented, I believe that it is very rarely now that a telegrapher has an opportunity to get into any other electrical industry, due to the fact that specialization has rendered him unfit for any but the very low-salaried places, such as "helper" or as student, and also to the fact that universities and colleges are turning out thousands of trained applicants for positions in the electrical field. Twenty years ago the head of most electrical enterprises of any importance was an ex-telegrapher, and the telegraph was the most prolific school of engineering. While the present outlook is rather forbidding to the telegrapher, it is very favorable to the telegraph; as it is now possible permanently to avail of the services of the brightest men who enter the service—those who formerly left it after becoming good electricians.

It is also stated that the number of messages that can be handled on a telephone message-circuit will average twice the number that can be handled

by telegraph between the same offices. My opinion is that the reverse of this would be nearer correct —even where plain language messages are concerned. In the transmission of code telegrams, telephone handling is practically out of the question. A first-class telegrapher can handle seventy telegrams per hour all day, without hardship, on circuits practically unlimited in length. Telephone message work that I have seen done on comparatively short circuits and under very favorable circumstances, fell far below this figure in performance.

Again, it is stated that as compared with the telegraph, the telephone is a great time-saver, due to the fact that a dispatcher can transmit orders faster by telephone. It is my impression that where train orders are copied by pencil or stylus, the dispatcher generally can transmit by telegraph considerably faster than most operators can form copy sufficiently legible for trainmen to read. This brings to notice the fact that the speed of transmission in either case is determined by the speed at which the person receiving the order can write it down legibly. Undoubtedly, a skilled telegrapher can write more rapidly than a trainman or an untrained clerk. These considerations emphasize the fact that the alleged speed of the telephone over the telegraph where written messages or orders are concerned, is of no evident advantage.

Certainly, the telephone is a more satisfactory medium for carrying on short-distance conversations, especially between non-telegraphers, and the personal contact through the agency of the voice aids materially in limiting the discord resulting from misunderstanding of intent and attitude, which seems to be inseparable from the activities of train operation.

The paper states that under certain conditions the telegraph circuit is susceptible to disturbances to a greater degree than is the telephone. I ask Mr. Clapp if in this case a metallic circuit telephone line is being compared with a grounded circuit telegraph line.

In recounting the "disadvantages" of the telephone, I see no mention made of the fact that where telephones are used for train wire work, the operator has to remain at his desk with the receiver to his ear, in order to be informed of what is going on, while with telegraph operation, the operator may keep in touch with what is passing over the wire while attending to other duties, and without having to remain near the instrument.

Mr. Clapp says that, except in very few cases, the telegraph lines and equipment on railroads are not maintained at as high a degree of efficiency as are the telephone wires and apparatus. It is also stated that "the telegraph will probably continue to handle messages for the long distances, such as 500, 1,000, or 1,500 miles, for a considerable time to come." Those in close touch with the entire subject will undoubtedly agree that this latter conclusion is well founded, notwithstanding that a number of expensive attempts have been made to employ the telephone for this very purpose.

With reference to careless maintenance of telegraph lines and apparatus, it is my belief that herein are great possibilities for betterment, involving a reduced cost per message handled and a faster service. The railroad companies have, in many instances, availed themselves unstintingly of expert telephone advice, in which they have been industriously assisted by the telephone companies, while the telegraph, even for long-distance work, has been regarded as a necessary evil—something to be dispensed with, no matter what takes its place.

It occurs to me that where there are five million telegrams per year handled on one railroad, with little likelihood of the number per year decreasing as time goes on, the possibility of clipping off half a cent per message in the cost of handling, by increasing the efficiency of the telegraph, should prove an alluring prospect in these days of high aims.

The Lineman's Third Hand.

The lineman who puts up or repairs the wires on telephone and electric light and power poles actually requires three hands to do his work efficiently—a hand for each wire and a third to do the tying or

FIG. 1—LINEMAN'S THIRD HAND.

splicing. The Western Electric Buffalo Grip does the work of a third hand. Its jaws may be clamped open at any width, the grip held in one hand and the wire inserted, no matter in what position the lineman may be. The patented locking device makes this possible while the rest of the construction is such that pulling only serves to strengthen the

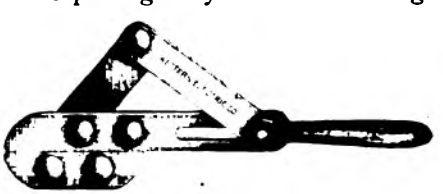


FIG. 2—LINEMAN'S THIRD HAND.

grip on the wire. The grip will hold all sizes of wire, bare and insulated, up to and including No. 0000 B. & S.

This grip gives confidence and insures safety to the lineman and produces good joints, and has been the standard for more than eighteen years.

How to Find and Remedy Telephone Troubles.

"Telephone Troubles and How to Find Them" is the title of a very practical booklet of fifty-six pages, written by Mr. W. H. Hyde, of Milwaukee, Wis. Mr. Hyde is a practical telephone man, and the manner in which he handles his subject shows that he is a close student of telephone apparatus. He points out the symptoms of telephone troubles, then tells the causes thereof. Knowing the cause, it is easy to apply the remedy.

Mr. Hyde uses plain language, devoid of technicalities, so that the contents of the book may be understood by anyone. The work covers troubles on overhead lines, cables, and in instruments and switchboards, of both the magneto and common-battery systems. The arrangement of the information is very convenient, and by the aid of many diagrams, the subject is made much more easily understood. A good description of telephone apparatus in general is given, and the pamphlet will be found valuable to all telephone inspectors and to everyone who uses a telephone, because it enables one to be his own telephone doctor.

The price of the booklet, which is paper covered, is twenty-five cents per copy. Copies are sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 572 and 573 to meet the claims arising from the deaths of DeL. H. Louderback, at Chicago, Ill.; T. C. Wetmore, at St. John, N. B.; F. C. Ford, at San Francisco, Cal.; I. P. Villegas, at Soledad, Cal.; J. W. Murphy, at Kansas City, Mo.; J. Burns, at Nashville, Tenn.; C. E. McCluer, at Tarboro, N. C.; T. Crockett, at Fraserville, Que.; D. L. Wilson, at St. Paul, Minn.; A. J. Carlin, at Chicago, Ill.; H. R. McLaughlin, at West Linden, Mo.; R. W. Sublett, at Pensacola, Fla.; D. T. Owens, at Albany, N. Y.

Phonograph Telegraph Records.

This publication is agent for telegraph phonograph records. Each record is a double one; that is, there is a record on each side of the disc. Samples of the finest sending, by leading operators, can be obtained on talking-machine records. The reproduction of these records on a phonograph, or any other make of talking machine, at any rate of speed, is intensely interesting to the lovers of good Morse. The price of these double records is $1.00 each.

To those desiring a low-priced but excellent phonograph, we can furnish a very durable talking machine for $8.00. This device will reproduce any records made, musical or otherwise.

Every telegrapher should possess a set, consisting of eight telegraph records. One purchaser states: "The telegraph records are worth their weight in gold."

Address all orders and remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Rubber Telegraph Key Knobs.

No operator who has had to use a hard key knob continuously should fail to possess one of these flexible rubber key caps, which fits snugly over the hard rubber key knob, forming an air cushion. They render the touch smooth and the manipulation of the key much easier. Price, fifteen cents. J. B. Taltavall, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

Manager J. J. Whalen is taking a rest from his duties.

The branch office at 1140 Broadway has been moved to a new location, at 8 West Twenty-sixth street.

Mr. C. Barnett, manager of the 344 East Forty-fifth street office, has been promoted to be manager at 274 Columbus avenue, and Mr. T. Logan, former manager at 274 Columbus avenue, has been promoted to be night manager of the office in the Thoroughfare Building.

Mr. M. F. Geigle, manager of the messenger department, who has been enjoying a well-earned rest, has returned to his desk.

Telegraph and Telephone Age

No. 18. NEW YORK, SEPTEMBER 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

IMPROVEMENT IN MORSE SINGLE-WIRE RELAY CONSTRUCTION.

The following description of a quick-adjusting relay of new design has been prepared in answer to inquiries regarding this instrument which is meeting with much favor on account of its compactness and other advantages which it possesses.

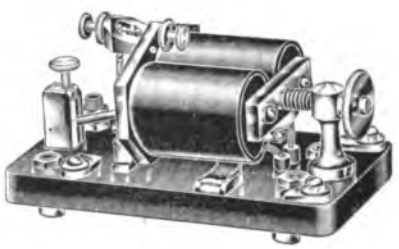
The most striking feature of this instrument when first viewed is its small size and rugged construction, and it embodies many improvements over the instruments that were standard for so many years. But relays like everything else these days have not been brought to such a high degree of perfection that they cannot be further improved.

The instrument under consideration has a thick slate base which material, as is well known, is free from the disadvantages of wood. Slate is an excellent insulator and is not subject to shrinkage and swelling due to varying atmospheric conditions.

The most important mechanical feature of this relay is its quick adjustment. On old style relays the operation of adjusting usually involves, in the main, more or less strain upon the retractile spring, or several turns of the magnet adjusting-screw. These disadvantages have been met in a very satisfactory manner in the new relay. The magnet adjusting-screw is cut with a larger pitch than usual so that the distance of travel of the magnets per revolution of the screw is much greater than in the old standard instrument. This enables the operator to reach the point of proper adjustment in much less time than is possible with the old style relay.

It should be noted, by the way, that all relays should be adjusted by varying the distance between the magnets and the armature and not by the tension of the retractile spring alone. The duty of the spring is merely to pull the armature with sufficient force to keep it from the front contact point when the magnets are not charged with current. By adjusting with the magnets much more satisfactory operating conditions are obtained.

The new relay has a retractile spring, but it is of secondary importance and differs in its setting from that of the spring of old-style instruments. In the latter the spring pulls on the armature in a horizontal direction and is placed at right angles thereto, but in the new instrument the spring pulls in a vertical direction. The spindle by which the spring tension is varied also works vertically and its motion is transmitted to the spring through the instrumentality of a bell-crank device, which is plainly shown in the illustration. This form of adjustment



QUICK ADJUSTING RELAY.

is superior in every respect to the old-style horizontal movement. The string is done away with altogether and there is no "chattering" of the instrument.

A jack is provided on the base of the instrument, at the front, in which the wedge of a sending machine can be inserted. The two terminals of the jack are of phosphor bronze and make contact with each other when the sending machine wedge is withdrawn, thus closing the main line circuit.

The practice of inserting the wedge of the sending machine in the contact closer of the key is injurious and soon impairs the operation of the instrument.

The magnets of the new relay are wound with enameled wire, which makes it practicable to place more wire into a given space and thus increase the efficiency of the instrument. Operators unfamiliar with the mechanical and electrical principles of a relay frequently screw the magnet close up to the armature—the two often touching, which should always be avoided—in an endeavor to secure proper adjustment. In the new relay such a result is not possible, as a stop is provided which prevents such an occurrence.

The instrument is provided with standard wire connectors which insure a firm and reliable connection between the wires and the instrument. In the old-style binding posts the wires were inserted in holes in the posts and a screw turned down upon the wires in order to obtain a firm contact. This

form of connection however is unreliable, because the binding screws frequently become loosened by jarring or other vibratory action, and thus cause trouble. In the new terminal device the end of the wire is given a complete turn around the screw post which is then screwed down to its final position by the use of a screw driver. This arrangement gives a large contact area and makes a secure and reliable connection.

Telegraph and Telephone Patents.

ISSUED AUGUST 18.

1,106,729. Wireless Telegraph Installation for Aerial Vessels. To L. Rouzer, Paris, France.

1,107,255. Telephone Transmitter. To L. Bradley and H. L. Bradley, Muskegon, Mich.

1,107,290. Apparatus for Metering Conversations in Automatic Telephone Systems. To G. Grabe, Nikolassee, near Berlin, Germany.

1,107,336. Printing Telegraph. To F. R. McBerty, New Rochelle, N. Y.

1,107,365. Printing Telegraph. To C. E. Scribner, Jericho, Vt., and F. R. McBerty, New Rochelle, N. Y.

1,107,366 and 1,107,367. Telegraph Receiver. To C. E. Scribner, Jericho, Vt.

1,107,371. Telephone System. To C. A. Simpson, Chicago, Ill.

1,107,536. Relay. To F. R. McBerty, New Rochelle, N. Y.

1,108,028. System of Electrical Selection. To N. L. Tolstad, Groton, S. D.

1,108,109. Telegraph System. To A. H. Adams, Sparkill, N. Y., and A. F. Dixon, Newark, N. J.

ISSUED AUGUST 25.

1,108,147 and 1,108,148. Telegraphy. To P. B. Delany, South Orange, N. J.

1,108,166. Moisture-Proof Telephone Set. To C. E. Hague, Rochester, N. Y.

1,108,194. Coin-Controlled Automatic Telephone-Exchange System. To W. W. Leach, Chicago, Ill.

1,108,305. Telephone Signal Apparatus. To D. D. Wright, San Francisco, Cal.

1,108,383. Telephone Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,108,482. Telephone System. To C. S. Winston, Chicago, Ill.

1,108,529. Telegraph System. To C. R. Underhill, Providence, R. I.

1,108,545. Telegraph Apparatus. To G. P. Blessing, Seattle, Wash.

PERSONAL.

MR. THOMAS CANTLEY, a former Canadian telegrapher, and now general manager of the Nova Scotia Steel and Coal Company, is the subject of an interesting sketch in the Montreal, Que., *Journal of Commerce*.

"LITTLE LUCILE," a celebrated violin soloist, and daughter of Mr. N. T. Collette, an old-timer, of Seattle, Wash., and her mother, were caught in France at the breaking out of hostilities. A tour of the principal European cities had been planned, but this had to be abandoned on account of the war, and mother and daughter will return to America, where Miss Lucile will no doubt make engagements to play.

MR. E. KLEINSCHMIDT, of New York, an electrical manufacturer, who has been in Europe for the past two months has returned to the city. While in London he made an exclusive agency arrangement with Messrs. Creed, Bille and Company, of London, for the sale of the Kleinschmidt keyboard perforator in various countries. Messrs. Creed, Bille and Company will use the Kleinschmidt perforator exclusively in connection with their own system of high-speed telegraphy. The Kleinschmidt perforator is now being used by the British Post-Office as well as by several large newspapers that have installed the Creed high-speed printing telegraph system.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. C. ADAMS, vice-president of this company, New York, is enjoying a couple of weeks' rest.

MR. C. P. BRUCH, vice-president, has returned to his desk after a rest in Connecticut.

MR. G. H. USHER, general superintendent, Atlanta, Ga., called at the executive offices a few days ago on his way back home from Saratoga County, N. Y., where he spent a couple of weeks in rest and recreation.

MR. M. M. DAVIS, electrical engineer and chief engineer of telephones of this company, New York, returned to his desk after an enjoyable rest in Chatham, Mass., which is his native town.

MR. J. F. SKIRROW, associate electrical engineer, New York, has invented a very simple and effective binding post for telegraph instruments. It effects a saving of fifty per cent in the cost of manufacture and in space. Two or three or more wires can be connected to it and any one may be removed without impairing the connection of the others.

MR. H. SCRIVENS, superintendent, Pittsburgh, Pa., is spending his annual holiday this year in New York City.

MR. H. C. SHAW, division electrical engineer, Chicago, Ill., is passing his vacation in Los Angeles, Cal.

MR. C. M. BAKER, division general superintendent of plant, Chicago, Ill., has returned to his office from a business trip to Salt Lake City, Utah.

MANAGERS APPOINTED.—Managers have been appointed as follows: F. W. Martin, at Charlotte, Mich.; R. L. Hays, at Columbus, Ind.; H. D. Thompson, at Reed City, Mich.; L. D. Friedly, at Pittsburgh, Kan.; G. C. Wood, at Ashland, Ky.; T. W. Davis, at Bucyrus, Ohio; Miss Ethel Day, at Edwardsville, Ill.; J. M. Callahan, at Boca Grande, Fla.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president, has returned to his office after three or four weeks' recreation on his yacht, cruising along the Eastern coast.

MR. W. H. BAKER, secretary of the company, is back from a vacation spent in the Adirondacks.

MR. J. C. WILLEVER, United States manager, cable system, has been appointed commercial general manager of the company, with headquarters at New York. His jurisdiction will extend over the company's land line business in addition to his cable work.

MR. A. G. SAYLOR.—During his recent trip through the New England States Mr. A. G. Saylor, general manager of the Eastern Division, visited forty-two towns and cities in Connecticut, New Hampshire, Massachusetts and Maine in seven days. He was enabled to cover so much territory in such a short time by the use of his automobile. He reports business in a sound condition in the East.

MR. H. C. WORTHEN, general manager, Southern Division, Atlanta, Ga., was a recent visitor at headquarters on company business.

MR. T. E. FLEMING, of the vice-president's office, is again on duty after a two weeks' rest in Greene County.

MR. F. E. D'HUMY, of the engineering department is in Chicago on company business.

MR. W. W. UMSTED, of Omaha, Neb., has recently been in Little Rock, Ark., establishing a district service for this company.

MR. J. T. WARNER, chief clerk to district commercial superintendent J. E. Scofield, Atlanta, Ga., has been appointed assistant manager at that place. Mr. V. X. Underwood succeeds Mr. Warner as chief clerk.

MR. J. H. GORDON, night operator, Porterville, Cal., has been promoted to the managership of that office.

MR. J. W. WARE, chief clerk to division traffic superintendent J. P. Edwards, Atlanta, Ga., has been appointed division traffic supervisor, and Mr. R. E. Satterwhite has been appointed chief clerk to succeed Mr. Ware.

MR. E. A. TALCOTT, manager at Lewiston, Idaho, has been transferred to Great Falls, Mont., as manager, and Mr. W. J. Stone, manager at Price, Utah, has been transferred as manager at Lewiston, Idaho. Mr. P. D. Armour, manager at Hobart, Okla., takes Mr. Stone's former position at Price, Utah.

MR. J. R. TERHUNE, district commercial manager, Nashville, Tenn., announces the following changes in his district: Mr. J. B. Cheatham, formerly connected with the office of Mr. H. C. Worthen, general manager, Atlanta, Ga., has been transferred to the fourth district, with headquarters at Nashville, Tenn., and is delegated with authority to represent and act for the district commercial superintendent in the field. Managers appointed: Miss F. A. Bryant, at Cynthiana, Ky., vice W. J. Searcy, resigned; Miss Letitia Davis, at Paris, Ky., vice T. P. Owings, transferred as manager to Winchester, Ky.; W. A. Walker, at Greenville, Tenn., vice A. G. Caudle, transferred as manager to Clarksville, Tenn., vice C. T. Dowling, resigned; John G. Hamilton, at Dyersburg, Tenn., vice W. A. Culley, resigned; Frank Ohlman, at Paintsville, Ky., vice W. E. Pitt, resigned; J. C. Satterwhite, at Tupelo, Miss., vice M. C. Hill, resigned. All class 10-A offices in the fourth district, with the exception of Glasgow and Somerset, Ky., Cookeville, Tenn., and Water Valley, Miss., have been turned back to the telegraph company and are now being operated as independent offices.

MR. J. E. ROMER, former operator at Emporia, Kan., has been appointed manager at that place, to succeed Mr. C. W. Cleaver, resigned. Mr. Cleaver was, up to the time of his resignation, the first and only manager of the office from the time it was opened, thirty-two years ago.

MR. THOMAS F. SLOAN, manager of the McConnellsburg, Pa., office of this company, has held that position continuously for fifty years, having entered the service on September 1, 1864. During the last forty years he has been ably assisted by his wife, who managed the office during periods of absence of her husband in line repairing. In 1903, Mr. Sloan was placed in charge of the testing station at the Mountain House on Rays Hill, where there is little or no habitation. On the occasion of the reception to Professor Morse, in New York, in 1871, Mr. Sloan met the famous inventor and is proud of having the honor of shaking hands with him. Mr. Sloan is a member of the Old Time Telegraphers and Historical Association and attends the annual reunions occasionally.

MR. J. F. READE, manager, Denver, Col., made an interesting address before the Denver Rotary Club on August 13, his subject being "The Growth and Development of the Telegraph During the Past Seventy Years." Mr. Reade compared the early telegraph apparatus with the present-day instruments, and the costs of telegrams in 1861 and now. The cables and the printer system were also dwelt upon.

THE WESTERN UNION EDUCATIONAL AND MUTUAL IMPROVEMENT SOCIETY is being organized among the employes of the general operating department, Walker-Lispenard Building, New York. Mr. S. B. Haig, division traffic superintendent, is the prime mover. Over one hundred persons have already enrolled.

Thomas M. Ragen, Wire Chief, Western Union Telegraph Company, New York.

Mr. Thomas M. Ragen, wire chief, Western Union Telegraph Company, New York, while being a brilliant telegrapher, is an interesting writer, as is attested by his articles recently published in these columns. He has had a large and varied experience and is a close observer of things and events.

Mr. Ragen was born in Bethlehem, Pa., April 28, 1872, and first entered the telegraph service as an operator on the Central Railroad of New Jersey, at Mauch Chunk, Pa., in June, 1889, later becoming train dispatcher on the same road. Between 1900 and 1908 he was a broker and newspaper telegrapher, and in the latter year he entered the service of the Western Union Telegraph Company, with which interests he has been identified ever since, with the exception of a few months in 1911 which he spent on the Pacific Coast for his health. He is now the Long Island wire chief, having charge of

THOMAS M. RAGEN, NEW YORK.

the Long Island and city wire nights. In addition to his technical ability as an electrician he is considered a first-class telegrapher. Mr. Ragen spent some time in Mexico as a train dispatcher for the Mexican Central Railroad.

Mr. Ragen's record emphasizes the fact that the telegraph fraternity includes many exceptionally bright men. While it is generally admitted that the sending machine and typewriter have had the effect of destroying individuality more or less in operating qualities, the fact remains that really bright individual characters will find other ways through which to shine in the same degree as they did in the old times prior to thirty years ago, when operators distinguished themselves by their beautiful Morse sending and fine penmanship.

THE CABLE.

MR. GEORGE G. WARD, vice-president and general manager of the Commercial Cable Company, New York, who has been in England for some months, was on his way to Germany on a business trip at the outbreak of hostilities. He was stopped en route, and was only able to get back to London after much trouble and delay.

MR. F. B. GERRARD, general superintendent, Commercial Cable Company, New York, has on his desk a beautiful specimen of white coral found attached to a cable of the Central and South American Cable Company in the vicinity of the West Indies, recently. The coral was built up on the cable and shows the impression of the spiral shape of the sheathing wires. Pieces of tarred hemp were detached from the cable in removing the coral, and these are still sticking to the specimen.

MR. F. B. CHAPPELLE, identified with the Western Union service at Memphis, Tenn., has joined the Western Union cable staff at Key West, Fla.

CABLEGRAMS TO JAPAN.—The Japanese administration has given notice that there are no restrictions as to language in cablegrams destined to Japan via San Francisco.

THE WESTERN UNION TELEGRAPH COMPANY is erecting two additional dwelling houses for the married men of the operating staff at Bay Roberts, N. F.

THE BRITISH PACIFIC CABLE service has been interrupted because of a break between Bamfield, B. C., and Fanning Island, in the Pacific Ocean. During the interruption telegrams for Australia and New Zealand will be sent by the Mediterranean route.

Cable Interruptions.

Recent interruptions to submarine telegraph cables are reported as follows:

Between Madagascar and La Reunion, and between La Reunion and Maurice, June 23; Cap St. Jacques and Doson, July 17; Azores and Emden (two cables), August 5; Bundaberg and New Caledonia, August 19; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Vancouver and Fanning Islands, September 7.

CANADIAN NOTES.

CANADIAN PATRIOTIC FUND.—The directors of the Canadian Pacific Railway have contributed $100,000 to the Canadian patriotic fund, and all the employes of the company have been invited to contribute one day's pay. The company has 58,000 permanent employes and if they all respond to the invitation $150,000 will be added to the fund.

CANADIAN OPERATORS AND THE MILITARY SERVICE.—Several operators in Montreal desired to enter the military service and go to the front with the Canadian engineers. It was announced from Ottawa that proficient operators for military service were difficult to secure in Canada on account of the difference in telegraph codes used in Canada and in England and Europe. The Montreal operators claim that the difference between the two codes can be easily mastered and that they can become proficient in the Continental code within a week or ten days. They state that the majority of first-class operators know both codes. Included among the number who would be willing to go into active service are a number of wireless operators, to many of whom knowledge of the codes in both England and America is essential. "The government could obtain all the telegraphers it wants, and good ones, too," said one of the operators, "if it inquires of the different telegraph company officials, and posts bulletins stating what conditions are required."

THE TELEPHONE.

MR. F. H. BETHELL, president, Bell Telephone Company of Pennsylvania, New York, is touring the New England States in his automobile. He is expected back to his desk about September 21.

MR. F. V. BENNIS, assistant treasurer, American Telephone and Telegraph Company, New York, has resigned.

MR. W. B. T. BELT, general superintendent of plant, Northwestern Group, Bell Telephone Companies, Omaha, Neb., has been appointed vice-president and general manager of the same interests, with headquarters at Omaha. He has also been elected a director to succeed Mr. C. E. Hall.

MR. A. A. LOWMAN has been appointed general superintendent of plant, Northwestern Group, Bell Telephone Companies, Omaha, Neb., vice Mr. W. B. T. Belt, promoted.

MR. E. S. PILLSBURY, chief counsel, Pacific Telephone and Telegraph Company, San Francisco, Cal., called at headquarters recently on his way home from Europe.

MR. A. E. HOLCOMB, New York, has been elected assistant secretary of the Cumberland Telephone and Telegraph Company, with headquarters in New York.

MR. P. KERR HIGGINS, general manager of the independent telephone system in Texas, with headquarters at Waco, has resigned. The principal owners of the Brazos Valley Telephone Company, forming part of the system, presented him with a gold watch in recognition of his valuable and loyal services to the company and the independent interests in the State.

MR. H. E. KEPLER has been appointed general superintendent of the Brazos Valley Telephone Company, Waco, Tex., vice P. Kerr Higgins, resigned.

RECEIVERSHIP.—Mr. G. F. Wright has been appointed receiver for the Paterson, Passaic and Suburban Telephone Company, Paterson, N. J.

TELEPHONES IN CHINA.—The use of the telephone has not developed to any extent in China; long-distance lines, apart from the Pekin-Tientsin line and some railway lines, are non-existent. Local networks exist in Pekin, Tientsin, Shanghai and Canton, which are controlled by the State and associated with the telegraphs. The Chinese Government is understood to favor a great extension of telephone facilities, especially where there is no telegraph, and a number of installations are to be carried out during the next two years.

Richmond Convention of Telephone Pioneers.

The fourth annual convention of the Telephone Pioneers of America will be held in Richmond, Va., October 29 and 30, as previously announced. Each gathering of the men and women who created and developed and have been engaged in the telephone business for twenty-one years or more, has been characterized by some special feature which added to the interest and pleasure of the occasion, and, in this respect, the meeting in Richmond will be no exception.

The convention will open on October 29, at the Jefferson Hotel, for registration of members and for the transaction of business of the association. After luncheon there will be the reading of papers of special interest, and this will be followed in the evening by a banquet.

October 30 will be devoted to a steamer trip down the James River from Richmond to Old Point Comfort, starting at 9 a. m. Dinner will be at the Chamberlain Hotel. After dinner there will be another steamer trip on the Potomac, arriving at Washington 7 a. m., October 31.

The banquet at the Jefferson Hotel, the trip on the James River, the dinner at Old Point Comfort, and the trip to Washington will be tendered to the members attending the convention by the American Telephone and Telegraph Company.

The sail down the historic James and up the Potomac not only will be full of interest, but afford a better way than has ever been given for Pioneers to meet one another, renew old associations and friendships and establish new ties.

It is expected that three hundred or more Pioneers will attend this convention. All who have not signified their intention of doing so and desire further information, should apply to Mr. R. H. Starrett, American Telephone and Telegraph Company, 15 Dey street, New York, chairman of the transportation committee. All matters relating to reservations in Richmond should be taken up with Mr. J. W. Crews, vice-president of the Chesapeake and Potomac Telephone Company, Richmond, Va., chairman of the local committee.

A special train will leave New York probably on October 29, picking up members on the way to Richmond, and arriving there that night. It may be that many may prefer to reach Richmond a day or two ahead, so as to visit the museum, battlefields, and other points of interest.

RADIO-TELEGRAPHY.

MR. A. H. GINMAN, general superintendent, Pacific Coast Division, Marconi Wireless Telegraph Company of America, San Francisco, Cal., is in Honolulu, Hawaii, on business in connection with the opening of the trans-Pacific service, which will take place on September 20.

MR. H. M. SHORT, of the Marconi International Marine Communication Company of London, England, has been appointed resident inspector for that company in New York. Mr. Short has been for some time an instructor in the wireless school at Marconi House, London, and was formerly an inspector on the London staff of the late United Wireless Telegraph Company. As an earnest of their good will his London colleagues presented him with a handsome cigarette case on his departure. Mr. Short was very popular with all in the English Marconi service, and is held in high esteem by the Marconi administration.

MARCONI SERVICE MAGAZINE is the title of a neat publication issued monthly by the Marconi Publish-

ing Company of the Pacific Coast, San Francisco, Cal., in the interests of all employes of the Marconi Wireless Telegraph Company of America, Pacific Coast Division. Mr. A. H. Ginman is editor-in-chief and Mr. George Jessop managing editor.

THE TUCKERTON STATION IN GOVERNMENT CONTROL.—The Goldschmidt wireless telegraph station at Tuckerton, N. J., over the status of which there has been much controversy since the beginning of the European war, was taken over by the United States Government on September 9, and its service opened to the world. The station will be held by the Government till the close of the war, and commercial messages, as well as news and diplomatic communications will be handled.

WIRELESS CENSORSHIP CONTROVERSY SETTLED.—The controversy over the wireless censorship has been finally settled by the Washington authorities and the rigid order prohibiting the sending of any messages in code to a belligerent has been relaxed. The American censors at the stations will be furnished with copies of code and cipher books so as to be in a position to determine that the neutrality of the United States is not violated. The British and German governments have acquiesced in this limited use of the wireless stations.

AMERICAN GOVERNMENT TAKES OVER ATLANTIC WIRELESS STATIONS.—On September 5 President Wilson issued an order that one or more of the high-powered wireless stations on the Atlantic coast be taken over by the Government for its exclusive use during the European war. The Navy Department has been delegated to carry the order into effect.

Institute of Radio Engineers.

The September meeting of the Institute of Radio Engineers was held Wednesday, September 2, in Fayerweather Hall, Columbia University, New York.

Mr. David Sarnoff, contract manager of the Marconi Wireless Telegraph Company of America, presented a paper, entitled "Radio Traffic." He discussed the methods of handling all classes of radio traffic and the problems in connection therewith. He also spoke on the London convention and the international regulations pertaining to radio communication, and particularly the present commercial wave length limitations.

The Tuckerton, N. J., Wireless Station.

In order to correct possible misapprehension regarding the wireless station at Tuckerton, N. J., the operation of which has figured so prominently in connection with the European war, it should be explained that this station and the Eilvese, Germany, station have nothing to do with the Atlantic Communication Company, nor with the Telefunken system which is used by the Atlantic Communication Company. Both stations are working under the Goldschmidt patents, including the high frequency alternator for sending, and the so-called tone wheel, also a mechanical device as a detector for receiving. Mr. Emil E. Mayer, of the Tuckerton radio station, states that this station is the only one on this continent which is able to send messages across the Atlantic to Germany on a commercial basis, and did so experimentally for some time before the station was ordered closed.

English Government Takes Possession of Marconi Stations in Wales.

Mr. E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, announces that the British Government has commandeered the three high-powered wireless telegraph stations at Poldhu, Towyn and Carnarvon, in Wales, and has made an emergency war ruling that no merchant vessel carrying wireless apparatus may send messages while within three miles of the English coast. The station at Clifden, Ireland, which communicates with Glace Bay, Nova Scotia, has also been commandeered for part time use by the British Admiralty. The Marconi company will be allowed to operate the Clifden-Glace Bay circuit during certain hours for the transmission of censored commercial or other messages, but will be unable to use the stations in Wales until further notice. These stations were completed only a short time ago and were to have been opened to the public on September 1, the American stations in the circuit being at Belmar and New Brunswick, N. J.

The British Government has also demanded the exclusive service of the 150 operators of the Marconi company who were employed at the Welsh stations.

Because of the unexpected use to which the Welsh stations are to be put, the Marconi company is planning to use the new stations in New Jersey for communication directly with San Francisco, and from there to Honolulu. The company expects to open this service for the public on September 20, when there will be opening ceremonies at San Francisco, Marshall and Bolinas, Cal., and Honolulu, Hawaii.

Navy Department's Jurisdiction Over Wireless Questioned.

The Secretary of the Navy at Washington having complained that the Marconi Siasconsett, Mass., station had forwarded to a New York address a wireless message received from the British cruiser "Suffolk," ordering provisions and newspapers, asked for an explanation, and threatened, failing a satisfactory explanation, to close the station.

To this complaint, Mr. John W. Griggs, president of the Marconi Wireless Telegraph Company of America, has made a vigorous reply. He denies the right of the Navy Department to interfere with his company's business in any manner, and that the message in question was not in violation of any law of neutrality.

"The Act of Congress of August 13, 1912," says Mr. Griggs, "confers upon the Department of Commerce certain supervisory powers over radio communication, but we know of no statute which con-

fers any such power or authority on the Navy Department. The assumption by the Navy Department of authority to intervene seems to be unjustified by any law and to be practically a usurpation of the power of another department of the Government. This company has always submitted with ready willingness to the lawful supervision of the agents of the Department of Commerce, and will still do so, but it cannot recognize any authority in your department to make demands, give orders, impose censors or to stop our business. It is manifest that the claim of the agents that you have installed in our stations to decide questions of international law and to determine what messages are unneutral is unjustified. The fact that other nations are engaged in war has not changed the law of the land in this country. We are still governed by civil law and are not subject to arbitrary military dictation.

"With reference to your threat to close our station," continues Mr. Griggs,, "we have to suggest that, in the first place, you have no right or power to do it. It can be closed only by action of the Department of Commerce in revoking our license. which can be done only for cause, and no cause exists. In the second place, the result of carrying out such a threat on your part would be of immensely more injury to the public than it would be to this company, in cutting off one of the coastal stations constantly used by ships at sea and liable to be needed to answer calls of distress."

Mr. Griggs charges that the action of the Navy Department censor in transmitting a copy of the message to the department at Washington is a violation of the provision of the Act of Congress relating to divulging or publishing the contents of any message, and if the Secretary of the Navy differs from the company's view as to the law of the case, the Marconi company will welcome any legal action that will decide who is correct.

"We hold ourselves ready and willing," says Mr. Griggs in conclusion, "to take up with the Department of Commerce, which has jurisdiction of the subject in so far as any department has been given jurisdiction, any matters relating to this subject. and express our willingness, as far as the law will permit us, to conform to the wishes of the Government in observing in the strictest form the laws of neutrality."

Annual Meeting of the English Marconi Wireless Telegraph Company.

At the annual ordinary general meeting of the English Marconi Company, held on July 21, in London, the directors submitted their report, showing that the gross profits for the year amounted to £245,583 ($1,227,915), and recommending the payment of a final payment for the year 1913 of ten per cent on both classes of shares. A review of the growth of the Marconi system was presented, the American Company and its vice-president and general manager, Edward J. Nally, being favorably mentioned. The report is, in part, as follows:

"In October, 1913, the capital of the company was increased to £1,500.000 ($7,500,000) by the creation of 500,000 new ordinary shares of £1 ($5) each, ranking for dividends declared in respect of the period commencing January 1, 1914, and, in all other respects, *pari passu* with the existing 750,000 ordinary shares of £1 ($5) each. Two hundred and fifty thousand shares were forthwith offered to the shareholders pro rata at £3 5s. ($16.25) per share and the whole of the issue was subscribed and duly allotted. Of the remaining 250,000 shares, 222,688 were issued for cash in December, 1913, in connection with the arrangements made with respect to the shares acquired in the Compagnie Universelle de Téléphonie sans Fil.

"The share premium account has increased during the year by £511,958 ($2,559,790), and now stands at £767,665 ($3,838,325). Of this amount £397,057 ($1,985,285) fell due in the early part of this year and has been received.

"The erection of the high-power station for the Norwegian government is well advanced and should be completed by the autumn. A commercial telegraph service between Northern Europe and the United States of America is to be inaugurated, in which this company will be interested to the extent of ten per cent of the gross receipts.

"In December last, the Trans-Oceanic Wireless Telegraph Company, Limited, was incorporated, with a capital of £200,000 ($1,000,000), for the purpose of conducting a wireless telegraph service between this country and the United States. That company has acquired the new stations which have been erected in Wales for this purpose. These stations will be opened in the near future, when, for the first time, a direct wireless telegraph service between London and New York will be established.

"We are glad to be able to report that Mr. E. J. Nally, former vice-president and general manager of the Postal Telegraph-Cable Company of America, has become the vice-president and general manager of the American Company. Your directors have had the advantage of receiving two visits from him, and are very hopeful that his business ability and experience in all matters concerning the cable and telegraph business, together with his energetic methods and organizing powers, will soon make themselves markedly felt in the development of the American business."

The report refers favorably to the progress of the Canadian, French and Russian companies, and says, in conclusion, that marked progress has been made during the past year in the development of the wireless compass or direction-finder, and fog and submarine signalling apparatus.

Mr. W. R. Williams, manager of the Norfolk and Carolina Telephone and Telegraph Company, Elizabeth City, N. C., writes: "Enclosed find $2.00 to cover my renewal to your publication, which is highly appreciated."

Mr. C. E. Stump, manager of the Dock street office of the Postal Telegraph-Cable Company, Philadelphia, Pa., writes: "TELEGRAPH AND TELEPHONE AGE is a good thing. Keep it coming."

Original Staff of the Direct United States Cable Company.

The original operating staff of the Direct United States Cable Company was one of the most noteworthy bodies of men ever brought together for co-operation in a large enterprise of this character. The members of the staff were selected with exceptional discrimination and intelligence as to their fitness for the positions to which they were appointed, and in subsequent years many of them received important appointments in the cable service of the world. The staff was really extraordinary for its time, because it was composed almost exclusively of young people, mere youths, with only a sprinkling of seasoned men. Hitherto the cable services had been recruited from the older ranks of telegraphers. The men of experience necessarily chosen for the principal posts were aghast at the idea of entering on a serious competitive career with such raw material. Among the living members there is still a bond of sympathy and fellowship, and when anyone of them visits another cable centre it is made a religious duty to pay his respects to any of his former associates whom he may find there.

The Direct United States Cable Company was organized in London in 1874. Mr. George Von Chauvin, now managing director of Siemens Brothers, Ltd., London, one of the largest electrical enterprises in the world, was appointed managing director of the undertaking and Mr. Oscar Moll, now managing director of the German Cable Company, with headquarters at Cologne, Germany, chief clerk, and J. W. Fuller,* traffic manager. The staff appointments reflected great credit on the organizing body, and conspicuous among them were Oscar Moll, assistant traffic manager; S. L. Clark, secretary, and F. O. Thompson, electrical staff, now accountant Direct and Anglo Companies.

London Station: G. H. Bambridge,* superintendent, assisted by J. W. Ward,* and an operating staff of which E. Chambers (now superintendent, Western Union Cables, Penzance, England) recently retired; H. Osborne (now superintendent, French Cables, Orleans, Mass.) and H. E. Robson (now with Postal Telegraph-Cable Company, New York) were members.

At the Liverpool Station were: A. C. Forshaw, senior clerk, afterward superintendent at London, and now retired; Joseph Furze, now superintendent of the Commercial Cable Company, Liverpool; J. H. H. Smith,* J. H. Colegate, J. W. Graves, retired, W. M. Kent (now relief superintendent, Commercial Cable Company, London); W. Coulthard,* T. Gleave, operator and counter clerk.

The Chester Station, only eighteen miles from Liverpool, was a repeater or relay station as occasion demanded, intermediate between London to the south, and Liverpool to the north, and Ballinskelligs Bay, in Ireland, where the Direct cable was operated. Chester was in charge of C. B. Wood, superintendent, (now with the Western Union in Philadelphia, Pa.) and with him were D. E. Le Rougetel, (now cable representative on the Continent), J. H. Beswick, E. Alden, R. J. Hughes, (now superintendent Commercial Cable Company, Waterville, Ireland) operators, J. W. Shirley, senior clerk, and C. O. Donoghue, check clerk.

Ballinskelligs Station: J. J. Gavey, superintendent; F. Topping, (now pensioned) clerk in charge; W. Hayes, T. N. Wood, D. McLaine, (now superintendent Western Union, Bay Roberts, N. F.); J. Brock, W. Seekins, J. H. Icely, (now retired, went with the French Cable Company to St. Pierre, afterwards to Brest, France); D. Cuthbert, (now superintendent, Pacific Cable, Bamfield, B. C.); David Main,* R. A. E. Taylor,* J. G. Armstrong, N. O'Connell, operators; J. O'Shaughnessy, check.

Torbay, N. S., Station: C. W. Lundy,* superintendent; S. S. Dickinson,* chief clerk; J. Manley,* S. H. Fenn, (now traffic manager, Western Union Cables, London); G. H. Mockridge,* (afterwards superintendent, Western Union Cables, Penzance, England); J. Laing, (retired, living in Annapolis Valley, N. S.); J. Grant, (now assistant superintendent, Direct U. S. Cables, Halifax, N. S.); F. B. Gerrard, (now general superintendent, Commercial Cable Company, New York); G. W. Mitchell, (now in commercial business, Boston, Mass.); Mr. West, Mr. Howard, T. H. Chapman,* F. W. Nevett, J. Waugh and E. C. Sweeney, (now American representative, French Cable Company, New York) operators.

Rye Beach, N. H., Station: W. J. Fraser, superintendent, (now commercial agent for the Western Union in New England); James Brown,* afterwards superintendent at New York; J. F. Fraser, (now superintendent, Direct United States Cable Company, Halifax, N. S.); G. Clapperton, (now vice-president and traffic manager, Commercial Cable Company, New York); Thomas Wilmot,* A. F. Toovey, (now with French Cable Company, Cape Cod, Mass.); J. C. Shaw, (now manager Direct Cable Company, Boston, Mass.); R. Herne, (now superintendent, Commercial Cable Company, Rockport, Mass.); T. Bradley,* T. Blake,* and T. Gothorpe (now superintendent, Direct Cable Company, Harbor Grace, N. F.); J. Connor,* Wm. Matheson, T. Quinn, F. W. Noad, W. J. Brown (now manager, Western Union Cables, Canso, N. S.), operators.

New York: George Gray Ward, superintendent, (now vice-president and general manager, Commercial Cable Company, New York); G. W. Wise, J. G. Reid,* E. Barrieri, clerks.

Operating Staff: H. Cavalier, clerk in charge; A. C. Frost,* (who afterwards became superintendent); W. B. Gee,* W. Tucker,* (no doubt one of the most brilliant Morse and Continental operators in the world); C. Lee, (who became superintendent, and is now retired and living in Brooklyn, N. Y.); J. E. Palmer,* and J. D. B. Stuart, (now with Mexican Telegraph Company, Galveston, Tex.); J. O'Connor,* and C. E. Shafer, (now with French Cable Company, New York), operators; H. Lee, (now with the Commercial Cable Company, New York), delivery clerk, and C. E. Merritt, (now assistant treasurer, Commercial Cable Company, New York), counter clerk.

Those marked with a star are dead. Many of them rose to positions of distinction in the cable and commercial worlds.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, SEPTEMBER 16, 1914.

International Telegraph Regulations.

There are many American telegraph people who do not understand that the United States and Canada, which do not use the Continental alphabet, are still subject, in their foreign telegraphic correspondence, to the international rules and regulations of the governments that do use the latter alphabet. Letters received by us from various persons connected with the telegraph in the United States indicate that the companies on this side of the Atlantic can do as they please in regard to rules and regulations. This is true only so far as the business affects their own offices. When a cablegram is accepted in the United States for transmission to a foreign country it is obvious that the foreign country may have something to say about the counting and charging of the message. This is provided for in the international regulations adopted by the governments of the world and circulated through the Central Telegraph Office at Berne, Switzerland. The international regulations prescribe the manner of writing, counting and charging of international telegrams and is the authority which determines how many letters and under what conditions they shall constitute a word.

Morse Alphabet in the War.

An interesting example of the standing of the Morse telegraph code in times of war is afforded in the recent endeavor of several Canadian operators to join the military service and go to the front with the Canadian engineers in the present European war. It was pointed out to them that their lack of knowledge and practice of the Continental code would act as a bar to the attainment of their desires in the present instance.

This certainly is a powerful argument in favor of a universal telegraphic code. English possessions should act in harmony with the mother country in all material things, and it is not at all impossible that this experience may lead to the unification of the telegraph alphabets as practiced in England and Canada.

The New Western Union Operating Department in New York.

The article published on other pages of this issue, describing and illustrating, in part, the new operating headquarters of the Western Union Telegraph Company in New York, will be read with general interest. To give a full-detailed story of this great office would require a special volume, and even then the conception of its magnitude thus obtained would fall short of the reality. It is one of those cases that requires personal observation to fully appreciate.

It is hardly necessary to state that this office is the largest and most modern in the world, except, perhaps, that of London, as to size. In it is represented the highest development in the telegraphic science and art, and it is truly a model, but in these days of rapid progress it would be vain to predict what changes in methods and equipment will take place in a few years. However, there is satisfaction in the knowledge that the office, as it is to-day, is the most complete and adequate for the service that human skill and ingenuity can make it.

OBTAINING MONEY BY FORGED TELEGRAM.—Recently a man obtained from a Western Union messenger in Knoxville, Tenn., a message blank and envelope, and hired the boy to deliver a (forged) message to the First National Bank of Knoxville. The message purported to be from a bank in a neighboring city advising the Knoxville bank to honor a draft drawn by a woman for $150. The money was paid to the confederate, and in due time the dishonored draft was returned, and the bank advised the telegraph company. The company had the parties arrested and brought back to Knoxville, where they were tried, found guilty and sentenced to prison. The same persons are wanted in many places in the South for similar offences.

OPTICAL TELEGRAPH.—It is stated that the German army signal corps is testing a new form of optical telegraph. It consists of a small flash light on a field glass or telescope, and is controlled by a push-button, by means of which telegraphic characters are flashed.

New Operating Department, Western Union Telegraph Company, New York.

In our issue dated July 1 we gave a brief account of the new operating headquarters of the Western Union Telegraph Company in the Walker-Lispenard Building, New York, together with a view of the new building and the old one at 195 Broadway. We are now enabled to present some additional information regarding this modern telegraph office, which is unequalled in the world for completeness.

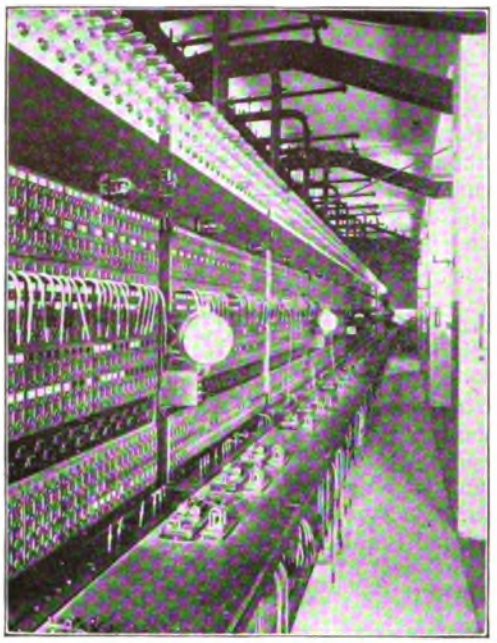

FIG. 1—MAIN LINE SWITCHBOARDS.

FIG. 2—DISTRIBUTION FRAME ON LEFT; REAR OF SWITCHBOARD ON RIGHT.

As already noted, the Western Union Company occupies seven floors of the building, the eleventh to seventeenth, inclusive. Each floor has an area of about 14,000 square feet and is splendidly lighted.

The thirteenth floor is known as the plant room. On this floor all the lines from outside points, including the various loops around New York City and vicinity, come into thirty-four sections of switchboard. There are about 2500 incoming wires, all told. Fig. 1 shows a number of sections of the main switchboard and Fig. 2 shows the rear of the same sections and gives an idea of the method of cabling. At the left of this view is a part of the main distributing frame, by means of which changes in connections from incoming lines to the switchboard can easily be made. All wires leading to and connecting different sections of the board are run in lead-covered cables supported on overhead racks, shown in the photograph. The switchboards serve the purpose of connecting any incoming wire with any operating position in the building or with any outgoing wire.

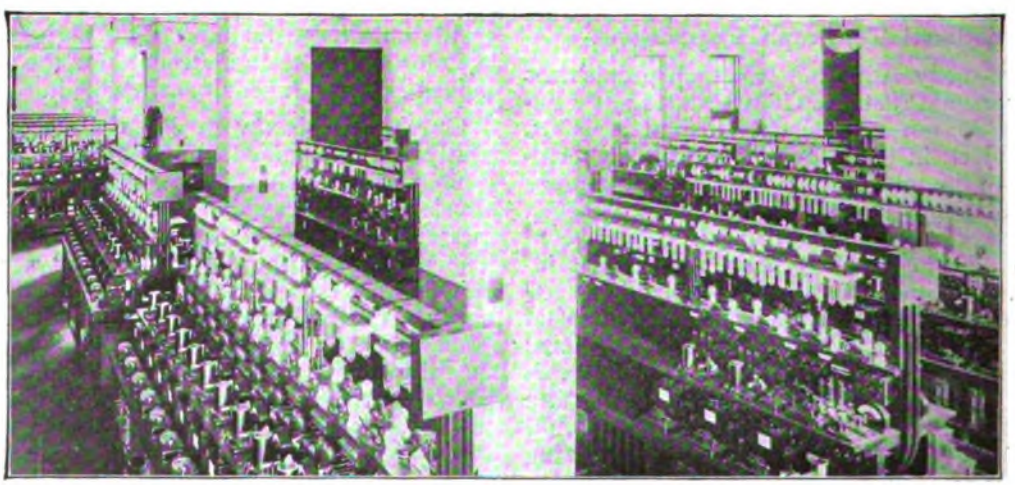

FIG. 3—MULTIPLEX AND REPEATER APPARATUS.

Fig. 3 is a view on the thirteenth floor showing the multiplex and repeater apparatus. There are fifty-five Morse repeaters, thirty-five half Morse repeaters, three duplex repeaters and twelve half duplex repeaters.

The power plant is also on the thirteenth floor. The motor-generator sets receive alternating current received from the Edison company. This current is converted to direct current of the proper potential for telegraph use by the motor-generators. In the basement of the building is an engine and generator for emergency use.

The time service department is located on the thirteenth floor also. It contains a master clock, which is kept correct by comparison each day over a wire with the United States Observatory at Washington, D. C. This master clock operates ninety circuits throughout New York City, on which there are about 3,000 synchronized Western Union clocks. From this department, at noon each day, there is sent out a signal all over the United States, by which the correct time is known. Special wires are released for this purpose at five minutes before noon and on the stroke of the hour a signal is flashed over these wires.

The fourteenth and fifteenth floors are occupied by operating rooms. The Morse operators sit at long tables, each with its key and with a sounder in a resonator on a hinged arm. Typewriter drops are at positions. Altogether, on these floors there are 1025 operating positions. These positions include 160 for forty quadruplexes and 388 for duplexes. The commercial news department is also located on this floor.

An interesting feature of the fourteenth floor is the distribution center and automatic message carrying equipment. Here are twenty-two incoming and twenty-two outgoing pneumatic tubes for receiving and sending messages to local offices in New York City.

Along the middle of each operating table, between the operators who sit at opposite sides of it, is a steel trough in which runs a moving belt. Altogether, there are thirty-four of these tables with a belt on each. These belts deliver messages laid on them to six moving belts which in turn deliver them to the distributing center. The distribution of messages coming into the distributing center through the pneumatic tubes or from receiving

FIG. 4—OPERATING ROOM ON FIFTEENTH FLOOR.

FIG. 5—THE MULTIPLEX.

FIG. 6—COMMERCIAL NEWS DEPARTMENT.

operators which require redistribution to sending operators are conveyed to the proper sending position by sixteen lines of automatic carriers, very similar to the carriers used in department stores for conveying cash to the change desk.

About 1500 employes are required to take care of the traffic through the general operating depart-

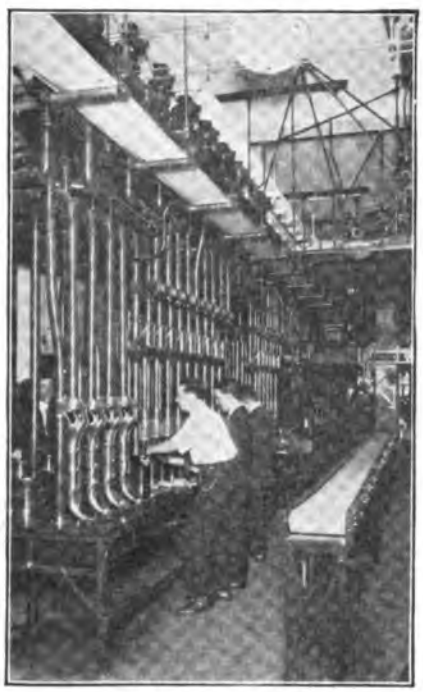

FIG. 7—PNEUMATIC TUBE TERMINALS.

ment. This traffic amounts to about 150,000 messages per day, but exceeds this number on special occasions, such as the playing of a world series or other event in which there is universal public interest.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

Answer the questions on pages 53 and 54.

If a magnet or a compass needle is mounted in such a way as to be free to turn what position will it assume? (Page 55.)

What is the name given to the end that points to the north, and that to the south?

What is the first law of magnetism?

Is this law universally true?

How can it be shown that there is a magnetic field in the space surrounding a bar magnet? (Page 56.)

What is the meaning of the term "lines of force"?

Do the lines of force which start from one pole of the magnet return to the opposite pole of the magnet or are they "lost" in space?

Explain this condition.

How can the magnetic field be mapped out? (Page 57.)

Is there any magnetism at the middle of a bar magnet?

Give a reason why the magnet is neutral at a point midway between the north and south poles.

Why are iron filings used in mapping out a magnetic field, as described?

How can the attraction and repulsion of unlike and like poles be shown?

What are the laws governing the general behavior of lines of force? (Page 58.)

What is magnetic induction?

Do lines of force exist in the body of a magnet as well as in the air surrounding the magnet? If so, how can the neutral point, midway between the poles, be accounted for?

If a bar magnet is broken into two parts, what happens to the distribution of magnetism? (Page 59.)

What is the theory of magnetism?

Are the molecules of iron in a magnet supposed to be magnets themselves?

In soft iron and unmagnetized steel how are the molecules supposed to lie?

What is the effect upon the molecules when an iron bar is subjected to the stress of a magnetic field?

What is the result of adding together the magnetic effects of the separate molecules?

Is it easier to turn the molecules in soft iron than in hard iron or steel when subjected to magnetic lines of force?

Does soft iron retain its magnetism after removing the magnetic excitation?

Does hard iron or steel lose its magnetism readily?

What is the partial exception to the rule?

What is the cause of the "freezing" of a relay or telephone ringer armature? (Page 60.)

(To be Continued.)

"Old Farmer" Lawton as a Farmer.

"Old Farmer" Lawton's national reputation as a farmer received a severe shock this year, but it was not due to any fault of his, as he explains in a recent letter from Denver, Col.

"I began to think I was going to have trouble in my happy little home," he says. "I rather pride myself on a pretty good garden, but this year things went wrong. I laid it to the unusually cold nights we have had all summer and when the cucumber vines began to die and tomatoe vines look sickly. Mrs. Lawton began to growl and said just to think she had lived with me most thirty years to now find that I was not a real farmer, was more than she could stand. She began to talk of lawyers and courts, when little Johnnie, our fourteen-year-old boy, averted the rupture and saved my reputation by taking us out in the garden and showing where I had planted these vegetables on an ant hill and the blasted little creatures had just about finished them. So Mrs. L. is going to give me another trial next year before branding me as a base deceiver."

A Reminder of a Civil War Incident.

BY O. C. HATTON, BROOKLYN, N. Y.

It was recently announced that some English cavalrymen while in bathing were taken by surprise by the appearance of German soldiers at Lungtungpen, Belgium. History only repeats itself. I doubt if the following incident of our Civil War ever got into print.

What happened to the British cavalrymen happened also to the First Battalion, First Wisconsin Cavalry, in the summer of 1862, at the Chalk Bluff ferry over the St. Francis River in southeast Missouri. The bluff on the Arkansas side of the river was an almost perpendicular cliff of chalky clay, bare of vegetation on its river face, but covered thickly at the top with trees and undergrowth. At the foot of the bluff the river widened out into a slack-water pool, across which was stretched the rope of the ferry.

The Wisconsin troopers on a scouting expedition one hot afternoon reached the ferry landing on the Missouri side and got permission to take a swim, one-half of their number at a time. While about 200 men were in the water a shower of rifle bullets came from the top of the bluff, giving the surface of the water near the opposite bank exactly the appearance caused by a hailstorm, and earth, bark and leaves flew thickly on shore. At the waterside our surgeon, good Dr. Gregory, was washing his hands, and on a log a short distance back sat Lieutenant-Colonel, afterward Brigadier-General O. H. Lagrange. The doctor was mortally wounded and his horse a few feet behind him was killed. No one else was seriously hurt.

The swimmers ducked under the water, reappearing closer to shore after each disappearance, the roaring voice of Col. Lagrange lined up the men on shore at the river bank with their carbines, and the firing soon stopped. The bugles sounded "Boots and Saddles" before the men were all out of the water, and "Fall In" caught them in all stages of undress. Before we could cross on the ferry scow the guerrillas got away. Picture to yourself more than a hundred men, whose average equipment besides their arms was their boots and a shirt or a jacket, or boots and trousers, scrambling through thick underbrush until darkness recalled them, with the resulting scratches and profanity. The affair would have been vastly amusing had it not been for the death of the best-loved man in the regiment. Oh, how we missed him.

I was one of these swimmers until our surgeon called me from the water to hold his horse while he washed his hands. I stood within six feet of the doctor and he was talking to me when the firing began. I was stung by flying sand and bark kicked up by the balls, but not by the shots. The horse was struck in three or four places and was killed in his tracks. Dr. Gregory's arm was broken and he was shot through the lungs. I turned and saw him slipping into the water and caught him in time to give other comrades a chance to help him out of the water. When we stood him on his feet he shook us off saying: "Damn it, boys, let me alone, I can walk." He was humored, but collapsed after walking a few steps, and we carried him to his ambulance. He died two days later.

It was while serving with the regiment named that I first heard of the military telegraph. There was a wire from Cape Girardeau, Mo., to St. Louis in the fall of 1862 that worked when the Confederate irregulars relaxed their attentions to it. That country was heavily wooded and was full of small bands of men not attached to either army, who made war on their own hook. We called them guerrillas or bushwhackers. Joe Sears was operator at the Cape. The wire was broken so frequently by these marauders that civilian linemen were afraid to repair it. Joe called for soldiers. Our regiment had recently returned from an all summer scout that took us to Helena, Ark. Headquarters learned that there was a trooper in the regiment who knew something about telegraphy. So I got the job of chief lineman for Joe's territory. He accompanied me on my first trip as far as the first break. There he tested north and returned to his post. I had seen climbing spurs used and had learned how to splice a broken wire. I did the repairing with the help of three or four comrades who "pulled up the slack" and stood guard. I was on this duty about three weeks, between Cape Girardeau and Frederickton, returning to the Cape for orders, rations and repair material.

My last trip over the wire ended on October 12. I found awaiting me a discharge from the service dated October 3. I had been on the assignment nine days after I had ceased to be a member of any military organization. My company commander had not relieved me. I never learned why as I left the camp without seeing him, in order to catch a boat for St. Louis, then nearing the landing. I went aboard the boat without a cent, with a haversack filled with apples and a pint flask of peach brandy in the inside pocket of my jacket. I found on the boat some forty of my comrades, who, like me, had been condemned by the new surgeon who had taken Dr. Gregory's place. My trouble was deafness. A wealthier comrade advanced the price of my deck passage to St. Louis. I made my supper off the apples and next morning the brandy, judiciously placed with the cooks in the kitchen, secured me the same fare that was served to the cabin passengers, to the end of the trip. I promised to bring the farmer who gave me that brandy two pounds of horse-shoe nails on my next trip out, but there was no next trip. I was entitled to transportation home, but I resented having been kept on dangerous service after I was no longer a soldier and would not ask for it. I was paid off in St. Louis on the afternoon of the day of arrival there; had money enough for a ticket home, and a good dinner at the Planters Hotel, and night found me on my way to Pennsylvania.

Two days after my arrival at home the Pennsylvania Railroad people sent for me and installed me as operator in the office where I had learned the rudiments of the business. Early in 1864, my health having improved, and my telegraphing also, I went

back to the army, this time in the military telegraph corps. In the intervening time, one of my girl schoolmates had asked me to teach her the business and I did so. She soon became as good an operator as I was. Then I resigned, secured her appointment as my successor, and went West. So far as I know there was at that time only one woman operator in the business, Miss Cogley, of Lewistown, Pa. The name of my pupil and successor was Rachel Stehman, of Middletown, Pa. She married a few years later, and the business knew her no more. Through George J. Goalding, now living in Los Angeles, Cal., I communicated with Capt. W. L. Gross, went to Louisville, Ky., to meet him and was sent to Crab Orchard, Ky. Then followed assignments to Cumberland Gap, Tenn., New Orleans, La., and Meridian, Miss. I remained at Meridian as military manager until the telegraph lines in the South were relinquished to their owners, in August, 1866, and military occupation came to an end. At Meridian I found as operators for the owning companies, J. C. Hueston, Gustav M. Heiss and Ed. H. Hogshead, all of whom had seen service with the Confederacy. With all of them I formed close personal friendships, which lasted until the death of Hueston and Heiss, and still continues with Hogshead.

Senator John Sherman as an Operator.

BY "OLD FARMER" LAWTON, DENVER, COL.

You know what General Sherman said about war, and I think old Tecumseh was about right even if the telegraph was not as extensive when the general changed Webster's definition of war.

Tecumseh told me personally the summer before he died that the telegraph had turned the tide of battle more than once and made great generals during the Civil War by assisting in the movement of troops, and he was confident that it would cut a much greater figure in coming wars, and how true his prediction is.

His brother, John Sherman, the senator from Ohio, was stranded in Pueblo, Col., a couple of weeks in 1876, where he had come to investigate the big Maxwell land grant of New Mexico, and as the Mexicans predominated in the make-up of the population of Pueblo at that time, the senator, who was of a very sociable nature, appeared glad to find an American in the telegraph office where he could while away some of his idle time. He, too, was greatly interested in the telegraph, and after having me explain its working, wanted me to teach him the alphabet. I found him a very apt scholar, until one day the Denver office told me to keep that "Ham" off their wire. As it was the only wire we had in Pueblo in those days and was the through wire to Santa Fe, New Mexico, I was compelled to cut it out at the board when John came around a couple of times a day for his usual lesson and practice, and reported to him that the circuit was interrupted. Usually I did not have to tell a story to shield the Denver crowd, as that old government line was out of commission two-thirds of the time, especially south of Pueblo. However, later when I was transferred to Denver I told the boys here that they should have been ashamed of themselves for calling such a prominent United States senator as John Sherman a "Ham" and I am confident the practice has ever after been discontinued as far as the Denver office is concerned.

Three Important and Valuable Electrical Books for Students.

"Electrical Instruments and Testing," by Norman H. Schneider, is the latest work on this important subject, and has been brought up to date. It is an extremely practical book, and every telegrapher who is preparing himself to fill positions in the engineering branch of the service should make a copy of this work his text-book in testing. It is thoroughly reliable, and was written by a practical engineer. The section on the testing of telegraph wires and cables was written by Mr. Jesse Hargrave, a well-known telegraph engineer, and the illustrations, of which there are many, are very clear and understandable. The price of this book is $1.15 per copy.

"American Telegraph Practice," by Donald McNicol, is another book to which we desire to call especial attention. This book contains the latest information and descriptions of telegraph apparatus and systems, and it constitutes a complete course in telegraph engineering. It is well illustrated and a careful study of its contents will give the student an immense advantage in the line of promotion. The book deals with every detail of the telegraph engineering and construction services and is written in so clear English that anyone with average intelligence can readily grasp the facts set forth. The telephone in its relation to telegraph operation is also covered to a liberal extent. It is a book that gives one a desire to know it from beginning to end, and, with patient effort, this result can be easily attained. The price of this book is $4.00.

"Handy Electrical Dictionary," by W. L. Weber. This little book, which is of vest-pocket size, is a necessary companion of the two books referred to, as it supplies the key which unlocks the meaning of the technical terms met with in these volumes. To the beginner this little dictionary is really indispensable. It will remove all doubt as to the meaning of technical words and phrases and is a positive help in the study of electricity. Progress in study is much more satisfactory and really enjoyable when one knows that he is on the right road and thoroughly understands what he is reading. This book is a library in itself, and is complete, concise and convenient. The price is 25 cents per copy for cloth binding, and 50 cents for leather binding.

Alfred Vail's Diary.

BY DONALD MC NICOL, ELECTRICAL ENGINEER'S OFFICE, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

The extracts from Alfred Vail's diary dating from the middle of March, 1844, until the middle of August,, 1844, recently reprinted in the columns of TELEGRAPH AND TELEPHONE AGE, constitute an illuminative commentary upon the difficulties encountered and overcome by Messrs. Morse, Page, Vail, Cornell, Gale, Smith, Rogers, Wood and Avery, in connecting-up and operating the first American telegraph line—that between Relay House (RH) Baltimore, Md., and the capitol at Washington, D. C.

The frequent reference to packing up, and unpacking instruments, connecting up and trying out various combinations of conductor, earth and battery, remind one of the vast amount of this same kind of activity which has, during the intervening seventy years, constituted the day's work of a myriad of eager hands the world over.

Reference is made to a trip made by Mr. Vail on June 28, 1844, to Morristown, where he went on a visit to the Speedwell Iron Works, with which company he was formerly connected and where some of the first telegraph instruments were manufactured. The present writer spent a day in Morristown about a year ago, and while there was unable to find any one sufficiently versed in the antiquities of the town, or in telegraph history, to point out the place where the first apparatus was constructed.

Entries in the diary show that Mr. Vail, when not engaged in telegraphic experiments or demonstrations, visited nearby quarries and mines in search of rare mineral specimens. On July 22, 1844, he collected some specimens of iron pyrities. It is interesting to note that while engaged in the work of constructing the first Morse telegraph line, he had in his possession a sample of one of the elements at the present time employed as a detector in wireless telegraphy. This, taken in connection with the fact that a few months previously Prof. Joseph Henry, at Princeton, N. J., had discovered that the discharge of a Leyden jar, or condenser, is oscillatory, [it is the oscillatory character of the spark discharge which makes wireless telegraphy possible] vividly suggests the possibilities in chance experiments. In this instance the chance experiments were not made until fifty years later by a Frenchman who, in 1844, was in his cradle.

It would be very interesting if Mr. Maynard, who contributed the extracts referred to, could give us Mr. Vail's record of what took place on the Washington-Baltimore line between October 17, 1843, and March 12, 1844, the former being the date Mr. Cornell went to Baltimore with his newly invented pipe laying machine. In the fall of 1843, Prof. Morse commenced the installation of a lead cable, containing four insulated No. 16 copper wires, between the double tracks of the Baltimore and Ohio Railroad extending between Washington and Baltimore. By means of Mr. Cornell's pipe laying "plough," drawn by an eight-mule team, the cable was laid at the rate of three-quarters of a mile per day.

Mr. Cornell's account of the progress of this work, contained in his biography, throws considerable light upon the relations existing between the various persons identified with this pioneer telegraph enterprise. A re-reading of the extracts from Vail's diary will show that very little reference is made therein to Mr. Cornell's connection with the undertaking, and, reading between the lines of Mr. Cornell's account of the work, one cannot do aught but conclude that there was a pronounced professional rivalry between these two gentlemen.

Mr. Cornell relates that his duties consisted in laying the cable, while Messrs. Vail and Avery tested the circuits from point to point as the various sections were connected up. It appears that the plan followed in making the tests was to first test one pair of wires as a circuit and then the other pair. After three miles of pipe had been laid, Mr. Cornell suggested to Avery that this procedure would not develop possible leaks or contacts between the pairs tested as circuits. Avery, however, declined to call the matter to Vail's attention, as the latter had on other occasions intimated to him that he would do well to confine himself to his prescribed duties. Avery agreed to accompany Cornell on a nocturnal expedition having for its object a proper test of the individual conductors of the precious cable the success or failure of which would have such intimate relation to their own fortunes. They left their hotel at midnight and proceeded to the point where the battery and galvanometer were located. The tests which were made during those eventful early morning hours confirmed their fears, as contact was discovered between two of the conductors. Even then, owing to the attitude apparently maintained by Mr. Vail toward his associates, no corrective measures were taken. After the pipe had been laid between Baltimore and Relay House (about ten miles) Prof. Morse appeared at the workings and calling Mr. Cornell aside, said: "Mr. Cornell, can you not contrive to stop this work for a few days in some manner, so the papers will not know that it has been purposely interrupted? I want to make some experiments before any more pipe is laid." Stepping over to the mule drivers, Mr. Cornell shouted: "Hurrah, boys, whip up your mules, we must lay another length of pipe before we quit for the night." It was then about 5:15 p. m. The drivers laid on the whip, and Mr. Cornell at the plough handles, watched for the first promising obstacle upon which to impale his beloved machine. A suitable rock soon presented itself, upon which the machine was "accidentally" overturned and completely wrecked.

This incident in connection with the building of the first telegraph line, established a precedent which, possibly, has served as a guide to promoters of subsequent enterprises in devising plausible accounting for the delays which so often interfere with promised results.

Many tests and examinations of the cabled conductors were made during this time, and at a con-

ference it was decided to postpone the work until new plans could be made.

In his biography Mr. Cornell states that as the cessation of the work for a time left him unoccupied, he procured from the Commissioner of Patents, Mr. Ellsworth, a list of the works dealing with electricity, on hand in the patent office library. Upon applying for these works the following day he learned that Mr. Vail had obtained possession of them the day before. Mr. Cornell later procured some works on the subject from the congressional library.

Messrs. Morse, Vail and Cornell spent the succeeding winter months delving into the available literature of the subject, discovering that Messrs. Cooke and Wheatstone in England had experienced the same difficulties as themselves in laying underground conductors, and that in Europe it had been decided to suspend the wires on poles. It quickly dawned upon Prof. Morse that this was the thing to do with his Washington-Baltimore line. As there were no manufactured insulators procurable, Messrs. Vail and Cornell, independently submitted to Prof. Morse plans for fixtures which might be used for the purpose. Upon the recommendation of Prof. Henry, of Princeton, to whom both plans had been submitted by Prof. Morse, Mr. Cornell's insulator was adopted.

This crude insulator consisted of two plates of glass between which the line wire, after having been wrapped with cloth saturated with an insulating compound, was fastened. The fixture was then enclosed in a wooden box to protect it from breakage, the box being fastened to the pole. This insulator was early replaced by primitive forms of the glass and porcelain knobs used today.

The receiving instrument, or relay, used weighed nearly two hundred pounds, due to the fact that the electromagnets were wound with No. 16 gauge insulated copper wire, being the same gauge as the line wire.

Recently the writer had occasion to spend a day in the little village of Relay, Md., and while there made the most of the opportunity thus afforded to view the site of the first telegraph construction camp, where Professor Morse, himself, was foreman.

The extracts from Vail's diary submitted by Mr. Maynard, take up the construction and operation of the line beginning in March, 1844, after it was decided to place the wires on poles.

Mr. Swope's Experiences in the European Warring Countries.

Mr. Gerard Swope, vice-president, Western Electric Company, New York, who recently returned from Europe, gives an interesting account of his experiences there in the *Western Electric News*. In his travels he kept just ahead of the crest of the war wave and he describes the conditions as he found them in Berlin, Paris, Antwerp and London. In Antwerp the factory of the Bell Telephone Manufacturing Company was partly emptied of workmen and partly filled with soldiers. The government had requisitioned space to house five hundred troops in the factory buildings.

"Trying to do business and hold conferences, constantly interrupted by the blasts of trumpets, or the entrance of officers," Mr. Swope says, "was difficult indeed."

"In London, all was excitement as to whether England should join France and Russia, or remain neutral; the crowds were enthusiastic for war, but Parliament was still debating the question, amid much impatience of press and public.

"Sir E. Gray's admirable statement before the Commons gave much light on a very complicated situation, and on Tuesday, August 4, England sent its ultimatum to Germany which on the next day was changed to a declaration of war.

"The temper of the people seemed to change almost over night and now that Great Britain was at war, they seemed to be settling down to grim determination to face the seriousness of it, to go through with it and to make the best of it."

Telephone Troubles and Their Remedy.

In the practical work of installing and caring for telephones it is important to know just how to remedy the troubles that occur in the operation of telephone apparatus and systems. Mr. W. A. Gibson, in his book, "Manual of Telephone Troubles," covers this phase of telephone work very thoroughly, and every telephone man should have a copy at hand, as it will help him out of many difficulties. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.50. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

The Migratory Telegrapher.

BY R. M. TELSCHOW, OPERATING DEPARTMENT, POSTAL-TELEGRAPH COMPANY, NEW YORK.

The following story of a migratory operator who left New York and returned a few months later has a familiar ring to it, and fits dozens of other like cases.

He was headed straight for Broadway, and as the suburban town in which I live, and where we met, is only fifteen miles removed from that mecca of the American telegrapher, he was due there some time Monday morning.

It would have been cowardice to avoid the friendly smile and outstretched hand of Early Boyd, whom I had not seen in several years. I assure you it was quite a "touching" incident.

In response to my query as to where he had been since last we met, my old side kicker at "195" took me into his confidence and reeled off the following:

"From '195,'" he said, "I went up to the Postal. A few weeks there sufficed, and on a beautiful autumn morning I found myself in Beantown. Somehow it seemed good to be back on dear old State street and the old crowd of regulars there all welcomed me back to the beans and apple-pie diet. Boston is a mighty nice town to live in, but along in December they were looking for men to go to Jacksonville, and as it is but natural for a Boyd to migrate in that direction, I volunteered, and had a comfortable hike on a company pass to Florida.

"I went over to New Orleans to take in the Mardi Gras, and, while there, ran into a bucket-shop job and flagged Jacksonville. Things came my way now, and I bought some grand clothes. The manager of the establishment grew suspicious of my prosperity and thought I was making more money than he was, hence, with the advent of March, I was marching upon Memphis. I didn't connect at Memphis, however, and had just about coin enough left to pay my fare to Dallas.

"I was 'on the block' several days in Dallas, and then entered the service of the Texas Postal. A couple of months later found me working in Kansas City, whither old associations and the fascination of the hill city had lured me. Brief sojourns at Des Moines and Omaha followed, and I finally decided to go back to 'O. S. g.,' getting a job on the Iowa Central, near Cedar Rapids. This yarn must be getting tiresome, old man."

"No, it interests me greatly," I assured him. "It does beat all how you fellows get around."

"Well, I'll boil it down anyway," he said. "Let's see, where was I at?"

"'O. S. g.' in Iowa," I volunteered.

"When I quit the railroad," he continued, "I went over to the Western Union in St. Louis; when Lou Skipper stopped over in that place a few months later I couldn't resist the temptation of accompanying him to Chicago. Lou was anxious to visit his brother, having been out on the coast for some time. He is getting quite 'regular'—time was when the afternoon of the second pay day would find him consulting time-tables and packing his grip preparatory to bidding the boys farewell.

"In 'Chi' I put in an exceedingly long stretch, considering my nervous disposition. But the old craving for the pike asserted itself, and the scene of my activities was next transferred from the vicinity of Jackson Boulevard to Fountain Square, in Cincinnati. Racing was on at Latonia, across the river in Kentucky, and the bookies took whatever profits I derived from my telegraphic endeavors. I have always inclined to the belief that nothing can happen which may not be a turn for the best; that no matter what misfortune may overtake me, it could have been worse. In other words, my optimism carries me across the rough eddies in life's current.

"Gently, but firmly, I brushed Cincinnati's dust from my natty brown suit, as I emerged from the depot in Detroit one fine evening, having left the Ohio metropolis at noon.

"Detroit is beginning to look like home to me, and some day, when I get married and settle down, it's going to be in the vicinity of Belle Isle. There is something in the surroundings and people of that wide-awake Michigan burg which strikes a sympathetic chord within me, and keeps tugging at my heart strings that sometimes I feel like staying there forever. The only trouble is I grow restive. Pay days were coming so regular that I almost forgot what a time-table or railroad map looked like. One evening I took a young lady on an excursion down to Bob-Lo Island, in the Detroit River, near Lake Erie, where the river is wide and the broad expanse of shining water under the bright moonlight cast a magic spell over me, which proved my undoing. Next thing I knew I had quit the Western Union in Detroit (for the sixth time) and was on my way across Lake Erie on one of the floating palaces operated by the D. and C. Steamship Company.

"In Buffalo I met a friend who tipped me off to buy a shave and come over to the Western Union main office and get a 'sine,' as they were shorthanded.

"While working the Pittsburgh wire one afternoon, I ran across Bill Jones, who was holding down the other end. Bill and I used to be pals on the New Haven road back East in Connecticut, and it didn't take me long to decide that the Smoky City had suffered altogether too long from my continued absence.

"You never saw a more disappointed knight of the key than I was when I got into Pittsburgh and found Bill had 'beat it' for New York. However, I lingered a couple of pay days, and a further session of several weeks followed at Johnstown, 'subbing' on a leased newspaper circuit.

"A pleasant day's jaunt over the picturesque B. & O. brought me into the national capital just in time to run into a bucket-shop position. I was arrested in a raid on the place several days later, and when released, tried unsuccessfully to induce the chief operators at the Washington offices of the commercial companies to give me work. Luckily there was racing at Pimlico, over in Maryland, and I secured a temporary place as a sheet writer, taking the place of a fellow who was down on his back with a combination of ailments.

"When I 'lost out' at Pimlico I paid my regular semi-occasional visit to Philadelphia. There I found a market for my loose change, and I've hoofed it all the way up here, this being my third day on the road. I hope to 'hit' Broadway sometime to-morrow."

Boyd was always a hard worker, a good spender and took frequent "rests." His migratory career had broadened his faculties, and he was never at a loss for a quick, sure and easy method of raising funds when he was financially pinched. One of his schemes was to approach an operator acquaintance in front of the telegraph building, greet him cordially, and remark, casually, "By the way, here is that half dollar I owe you." He was careful, of course, to choose some one to whom he was really not indebted. The victim, surprised, would say: "Guess you've made a mistake." Early was merely establishing credit. A day or so later he would "brace" the unsuspecting individual for a loan, and often got it, largely owing to this bluff game.

Arriving in New York, Boyd managed to "catch on" at the Postal. When applying at "253" the manager looked up his previous record.

"Last time you worked here," said that official, "you remained just three weeks; how long are you good for this time?"

Early, unabashed, blandly asserted he "guessed" he was booked for the rest of his natural life.

One fine morning, three months later, I met him lugging a brand new suitcase, going in the direction of the Subway station at the Brooklyn Bridge.

"Hello, Early," I said, "where going?"

"Why, hello, darn you for being so inquisitive, but I'll tell you. That 'bonus game' got on my nerves and I'm just taking a little run up into the country to rest up."

"Whereabouts you bound for?"

"Me for Montreal," Early Boyd replied. "After I work there awhile maybe I can induce the C. P. R. to send me out to Winnipeg or Vancouver. So long!"

The Slide Wire Bridge.

One of the most important things in connection with the study of telegraphy and telephony is a measuring outfit. Not many students are aware of the fact that they can make a very serviceable and accurate measuring instrument themselves at very little cost, provided they have sufficient mechanical ability to undertake the task.

The "slide wire bridge" is a very popular instrument on account of the cheapness and simplicity of its construction, while the accuracy possible to attain with it places it in the laboratories of the most advanced investigators. Its construction is thus described in "Electricity and Magnetism in Telephone Maintenance."

In the simplest form it consists of a scale of any convenient length, A B, often one meter, (whence the name "meter bridge") divided into one hundred or one thousand equal parts, mounted on a board; of a heavy wire or strip of copper, C, parallel to it and two or three inches away; of two short similar wires or strips, D E, placed across the ends of the scale leaving an opening of convenient size between their ends and the ends of the longer strip; and of a bare German silver or platinoid wire, F, as small as possible without sacrificing the necessary mechanical strength, stretched over the scale and connected by clamps or by soldering to the short copper strips, exactly at the ends of the scale. The last point is important, because if the connection is made, for example, one-eighth inch beyond the end of the scale a serious error will be introduced when taking readings near one end of the scale. Suitable binding posts are mounted on the copper strips for making the necessary connections.

A resistance of any known value, R, is connected across the left-hand opening, and X, or the unknown, across the right hand. The battery is connected across the two short strips, one side of a head telephone, G, is connected to the long strip and the other ends in a tip which is touched to the slide wire at different points until a balance is obtained as shown by the absence of a click. Applying the skeleton, A, is the portion of the slide wire between the tip of the receiver cord and the left-hand end of the scale, B is the portion between it and the right end, R is known resistance, and X the unknown. As an illustration of its use:

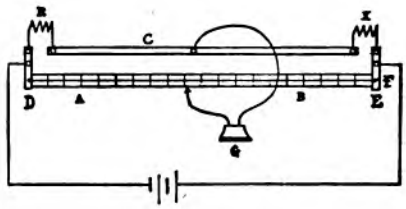

DIAGRAM OF SLIDE WIRE BRIDGE.

Let R = 100 ohms
and A = 450 (scale divisions).
Then B = 1000 — 450 = 550.

Applying the usual formula

$$X = 100 \text{ times } \frac{550}{450} = 122.2 \text{ ohms.}$$

New Edition Phillips' Code.

The new edition of Phillips' Code is being rapidly sold, and it is evident that there was a need for an up-to-date revision. Mr. E. E. Bruckner, who revised the book, did his work so well that there is no fault to find. His work was based on a definite, systematic plan, and when the rules of abbreviating are once understood the meaning of the various symbols in most cases suggests itself. An idea of the systematic arrangement of the words may be had from two or three examples. For instance, the word "contempt" is represented by "ctm," "attempt" by "atm," "cvk" represents "convoke" and "pvk," "provoke." There are about 700 additions to the revised list, which fully meets the need of present-day press service. Every progressive telegrapher should have a copy. Price, $1.00.

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This is one reason why the demand for Edison Primary Cells is increasing in telephone plants of the better class, low and uniform internal resistance being a characteristic of the Edison Battery in which it outclasses all other primary cells.

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THE RAILROAD.

MR. W. F. WILLIAMS, superintendent of telegraph, Seaboard Air Line, Norfolk, Va., was a recent New York visitor. Mr. Williams was accompanied by his wife.

MR. B. F. THOMPSON, telephone inspector, Baltimore and Ohio Railroad, Baltimore, Md., was in New York a few days ago.

DR. F. H. MILLENER, experimental engineer for the Union Pacific Railroad Company, Omaha, Neb., announces that a complete system of wireless telephone communication will soon be installed upon that road and on its overland trains.

RAILWAY SIGNAL ASSOCIATION.—The annual meeting of the Railway Signal Association will take place at Bluff Point, N. Y., September 22, 23 and 24. Many important papers will be read and discussed, and there will be a large attendance, over four hundred members and guests having already been registered at the hotel. Mr. C. C. Rosenberg, Bethlehem, Pa., is secretary.

TELEGRAPH TOLL DIRECTORY.—Mr. A. J. Ewing, superintendent of telegraph at the Union Station, in Wichita, Kan., has compiled a directory for use in the station, giving telegraph tolls. The purpose of this innovation is to encourage greater use of the telegraph, it being held that many people do not telegraph because they think that telegrams cost too much. With a directory to consult, such possible patrons can see at a glance what the cost will be. The idea is apparently a very good one.

Every Man Determines His Own Salary.

The man who accepts twenty or thirty dollars a week for his work is in an entirely different class from the man who demands twenty or thirty thousand dollars a year. The latter has much wider knowledge and experience than the former, or he could not demand such a salary.

The low-priced man determines his own salary indirectly by submitting to an arbitrary appraisal of his worth, but the high-priced man determines his directly by appraising his own worth and demanding its full equivalent from those who employ him. He has worked hard in the past and has acquired knowledge and experience, and is thus able to do this. The man who does not exert himself to improve his condition in the world, through learning and experience, stands in his own light and cannot avoid letting others determine his salary. He cannot, with reason, expect to receive more than he is worth.

It should be the purpose of every employe of the telegraph and the telephone to place himself in a position where he can command a larger salary than he is receiving, and the only way to do this is to make himself worth all he asks. This, of course, can only be done by study of books and of the technical journals pertaining to these subjects, combined with perseverance and enthusiasm in the work. Knowledge and experience constitute the foundation of success.

THE BLESSINGS OF DEAFNESS.—Mr. Thomas A. Edison says his deafness has been a great advantage to him in many ways. "When in a telegraph office," he says, "I could only hear the instrument directly on the table at which I sat, and, unlike the other operators, I was not bothered by the other instruments. Again, in experimenting on the telephone, I had to improve the transmitter so I could hear it. It was the same with the phonograph. The great defect of that instrument was the rendering of the overtones in music and the hissing consonants in speech. Again, my nerves have been preserved intact. Broadway is as quiet to me as a country village is to a person with normal hearing."

SAN FRANCISCO TOURNAMENT.—Preparations for the holding of a telegraph tournament in San Francisco during the Panama-Pacific Exposition next year are now taking shape, and the promoters are actively engaged in the work. It is likely that all sections of the country will be well represented, and there is decided promise that the tournament will be one of the largest and most successful ever held. Mr. E. Cox, chief operator for the Postal Telegraph-Cable Company, San Francisco, Cal., is chairman of the committee having the contest in charge. The organization is named the Panama-Pacific International Telegraphers' Tournament Association.

Telegraphers of Today.

An excellent opportunity is offered to telegraph people in general to become acquainted with over 600 prominent telegraph officials and others identified with the telegraph, the railroad, the submarine cable and press associations of the past generation, through their portraits and sketches of their careers as published in "Telegraphers of Today."

This work was issued in 1894 and includes photographic engravings and biographical sketches of all the individuals connected with the interests mentioned at that period, many of whom have passed away from their earthly labors. The younger generation, however, will find much of interest in looking upon their portraits and reading of their achievements in life. Many of them are still alive and in harness in the telegraph and other fields of activity.

Mr. J. J. Ghegan, president of J. H. Bunnell & Co., New York, who recently received a copy, expresses his appreciation of the work as follows: "Copy of 'Telegraphers of Today' received. I casually saw a copy of the book when first published, but never had I an idea that it was so beautiful, interesting and historically accurate. It should be of great interest to telegraphers with any sentiment in their make-up. It is magnificent, unique, and I truly pity those of the fraternity who fail to secure a copy before the edition is exhausted. Kindly send me five additional copies. I can use them to good advantage."

This book, which is 11½ x 14 inches in size, was originally published at $5 per copy, but in order to close out the remaining copies we offer them at $1 per copy by express, charges collect.

Address orders to J. B. Taltavall, Publisher, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MUNICIPAL ELECTRICIANS.

FIRE ALARM BOX SYSTEM IN LONDON.—The telephone is being used with success in London suburbs in connection with the fire alarm box system. In case of fire the glass in the fire alarm box is broken. Instead of depressing a hook or pushing a button a telephone receiver is lifted. Speaking directly into a little box above the shattered glass, headquarters are informed of the fire's location. These sidewalk box telephones are also used for calling ambulance stations.

Convention of Municipal Electricians.

The nineteenth annual convention of the International Association of Municipal Electricians met at Atlantic City, N. J., on September 15, and will continue, through the three following days, September 16, 17 and 18. Some important papers are down on the programme, and these will be of much interest to the municipal electricians and others interested in electrical affairs.

Mr. Frank Skinner, city electrician, Atlantic City, is looking after the exhibits, of which there was promise of an interesting display.

Mr. J. W. Kelly, jr., chief of electrical bureau, Camden, N. J., is president of the association, and Mr. Clarence R. George, city electrician, Houston, Tex., is secretary.

OBITUARY.

JAMES EDWARDS FINLEY MORSE, aged ninety years, son of Professor S. F. B. Morse, inventor of the telegraph, died in New York on September 8.

T. E. HUGHES, aged sixty-four years, manager of the southeastern sales department of the Standard Underground Cable Company, Pittsburgh, Pa., and a former telegrapher, died in Atlantic City, N. J., August 27.

GEN. C. T. HOTCHKISS, aged eighty-two years, a wealthy citizen of Chicago, Ill., and said to have built and operated the first telegraph line from Chicago to Milwaukee, died in Chicago, August 28. He amassed a large fortune during the world's fair, but died almost penniless.

J. F. PADDOCK, aged fifty-one years, a well-known telegrapher of New York, died at his home in Woodhaven, L. I., September 6. He was employed at different times by the Great North Western Telegraph Company, the Rome, Watertown and Ogdensburg Railroad, and the Western Union Company in Syracuse and New York.

LINES DAMAGED BY STORM.—A heavy storm, followed by a flood, did much damage to telegraph and telephone lines in Kansas City, Mo., September 7.

NEW YORK ELECTRICAL EXPOSITION.—The Electrical Show Company, New York, will hold its annual Electrical Exposition and Motor Show at the Grand Central Palace, New York, from October 7 to October 17. Mr. George F. Parker, 124 West 42d street, New York, is the general manager.

POLES.—The Western Electric Company has just issued an interesting and artistically designed pamphlet, entitled "Western Electric Poles." It tells the story of pole production and shows many views illustrating the work. In addition, pole specifications and other useful data are given.

Mr. M. W. Jones, Guayaquil and Quito Railway Company, Guayaquil, Ecuador, and a former New York telegrapher, writes: "In this far-away land I cannot get along without the AGE."

Books Recommended by Us.

We are frequently asked to recommend good books for telegraphers, telephonists and beginners, as well as radio men. The best books on the telegraph are Maver's American Telegraphy and Encyclopedia of the Telegraph, price $5.00; McNicol's American Telegraph Practice, price $4.00; Thom and Jones Telegraphic Connections, price $1.50; Pope's Modern Practice of the Electric Telegraph, price $1.50; Schneider's Electrical Instruments and Testing, price $1.15. These books will form the basis of an excellent telegraph library.

Books on the telephone are Cummings' Electricity and Magnetism in Telephone Maintenance, price $1.50; McMeen and Miller's Telephony, price $4.00; Van Deventer's Telephonology, price $4.00.

Books for beginners: Meyer's Twentieth Century Manual of Railway and Commercial Telegraphy, price $1.00; Meyer's Railway Station Service, price $1.25; Dodge's Telegraph Instructor, price $1.00; Abernethy's Modern Service of Commercial and Railway Telegraphy, in Theory and Practice, price $2.00.

Excellent books on wireless: Bishop's Wireless Operators' Pocketbook of Information and Diagrams, price $1.00; Collins' Manual of Wireless Telegraphy, price $1.50; Lieutenant-Commander S. S. Robison's Manual of Wireless Telegraphy for the Use of Naval Electricians, price $1.75; Hawkhead's Handbook of Technical Instruction for Wireless Telegraphists, price $1.50. Any of these books will be promptly shipped on receipt of price.

Make remittances to TELEGRAPH AND TELEPHONE AGE, John B. Taltavall, Publisher, 253 Broadway, New York.

Concrete Poles in Toronto, Ont.

Twenty-five thousand concrete poles, designed by Mr. J. G. Jackson, were installed in connection with the municipal street lighting and general light and power distribution system of the Toronto, Ont., Hydro-Electric System in that city during 1910, 1911 and 1912.

Mr. Jackson, in an article in the *Electrical World*, describes the construction, tests and costs of these poles.

In their design and construction an effort was made to eliminate unnecessary details and to render the manufacture as simple as possible, in order that poles might be turned out rapidly and at low cost. A pole of solid square cross-section, with beveled edges, was adopted. The square section not only made possible a simple form of mold, but, as the strains to which a pole is subjected are, ordinarily, either normal to or in the direction of the line, this is obviously the most efficient arrangement of the material, especially with the longitudinal reinforcement grouped at the four corners, as fifty per cent of these members are then equally effective in tension in any direction normal to a face of the pole.

The earlier poles of the Toronto installation were provided with three galvanized-steel cross-arms, cast in the pole, and having a hole at each end for a steel core pin. This arrangement of cross-arms was not found sufficiently flexible in obtaining clearances of the lines and was later discarded. Holes were provided through the pole, with a slot on either face, so that brackets of any desired length could be bolted to the pole.

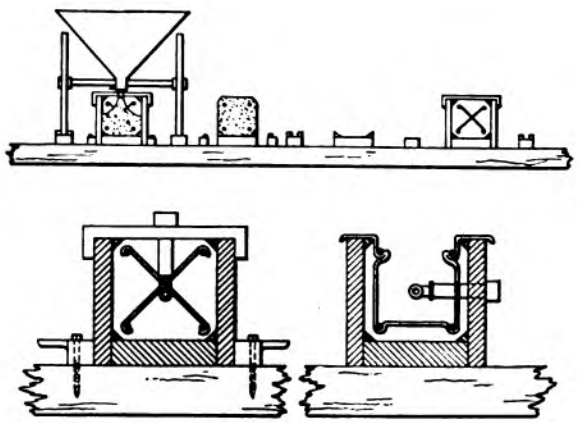
The concrete poles employed in this installation ranged from twenty-four feet to thirty-five feet in length, the majority being twenty-four feet long. Standard poles were made with eight-inch by eight-inch base and five-inch by five-inch top for twenty-four-foot poles, with nine-inch by nine-inch base and six-inch by six-inch top for thirty-foot poles, and with ten-inch by ten-inch base and six-inch by six and a half-inch top for thirty-five-foot poles. The longitudinal reinforcement consisted of four deformed or square-twisted steel bars of high elastic limit, set at the corners of the pole and one-half inch from the surface. Three-eighth-inch bars were used in the twenty-four-foot poles and one-half-inch bars in the longer poles.

Extra reinforcement, consisting of additional bars extending part way up the pole, was provided where poles were expected to be subjected to considerable strain. The cross-sections of the poles were determined with regard to the resulting appearance, as well as from considerations of strength and cost.

Poles at ends of lines or at corners were, ordinarily, well guyed. Insufficient guying at occasional points, however, resulted in considerable deflections of the poles concerned, with consequent easing up of strains; but in comparatively few cases did breakage of poles result.

A number of poles twenty-four feet long, with seven-inch by seven-inch base and four-inch by four-inch top, provided with four one-fourth-inch plain square reinforcing bars were experimented with when determining the sizes of the poles to be employed. These poles were found, at thirty days or thereabouts, to be incapable of withstanding the handling and transportation. It is of interest to note that in tests made on poles thirty days old, with plain square-bar reinforcement, failure resulted from slipping of the reinforcement in the case of three-eighths-inch and one-half-inch bars. One-fourth-inch square bars broke without appreciable slipping.

The plant employed in the manufacture of these poles consisted, in the main, of parallel horizontal forms, arranged in rows, with a runway at one end of the forms for the delivery of concrete, together with concrete mixer and special wagons for placing the concrete in the poles. All forms were constructed of finished Southern pine, as more satisfactory results were obtained with this wood than with the less dense and resinous Northern variety. Bases of forms were spaced two feet apart,



METHOD OF CONSTRUCTING CONCRETE POLES.

with wooden rails between, one pair of sides being provided for each three bases. A very wet mixture of concrete, in the proportions of one part cement to two parts of sharp sand and four parts of crushed limestone of less than one-half-inch size was used. The quality of sand used was found to have an appreciable effect on the characteristics of the pole, a sharp sand, as would be expected, tending to produce the more elastic concrete. Gravel, instead of crushed stone, was found to give satisfactory results.

A number of mixtures less rich in cement were tried, but were found to give a pole somewhat inferior in strength at ages up to thirty days covered by the period of test. The surface, also, was not so good as with the richer mixture. The 1:2:4 mixture employed gave an excess of cement and sand beyond that required to fill the voids in the stone. The method of placing the liquid concrete by pouring from a spout in the bottom of the concrete wagon resulted in the almost complete elimination of air bubbles, without special spading or working of the concrete for this purpose after placing in the forms. A small amount of troweling was necessary for the finishing of the upper sur-

face, however. The poles made in this way, when set, presented smooth white cement surfaces, showing the grain of the wood on three faces. The hand-finished upper surface was dressed by means of carborundum brick after removal from the form.

In casting the poles, sides were set up and forms poured on every third base during the first day. On the following day the side walls were removed from the first poles and advanced to the second base, and the operation was repeated. On the fourth day the first poles cast were removed from the forms and the cycle of operations was started again. The removal of poles from the forms was accomplished by sliding the pole endwise from the form in stages a distance slightly greater than its length every third day, until sufficiently set for handling.

In the first stage, in order to prevent overstraining of the green poles, an extension of the base, consisting of a two-inch plank slightly wider than and equal in length to the pole was provided. The withdrawal was accomplished by gripping the base of the pole by means of a particularly robust pair of ice tongs made for the purpose, the tractive effort being supplied by a horse attached to a rope on the tongs. Poles were commonly loaded on the outgoing wagons, or piled for storage after the third stage, at approximately ten days after casting.

Vertical reinforcement was placed by laying it in the form on wire hangers suitably spaced and with open hooked portions to carry the reinforcing bars. The lateral reinforcement intended to take up the vertical shear and to prevent failure by buckling consisted of a series of short bars, with hooked ends dropped diagonally across the longitudinal members at intervals and for a distance above and below the ground line proportioned to the strain to be provided for. No effort was made to bind the longitudinal reinforcement in a cage by means of the suspension wires, or together by means of the cross-reinforcing bars, except by hooking together, as noted, and depending on the setting of the concrete to complete the bond and lock the reinforcement in place.

This method of reinforcement resulted in a minimum cost both for labor and for material. Repeated inspection of poles cast in this way and afterward broken on test, or otherwise, proved the method of setting the reinforcement to be sufficiently accurate and the lateral reinforcement to be capable of developing the full strength of the longitudinal steel. It is ordinarily desirable, however, that the lateral reinforcement be such that the pole will fail by crushing of the concrete rather than by breaking of the bars in tension, as in the former case a very considerable force will yet be required to bring the pole to the ground, which would seem to be an advantage, in view of the weight of the pole, although the wiring carried would ordinarily prevent the falling of an overstrained pole.

Delivery of poles to erection gangs was carried out by means of ordinary wagons upon which oak frames were set to provide several points of support for the poles—a load consisting of six twenty-four-foot poles weighing 1,100 pounds, and four thirty-foot poles weighing approximately 1,600 pounds. Poles were lifted onto the wagons by a loading gang without special equiment, and were lowered to the ground on skids.

Ordinary labor was employed in the erection under the direction of line foremen. While three poles erected per day per man was accomplished under favorable circumstances, the average was slightly less than this. Raising pikes with a forked end were used, and poles were lifted and dropped into the holes in the same manner and with the same care as in the case of wooden poles. Twenty-four-foot poles were set four feet in the ground and thirty-foot poles five feet. The holes were refilled with the excavated earth, no concrete bases being employed. The small sizes of the bases, as compared with wooden poles, resulted in a smaller cost for digging holes, as a minimum diameter was excavated. While the cartage of concrete poles was comparatively expensive as a result of the weight, the cost of handling and erection was approximately the same as for wooden poles, with a possible advantage in this instance for the concrete pole as a result of the larger number erected and the fact that ordinary labor was employed for this purpose.

Notwithstanding the fact that no special precautions other than ordinary cares were taken in handling the poles, the total breakage on approximately 25,000 over a period of about three years, covering manufacture, erection and operation, was less than two per cent. Failure while in service during this period was a small fraction of one per cent per year, and resulted mainly from collisions with heavy vehicles and obvious overstraining. While several thousand of these poles have been in service during three winters, carrying from three to six lines, ranging from No. 6 to No. 2 and larger, in addition to frequent services to buildings, they appear, except in a number of cases where overstraining is apparent, to be in as good condition as when erected, and inspection of the concrete indicates the improvement which would be expected with age. With the exception of a number of poles which were frozen before the setting of the concrete, no deterioration of the concrete appears to have developed, and examination of the reinforcement poles broken gives evidence of the preservation of the steel.

The costs of the concrete poles under the several conditions described were variable, but for a considerable part of the work approximated $4.97 for twenty-four-foot poles and $7.70 for thirty-foot poles.

It is apparent, of course, that in a comparison of costs of wooden and concrete poles the labor required in preparing the wooden poles and also the painting should be considered as a part of the cost as the concrete pole is produced as a finished article. While concrete poles can compete, even in first cost, with wooden poles in many cases, and present decided advantages where appearance is a factor, it is not probable that satisfactory or economical results will be had from the occasional manufacture of poles by inexperienced persons.

Old Time Telegraphers' and Historical Association.

QUALIFICATION FOR MEMBERSHIP.

"Any person in good standing, who, prior to twenty-five years before the date of making application, was employed in the telegraph service, and thereafter for five years, shall, upon payment of $2.00 (an initiation fee of $1.00 and $1.00 dues) be eligible to membership."

It is earnestly hoped that all those who are eligible to membership will write for application blanks, and thus become affiliated with one of the most excellent associations in the United States.

Blanks can be obtained upon application through Mr. J. B. Taltavall, Committee on Membership, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

SERIAL BUILDING LOAN AND SAVINGS INSTITUTION.—At a meeting of the shareholders of the Serial Building Loan and Savings Institution, New York, on August 31, the by-laws were amended by a unanimous vote, authorizing the board of directors to subscribe for and purchase shares in the Land Bank of the State of New York.

TYPEWRITERS FOR OPERATORS.—Operators who desire typewriters will receive better attention by dealing with an agent who knows their practical wants in the shape of a writing machine. Mr. D. A. Mahoney, who represents the Central Typewriter Exchange, 203 Broadway, New York, being an operator himself, knows exactly what operators need in the way of machines, and has made these requirements a careful study for twenty years. He has sold rebuilt typewriters of all the standard makes to operators all over the country, and has made a success of the business and a great many friends. Mr. Mahoney gives his personal attention to orders from operators, and they are assured that their interests will be well taken care of.

LETTERS FROM OUR AGENTS.

CHICAGO WESTERN UNION.

Mrs. Margaret L. Walker, widow of J. D. Walker, and formerly an operator with the Western Union Company in this city, died on August 13.

PHILADELPHIA POSTAL.

Among the recent visitors at this office were Mr. J. F. Skirrow, associate electrical engineer, and Messrs. J. P. O'Donoghue and A. J. Eaves, of the engineer's staff, New York.

Mr. C. S. Almes, assistant wire chief, was married Sunday, September 6, to Miss Nettie Wallenstein, formerly of this office. A beautiful present, conveying best wishes, was sent by the office staff.

The athletic association has organized a basketball team. Mr. Krewson has been chosen captain.

ST. LOUIS WESTERN UNION.

The Western Union Electrical Society met in Central Public Library, Wednesday evening, September 2. The meeting was called to order by President Alger, and after disposing of routine business, introduced Mr. Roger N. Baldwin, secretary of the Civic League of St. Louis, who entertained the large audience in attendance. Mr. Baldwin spoke at some length upon the subject of city government and explained in an able and instructive manner the workings of the initiative and referendum. He also touched upon the adoption of the new charter for the city of St. Louis. At the conclusion of his talk, and upon motion of Mr. McNeill, a vote of thanks was tendered Mr. Baldwin for his instructive talk, after which the meeting adjourned.

Mr. John Mullen, brother of F. P. Mullen, assistant chief operator, died at the local hospital on September 4.

Messrs. A. E. Van Tyne and G. A. Littell are enjoying a short rest.

Telegraph and Telephone Age

No. 19. NEW YORK, OCTOBER 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Rectifiers for Telegraph and Telephone Work.

In many cities and towns where there is a supply of electricity for street lighting and power service the telegraph companies utilize this supply for the operation of their instruments, thus dispensing with the annoyances attending the use of chemical batteries.

There are two kinds of current supplied by electric light and power companies—direct current and alternating current. Frequently both need transforming for telegraphic uses, that is, they must be changed to the proper value, because, as originally generated, they are too powerful, or not powerful enough. The usual method of transforming direct current for telegraphic purposes is by means of a motor-generator. This is really two machines coupled together on one base, one being a motor and the other a generator. The motor part is driven by the electric light or power current, and in turn drives the armature of the generator half, which is so wound as to produce a current of proper value for telegraph work.

For telegraphic purposes an alternating current, which is the character of the supply in many places, must be changed to direct current. This may be done by a motor-generator, as in the transformation of direct current, but in this case the motor part is an alternating current motor. The latter drives the direct-current generator as before. Where alternating currents are involved, however, telegraph companies sometimes transform them into direct currents by the use of a device called a rectifier. Rectifiers are used principally for charging storage batteries, from which the telegraph supply is derived.

There are two types of rectifiers, the chemical and the mercury arc. Chemical rectifiers are used for the purpose of converting alternating current into a direct current where the current demand is small and it would not be economical to install storage battery and mercury arc rectifiers or motor-generator sets. They are used for operating tickers and for synchronizing time service clocks. One or two ticker circuits, or one to six clock circuits can be operated from one rectifier.

A chemical rectifier consists of a suitable earthenware jar containing two aluminum electrodes, called "anodes," one lead or iron electrode, called the cathode, and a chemical solution, called the electrolyte. The two anodes, which are of aluminum, are connected to the outside legs of a transformer secondary, the cathode to one side of the load and a tap from the middle point of the transformer secondary connects to the other side of the load.

The action in the rectifier cells is similar to that of a check valve. After the alternating current is turned on for a short period chemical action is set up in the electrolyte, which allows the current from either aluminum electrode to flow to the lead or iron electrode, but not from the lead or iron to aluminum, therefore the flow of the current in the external circuit is always in the same direction.

Transformers furnished with rectifiers of this type have two or more secondary windings so that various voltages may be obtained. The maximum voltage of a rectifier of this type varies from fifty to fifty-five volts per jar, when the alternating-current voltage of the primary circuit is from 110 to 115 volts.

Mercury arc rectifiers are used for charging storage battery at stations where the source of primary power is alternating current and the charging load such that they would be more economical to operate than motor-generators. Rectifiers cannot be operated on mains subject to great voltage variation.

Mercury arc rectifiers are used for the purpose of converting alternating current into direct current. They consist of an exhausted glass vessel in which are two graphite electrodes, called anodes, and a quantity of mercury, called the cathode, the latter making contact with a suitable terminal. The two anodes are connected to the alternating-current supply and to the negative side of the load by a tap taken off the middle point of a reactance shunted or bridged across their terminals. The cathode, or mercury terminal, is connected to the positive side of the load.

The action within the rectifier is similar to that of a check valve. Once an arc is formed and maintained within the tube, the action is to allow the

current from either graphite electrode to flow to the mercury and out to the load, but not from the mercury to the graphite electrodes, therefore the flow of current in the external circuit is always in the same direction.

Stock Exchange Business.

The New York Stock Exchange was closed on July 30. On August 12 the special committee appointed to handle the affairs of the Stock Exchange ruled that stocks could be bought and sold through the clearing house of the Stock Exchange at prices not less than the last prices of July 30. Trading through the Exchange clearing house has been done under this restriction. The minimum prices for telegraph and cable stocks now permitted are as follows:

American Tel. & Tel.	114
Mackay Companies	59¾
Western Union Telegraph	52⅜

Telegraph and Telephone Patents.

ISSUED SEPTEMBER 1.

1,109,111. Telephone System. To O. Coleman, Wawanesa, Manitoba, Canada.

1,109,163 and 1,109,164. Telephone Exchange System. To E. R. Corwin, Chicago, Ill.

1,109,165. Telephone Exchange System. To M. L. Johnson, Chicago, Ill.

1,109,166 and 1,109,167. Telephony. To M. L. Johnson, Chicago, Ill.

1,109,216. Automatic Telephone Exchange System. To G. Grabe, Berlin, Germany.

1,109,310. Telegraph Key. To B. B. Youmans, College Park, Ga.

1,109,411. Telegraph Transmitter. To R. F. Gale, Fort Wayne, Ind.

1,109,472. Telephonic and Telegraphic Apparatus. To J. Schiessler, Vienna, Austria.

1,109,616. Electrical Signaling System for Telephone Exchange. To E. E. Clement, Washington, D. C.

1,109,511, 1,109,615, 1,109,617 and 1,109,619. Telephone Exchange System. To E. E. Clement, Washington, D. C.

1,109,618 and 1,109,620. Telephone Exchange. To E. E. Clement, Washington, D. C.

1,109,621. Telephone Apparatus. To E. E. Clement, Washington, D. C.

1,109,622. Telephone Apparatus and System. To E. E. Clement, Washington, D. C.

1,109,650. Telephone Exchange System. To T. G. Martin, Chicago, Ill.

ISSUED SEPTEMBER 8.

1,109,686. Telephone Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,109,703. Telephone Exchange System. To F. N. Reeves, New York.

1,109,818. Telegraph Key. To R. L. Boulter, Los Angeles, Cal.

1,109,830. Quadruplex Telegraph System. To J. Gott, Hove, Brighton, Eng.

1,109,909. Wireless Oscillator. To H. P. Dwyer, San Francisco, Cal.

1,109,960. Automatic Telephone-Testing System. To W. L. Campbell, Chicago, Ill.

1,110,027. Telephone Switching System. To W. Aitken, Liverpool, Eng.

1,110,228. Telephone Receiver. To A. Plecher, Las Animas, Col.

PERSONAL.

MR. ANDREW CARNEGIE, who has just been elected president of the Old Time Telegraphers and Historical Association, accompanied by his wife and daughter, arrived in New York on the steamer "Mauretania" from England on September 25.

THE ELDEST SON of Mr. R. D. Blumenfeld, proprietor of the *Express*, London, England, and an old time American telegrapher, is first lieutenant in the Essex regiment, fourth division, which has played such a prominent part in repelling the German invaders on the French frontier.

J. KJENNERUD, manager of government telegraphs, Stavanger, Norway, and a well-known telegraph and telephone engineer, died on July 2. Mr. Kjennerud was well posted on American developments in telegraph and telephone apparatus, having been an admirer and subscriber of this publication for many years, also a contributor to its columns.

MR. GISLI J. OLAFSSON, manager of telegraphs and telephones in Iceland, is in New York on a short visit. There are about 1,300 telephones in Iceland. The government owns and operates both the telephone and telegraph, he says. In Reykjavik, the capital, the charge to the subscriber is forty-eight kroners—about $11.52—a year for local service. The Norwegian combination of receiver and transmitter are used.

MRS. N. T. COLLETTE, accompanied by her daughter Lucille, arrived from France on the steamer "La Touraine" on September 15, after an exciting experience in the war zone. Mrs. Collette is the wife of Mr. N. T. Collettee, of Seattle, Wash., a well-known old-time telegrapher. Mrs. Collette has been on the continent of Europe for some time past with her daughter, who is an accomplished violinist and pianist, and who was filling professional engagements in the larger cities of Europe. Although only twenty years of age Lucille has already earned an international reputation as a clever artist. She has been engaged by New York opera companies to remain in this city during the coming musical season.

MR. FIDEL VILLACORTA and Mr. Victor M. Escobar, of the government telegraph and telephone service, San Salvador, who have been in the United States for the past fourteen months making the telegraph and telephone a study, will return to San Salvador, El Salvador, early in October. Mr. Villacorta and Mr. Escobar, while in this country, have made many warm friends for themselves and their government. During a few months of their stay in this country they were located at Hawthorne, Ill., where they took an active part in the construction

and installation of telephone apparatus. Messrs. Villacorta and Escobar's numerous friends in the States wish them abundant success in the governmental service in their native country.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. CLARENCE H. MACKAY, president, and his three children, arrived from England on the steamer "Olympic" on September 23.

MR. CLARENCE H. MACKAY, president, has cooperated in the "Buy-a-bale" movement by purchasing twenty bales of cotton in the South.

MR. C. C. ADAMS, vice-president, who is absent on his vacation, has entered a golf tournament, hoping to become club champion.

MR. W. I. CAPEN, vice-president, has returned from a business trip to Colorado and the Pacific Coast.

COL. A. B. CHANDLER, former president of this company, now residing in Randolph, Vt., spent a few days in New York last week.

MR. T. C. LECKEY, Portsmouth, N. H., has been appointed manager of the Postal Telegraph-Cable Company's office at that place, to succeed the former manager, Mr. F. A. Brennan.

MR. H. R. WATERBURY, chief clerk to Mr. G. W. Ribble, superintendent, Atlanta, Ga., was recently in New York on his annual vacation and made it the occasion to call on numerous friends. Mr. Waterbury is a native of Connecticut, where his father and mother still reside.

MR. M. A. McCONNELL, of the general manager's office, is resting in the Adirondacks.

MISS B. M. ATKINS, manager of the Fitchburg, Mass., office of this company, was recently married to Mr. W. H. Green, of that city.

MISS A. T. HANSEN, of the auditing department of this company, died recently while on her vacation.

MANAGERS APPOINTED.—Managers have been appointed as follows: C. C. Kile, Sweetwater, Tenn.; Russell Perry, Wilson, N. C.; L. H. Matthews, Connellsville, Pa.; W. F. Meador, Thomasville, N. C.

FIRE IN SYRACUSE OFFICE.—On Sunday morning, September 20, a fire broke out in the building occupied by this company's office at Syracuse, N. Y., in one of the upper rooms. Owing to the inflammable nature of the stock kept therein, the prospect for a serious blaze was very good at first, but the fire department succeeded in putting out the fire. The company's greatest damage was from water.

RED WING, MINN., OFFICE.—We are in receipt of a postal card containing a photograph of the Red Wing, Minn., office of the North American Telegraph Company. It shows an up-to-date office and equipment.

Reducing Total Costs by Paying Operators Higher Salaries.*

BY KENDALL BANNING.

When John Jones, a telegraph operator, employed by the Postal Telegraph-Cable Company, decides to leave the New York office, he goes to John J. Whalen for a letter of recommendation. Mr. Whalen does not give him a friendly pat on the back and write a conventional but non-committal letter that tells the reader that the bearer is a nice, honest fellow and a good worker. Not at all! Mr. Whalen pulls open a card file, extracts John Jones' record and puts it into specific terms as follows:

"Any concern needing a competent and careful telegrapher will be glad to get your services when they see your record as follows:

"For the year 1913, you had three direct and implicated error cases; handled 67,040 messages—one error to each 22,346 messages; worked 2,140 hours and your average number of messages per hour was 31.

"For the first three months of 1914 you have no errors or irregularities against your record. You handled 18,062 messages, worked 625 hours and averaged 28 messages per hour on our private branch (brokers and bankers) wires, which is an excellent record."

Mr. Whalen is the boss of the 500 telegraph operators in the main office of the company. He left his home town in New Jersey when he was a youngster, got a job as messenger boy for the Western Union, and during his off hours he picked up telegraphy. At sixteen he became an operator at $45 a month. At twenty he entered the employ of the Western Union's rival, the Postal Telegraph. That was twenty-one years ago. During that time, Mr. Whalen has carved a unique place for himself in telegraph circles, not only because his big, fatherly and informal personality has done much to build up and hold together the organization of which he is head, but also because he has originated and established some original methods of handling the employes that has within the past seven years increased their earnings over thirty per cent and their output thirty-four per cent. And he has made those figures not merely a personal estimate but a matter of record.

"I used to spend considerable of my time discussing wages and work with the operators," he explained. "But I don't have to do that any more. Each operator's value is determined by this record"—and he tapped the file before him on the desk. "Changes in salary are recommended on a basis of these records; promotions also are made from them. An operator's value is not what I or anyone else guesses it is, but what these cards prove to him it is."

Long ago Mr. Whalen found out that the best incentive to rapid and accurate work was money. To pay an operator proportionate to his abilities was the key to better service. The only obstacle to this

*From *System*.

plan was the lack of a system for recording each individual's work. This is the problem that Mr. Whalen tackled first. He began by keeping a written record of the work each operator was doing, for the purpose of finding out what each operator's services cost the company. In other words, he started to find out the actual costs of production for the telegraph company. He was not as much concerned in what salary was paid to the operator as he was in what the operator's work cost the company.

From these records a daily "stint" was established, or minimum volume of work—a scheme that has been in operation for fifteen years, and which in itself is not new. But the system of records on which the scheme is maintained is Mr. Whalen's. In order to hold his wire, each operator must now do this prescribed task each day. Naturally, the "stint" varied on each of the twenty-nine different circuits. On the New York-Boston circuit, for example, the "stint" is 300 messages a day; on the New York-Chicago circuit, the "stint" is 280 messages. The messages average thirty words each. For each message in excess of this stint the operator gets one cent bonus.

Seven years ago the earnings of the average male operator were $68.77 a month and of the average woman operator, $44.92 a month.

To-day, the average monthly earnings of the male operator are $91.65 and of the woman operator, $50.00.

Yet the cost of each message is less.

"It is customary to claim that greater speed tends to inaccurate work," said Mr. Whalen. "But it doesn't. Look at the records." And they proved his point. One high-speed man had only one error chalked against him on 53,900 messages.

Through Mr. Whalen's system, the earnings are exclusively determined by the average costs of messages. To cite a typical case, one operator earned $55.00 a month on an average cost per message of .0107 cent. When his speed increased his salary, by steps, was raised to $75.00 and his cost per message was .0107 cent. Now his salary is $90.00 and his cost per message is .0108 cent, while his average earnings total $130.00 a month, on a trunk line the man's increased efficiency promoted him from a branch line.

The work that Mr. Whalen has done is not new in principle; it has been observed for years in a few of the well-organized and well-systematized factories and stores, as all students of scientific management know. But it is significant because Mr. Whalen has applied it successfully to office workers in a business whose requirements are admittedly "exceptional." He knew human nature well enough to comprehend that the best stimulant to effort touched a man's pocket and his pride in his work, and he used his common sense to work out a system based upon these two fundamental bits of human knowledge. And it won.

[A half-tone engraving accompanies the article and shows Mr. Whalen explaining his plan to three interested men.—EDITOR.]

Leased Wire Investigation.*

The Interstate Commerce Commission is investigating the subject of leased wires, with a view to stopping certain alleged abuses. The commission took testimony in New York on July 1 and 2, and in Chicago on July 9, 10 and 11. Still further testimony is to be taken by the commission very soon in New York. The testimony already taken shows grave abuses, and has brought to light certain facts which the telegraph companies have suspected but have been unable to detect or act upon. We are referring to wires leased to brokers.

The American Telephone and Telegraph Company on May 31, 1914, had a leased wire system which brought in an income of $2,909,448.60 annually, according to statements filed with the commission. Of this amount $317,265 was from wires leased to brokers; $2,156,423 from wires leased to industrial institutions, and $435,760.60 from wires leased to the press.

The Western Union Telegraph Company on April 30, 1914, had a leased wire system which brought in an income of $1,084,837.66 annually, according to statements filed with the commission. Of this amount $367,555 was from wires leased to brokers; $185,690 from wires leased to industrial institutions, and the balance, $531,592.66, is, apparently, from wires leased to the press, although the report is not complete as to that.

The Postal Telegraph-Cable Company on April 30, 1914, had a leased wire system which brought in an income of $535,449.56 annually, according to statements filed with the commission. Of this amount $264,426.08 was from wires leased to brokers; $35,250 from wires leased to industrial institutions, and $235,773.48 from wires leased to the press.

Since these dates the European war has broken out and the exchanges have been closed. The result is that the brokers have canceled hundreds of thousands of dollars of leased wire contracts. That has materially reduced the figures given so far as brokers are concerned.

[NOTE.—This is followed by extracts from the testimonies of M. C. Rorty (former assistant to the vice-president of the Western Union Telegraph Company); F. D. Giles, special agent of the same company; Hobart Mason, associate engineer in the office of the general superintendent of traffic of the Western Union Company, and C. C. Adams, vice-president Postal Telegraph-Cable Company.—EDITOR.]

OLD TELEGRAPH WIRE.—We have received from Mr. T. F. Sloan, manager of the Western Union office at McConnellsburg, Pa., a six-inch length of the first telegraph wire that connected Pittsburgh with the East, erected along the Philadelphia pike in 1846. It consists of a strand of four iron wires, and is considerably corroded and pitted.

* From *Postal Telegraph*.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

OFFICIAL TRIP OF INSPECTION.—Messrs. Newcomb Carlton, president; Belvidere Brooks, vice-president; John C. Willever, commercial general manager; A. G. Saylor, general manager, Eastern Division; L. McKisick, assistant to the president; G. M. Yorke, general superintendent of plant; W. N. Fashbaugh, general superintendent of traffic; S. B. Haig, division traffic superintendent, and M. C. Allen, division plant superintendent, made a trip of inspection through the Eastern Division last week. The party made stops at Philadelphia, Baltimore, Washington, Pittsburgh, Buffalo, Rochester and Syracuse, returning home on Saturday. The various district officials accompanied the party on the trip. It is likely that offices in other divisions will be inspected in the near future.

MR. S. M. ENGLISH, general manager of the Gulf Division, Dallas, Tex., announces the following appointments in that division: F. C. Cole, district commercial superintendent, first district, Dallas, Tex. [The first district of the Gulf Division will hereafter comprise the States of Texas and Louisiana.] T. P. Cummings, district commercial agent, New Orleans, La.; W. B. Kendall, division cable manager, Dallas, Tex.

MR. T. W. CARROLL, division traffic superintendent, Chicago, Ill., was a recent executive office visitor on company business.

MR. H. E. ROBERTS, formerly purchasing agent for the Western Electric Company, has been appointed supervisor of purchases and supplies and attached to the comptroller's office.

MR. GEORGE H. MESSNER, of the office of the United States manager cable system, New York, has been appointed manager of the cable bureau, and will have charge of detail cable affairs. This is a newly created office.

MR. W. R. CHAPMAN, district commercial superintendent, St. Louis, Mo., announces the following appointments in his district: Mr. J. E. Ikerd, manager at Jefferson City, Mo., succeeding R. J. Volker, retired after a service of twenty-five years as manager of that office.; Mr. W. L. Tucker, manager at Webb City, Mo., vice G. W. Blodgett, transferred to the traffic department at Cleveland, Ohio; A. E. Hamblin, manager at West Plains, Mo., vice W. L. Tucker, transferred to Webb City. Other managers appointed are: Mr. J. C. Roussel, at Charleston, Mo.; Mr. N. A. King, at Kennett, Mo.; Mr. H. T. Rice, at Sikeston, Mo.; Miss L. B. Moersfield, at Aurora, Mo.; Mr. A. H. Simpson, at Boonville, Mo.; Miss Marjorie Allen, at Carrollton, Mo.; Miss M. C. Wilbur, at Clinton, Mo.

OFFICIAL CHANGES.—Mr. J. C. Nelson, in charge of inspections, New York, has been appointed district commercial superintendent at Indianapolis, Ind., vice A. C. Cronkhite, transferred to St. Louis, Mo., as district commercial superintendent, in place of W. R. Chapman, who becomes assistant manager at Minneapolis, Minn. Mr. J. Fitzpatrick, commercial superintendent at Chicago, has been transferred to Detroit, Mich., as chief clerk to District Commercial Superintendent H. J. Kinnucan. Mr. H. W. Brown, division commercial agent at Chicago, succeeds Mr. Fitzpatrick as commercial superintendent.

PRESENTATION TO MR. FITZPATRICK.—On Saturday, August 19, the employes of the Chicago district presented to the retiring superintendent, Mr. John Fitzpatrick, a magnificent victrola, together with a cabinet containing one hundred records, as a token of the respect and esteem in which he was held by the rank and file in Chicago.

MR. A. GOSGROVE has been appointed night chief operator at Shreveport, La.

MR. L. A. OTT, a well-known Dallas, Tex., official, has been appointed manager of the Western Union interests at that point, vice Norman Ringer, who has resigned to accept a position at Los Angeles, Cal. Mr. E. H. Patton, night manager, has been appointed assistant manager of the Dallas office.

PNEUMATIC TUBES.—It is interesting to note that Mr. J. T. Needham, an old time telegrapher, for the past few years identified with a pneumatic tube service, installed the tubes in the new main office of the Western Union Telegraph Company, at 24 Walker street, New York.

SAMPLE OF COTTON.—We have received from Mr. J. D. McLelland, manager of the Western Union Telegraph Company at Houston, Tex., a sample of cotton taken from the first bale purchased under the "Buy-a-bale plan," which was devised by the Houston people to help the Southern cotton grower out of his financial difficulties resulting from the European war.

REGRETS.—A former employe at 195 Broadway read in our publication a month ago that building wreckers were at work razing the old 195 structure. He decided to pay a visit to the old building before it disappeared. He returned home a very sad man. He wrote us as follows: "You people down there do things too quickly for me. On September 14 I visited the spot where old 195 stood for so many years. I did want to see it once more so badly. I found nothing but a hole in the ground."

THE AMERICAN DISTRICT TELEGRAPH COMPANY OF NEW JERSEY is establishing an up-to-date office in the City of Virginia, Minn. It will be operated under the Western Union management. The same interests have brought the Oakland, Cal., district service up to modern requirements. The district plant at that point is giving excellent satisfaction to its patrons. Mr. E. G. Folger is the manager. The watchword of the American District Company seems to be service and efficiency. No expense is spared to bring its equipment in the various cities up to date.

THE DEMOLITION of the old building at 195 Broadway is completed and the workmen are now engaged on the foundation for the new structure. Preparations are being made to work at night time.

J. C. Willever, Commercial General Manager, Western Union Telegraph Company.

Mr. John C. Willever, whose appointment as commercial general manager of the Western Union Telegraph Company, as announced in our issue dated September 16, is a native of New Jersey, having been born at Montana, Warren County, that State, on March 9, 1865.

Early in life Mr. Willever learned to telegraph and was first employed by the Delaware, Lackawanna & Western Railroad Company and the Central Railroad of New Jersey. Seeing better opportunities in the commercial field, he shortly left the railroad service and entered that of the Western Union Telegraph Company, first at Asbury Park,

MR. JOHN C. WILLEVER, COMMERCIAL GENERAL MANAGER.

N. J., and later at New York, where he was employed originally in the then important Broadway branches, and later in the main office at 195 Broadway. While thus employed Mr. Willever acquired a knowledge of stenography, became statistical clerk of the general operating department and eventually was advanced to the position of stenographer in the office of the late General Thomas T. Eckert, then president and general manager of the company. He subsequently became General Eckert's secretary and executive clerk, and occupied substantially the same relation to Colonel R. C. Clowry when the latter succeeded General Eckert as president and general manager of the company. While thus employed he was elected secretary of the company, which office he relinquished to take up the development of the company's growing cable business when the Anglo-American and Direct United States cables were leased. His advancement to his present position followed two years later.

We have sketched Mr. Willever's career with this degree of particularity because it supplies another illustration of the opportunities for advancement which abound in the telegraph business when native intelligence is combined with industry and zeal. Mr. Willever is a hive of human industry, and his long experience in the executive branches of the service eminently fits him for his new duties, which his many friends know he will fill with ability. As an all-round telegraph man Mr. Willever has a wide reputation.

New York Western Union Operating Staff.

It will be interesting to our readers to know the names of those who manage the new operating department of the Western Union Telegraph Company, 24 Walker Street, New York. Following is an official list of the staff:

DAY FORCE: E. T. Burrill, chief operator; T. M. Brennan, chief clerk; J. Morison, chief of force; C. C. Lever, general wire chief; W. E. Stimpson, W. R. Taylor, A. M. Lewis, W. M. Morrissey, E. J. Liston, C. S. Pike, H. J. Dunn, J. T. Laidlaw and J. H. Haworth, assistant chief operators; H. A. Moody, tube chief; A. J. Fitzsimmons, messenger supervisor; J. Piccolo, in charge of newspaper service; L. Smearer, chief dispatcher.

NIGHT FORCE: J. F. McGuire, night chief operator; C. Danforth, chief of force; N. B. Topping, general wire chief; J. C. Robinson, T. A. Nolan, H. P. Wilking, L. Leipman, J. P. Cloléry, F. A. Hoag and C. H. Lawrence, assistant chief operators; D. A. Herman, tube chief; W. S. Jermain, messenger supervisor; D. J. Condon, in charge of newspaper service; J. L. Finneran, chief dispatcher.

LATE NIGHT FORCE: T. J. Tobin, late night chief operator; M. S. Polak, assistant; S. L. Nash, general wire chief.

THE CABLE.

MR. GEORGE G. WARD, vice-president and general manager of the Commercial Cable Company, New York, accompanied by his wife and daughter, Mrs. Hough, arrived from England on the steamer "Adriatic," on September 24.

MR. JOHN GOLDHAMMER, assistant secretary, Commercial Cable Company, New York, arrived from England on the steamer "Adriatic" September 25.

DR. GEORGE G. WARD, JR., and wife returned from Europe on the steamer "Baltic" September 18.

THE PACIFIC CABLE.—According to the London *Electrical Review*, a German cruiser appeared at Fanning Island, flying the French colors, on September 9, took possession of the cable station there and cut off all communication. This interruption was noted in our September 16 issue.

THE CABLE STEAMER "IRIS," of Australia, recently laid a cable connecting Victoria and Bamfield, B. C., for the Pacific Cable Board.

CABLE DIVIDENDS.—The Halifax and Bermudas Cable Company, Ltd., has declared a semi-annual dividend of three per cent, making six per cent for the year. A dividend of three per cent has been declared by the Direct West India Cable Company, Ltd., for the half year, making a total of six per cent for the year.

CABLEGRAMS TO NORWAY.—The Norwegian administration has suspended the use of secret language (code or cipher) in telegrams from or to

Norway. Telegrams must be written exclusively in plain language, English or French, offering an intelligible sense to employes.

SOLDIERS GUARDING CABLE TERMINAL.—At the outbreak of the European war the Commercial Cable Company's office in Weston-Super-Ware, England, was guarded by soldiers. Altogether there were twenty-five on duty. Outside both the office and the kiosk sentries were posted with fixed bayonets. Not only was the cable guarded on shore, but boats containing soldiers patroled in the Channel near the post which marks the spot where the cable enters the sea. The measures taken were of a purely precautionary character and were designed to make impossible any interruption of cable communication between England and foreign countries.

The Universal Telegraph Alphabet.

BY WALTER P. PHILLIPS.

For one who is fond of asking "Why does a sailor always know what time it is?" for the mere satisfaction of replying "Because he has been to sea," it was very stupid to say, in my contribution on the subject of "The Universal Telegraph Alphabet" in your issue of August 16, that the changes we adopted so successfully on the New York and Washington Associated Press wire were figures for the letters and that among the figures appropriated was "2." The changes were in fact as follows:

C—3
L—4
O—5
R—7
Y—8
Z—9

The short &, so called in printing offices, was expressed by the word "and," as it properly should be in all cases and under all circumstances. I ought to have verified the impression I was under, but I made a guess, and, though a Yankee, I went so far wrong that I am ashamed of myself.

Edison "Telescribe."

A demonstration of the "Telescribe," the latest development by Mr. Thomas A. Edison, was made in New York on September 22. The Telescribe is an attachment for the Edison dictating phonograph, which records both sides of a telephone conversation on the wax cylinder. The dictating machine is equipped with a micro-recorder which swivels into place over the wax cylinder, and is wired up with the Telescribe on the user's desk. The Telescribe is practically a complete telephone extension.

A telephone message is telescribed in the following manner: The receiver of the regular desk-telephone is removed from the hook and placed in the socket of the Telescribe. In this way the acoustic connection to the dictating machine is made without danger of criticism from the telephone company, as the instrument is neither mechanically nor electrically connected to its lines. The user then takes up a small receiver, which is part of the Telescribe, and gives his call to the exchange, while starting and stopping the dictating machine by means of two small buttons on the Telescribe in order to record the conversation between pauses or delays, thus avoiding any waste of running the wax cylinder meanwhile. In this way, both sides of the telephone conversation are recorded, including all evidence of the central operator's voice in making connection. The dictating machine becomes, in reality an "eavesdropper" on the telephone line.

The wax record, containing the telescript and the dictated confirmation, may be retained indefinitely for reference.

The Telescribe will be handled by Thomas A. Edison, Inc., Orange, N. J.

The Telephone in the Oil Industry.

The Standard Oil Company of California, which operates 1,000 miles of trunk and gathering pipe lines in the state of California, owes much of its success in pipe-line operation to the telephone. The company recently made the announcement that wherever it has an oil line it has its own telephone and telegraph wires, having found this as essential as that of employing line walkers.

Telephone and telegraph wires found their way into this field ahead of automobiles, which, according to the company's recent interesting statement, are now to be seen at every pump station, no matter how remote. These are owned, as a rule, by employes, who have found them a most suitable vehicle for their trade, but still somewhat slower than the telephone in case of serious accident when quick communication with nearby stations and towns is necessary.

Wherever the company has an oil line it also has its own telephone and telegraph wires, and communication between stations is but the matter of a moment. When a line walker discovers a certain unmistakable discoloration of the ground in the vicinity of the line, he investigates to learn the nature of the leak, and, if it is of such a character that he cannot repair it, he immediately climbs the handiest pole, and reports to the nearest station. In a very brief space of time, men, with the necessary tools and material, are on their way to do the repair work.

CANADIAN NOTE.

THE CANADIAN PACIFIC RAILWAY COMPANY has officially established the title of agent for the official in charge of a telegraph office and discontinued the title of manager, or local manager.

Mr. A. J. Coppin, of the Western Union Telegraph Company, St. John, N. B., writes: "TELEGRAPH AND TELEPHONE AGE continues to be indispensable to all connected with the telegraph and telephone service, who desire to keep up to the times in the matter of changes, improvements and general information. It is my sincere hope that your list of subscribers will rapidly and steadily increase, as a large circulation means material benefit to the publisher financially, and to the readers instructively. I shall always be glad to recommend it to possible subscribers."

New Officers of Old Time Telegraphers' and Historical Association.

The executive committee of the Old Time Telegraphers' and Historical Association has unanimously selected New York as the place for the 1915 reunion, the dates to be selected later. The following officers were elected: Andrew Carnegie, president; David Homer Bates, Belvidere Brooks, Charles P. Bruch, Thomas A. Edison and Edward J. Nally, vice-presidents; F. J. Scherrer, 30 Church street, New York, secretary and treasurer.

Executive committee: Geo. M. Myers, Kansas City, Mo.; H. J. Kinnucan, Detroit, Mich.; Hon. Wm. S. Jordan, Jacksonville, Fla.; Col. Wm. Bender Wilson, Holmesburgh, Pa.; Col. Albert B. Chandler, New York; Col. Robert C. Clowry, New York; F. F. Fitzpatrick, New York; Melville E. Stone, New York; Theo. N. Vail, New York.

Although Mr. Carnegie is averse to presiding at functions of this character, he has made an exception and accepted the presidency of the Association, greatly to the gratification of the fraternity of the telegraph, who feel that he has honored them by his acceptance.

As was announced in our issues of August 16 and September 1, the Kansas City reunion of the Old Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps, which was to have taken place September 15, 16 and 17, had been called off on account of the disturbed conditions growing out of the European war.

The following are the officers of the Society of the United States Military Telegraph Corps for the year 1914-1915: President, William Bender Wilson, Holmesburg, Philadelphia, Pa.; vice-presidents, William L. Ives, New York, N. Y.; Charles Almerin Tinker, Stamford, Conn.; Marion H. Kerner, New York, N. Y.; secretary and treasurer, David Homer Bates, 658 Broadway, New York. Executive committee: Colonel Robert C. Clowry, New York; William R. Plum, Lombard, Ill.; Colonel Albert B. Chandler, New York; Henry W. Dealy, New York; Charles A. Tinker, Stamford, Conn.; Richard O'Brien, Scranton, Pa.; John Wintrup, Philadelphia, Pa.; Marion H. Kerner, New York. President and secretary, ex-officio.

G. M. Myers, Retiring President of the Old Time Telegraphers' and Historical Association.

Mr. George M. Myers, of Kansas City, Mo., the retiring president of the Old Time Telegraphers' and Historical Association, has the unique experience of being president for one year of an association that did not meet for the transaction of its regular business during his term of office. He was ready and eager to fill the active duties of the position, but the unfortunate circumstances existing in Europe made it advisable to abandon the meeting for this year, so Mr. Myers retires without having enjoyed the pleasure of meeting his many friends among the old-timers.

Mr. Myers is one of the most prominent and wealthiest citizens of Kansas City, which he has made his home for many years. He is a native of New York City, where he was born in 1855. He began his telegraphic career in 1870, at Berea, Ohio, in the Lake Shore Railroad office. He went to Kansas City in 1875, and was employed by various telegraph companies in different capacities. He organized the Pacific Mutual Telegraph Company, and became its general manager, which position he held until 1887, when the company's interests passed into other hands. Since that time Mr. Myers has taken an active interest in many large enterprises that have helped to make Kansas City the city that it is to-day.

GEORGE M. MYERS, KANSAS CITY, MO.

Andrew Carnegie, President-Elect, Old Time Telegraphers' and Historical Association.

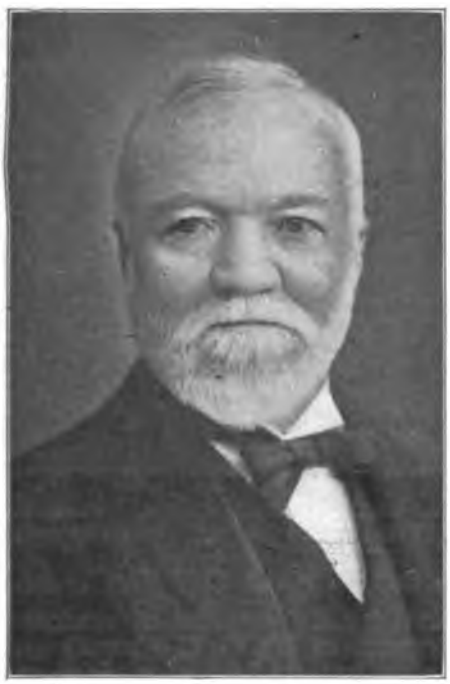
The love for the telegraph profession held by Mr. Andrew Carnegie, the well-known telegraph veteran, finds expression in his acceptance of the presidency of the Old Time Telegraphers' and Historical Association for the year 1914-15, and the association feels honored at having so distinguished a leader.

Mr. Carnegie is so well and widely known that his name is practically a household word. He began his business life as a telegraph messenger at Pittsburgh, Pa., in 1848, and figured as prominently in his early profession as he did in subsequent years in the railroad and industrial worlds. He has never lost his love for the telegraph and his early associates, and, in return, he enjoys the highest respect and admiration at the hand of the telegraph profession at large.

He has a pardonable pride in having founded the United States Military Telegraph Corps in the Civil War, and in being in possession of a government certificate of honorable service in that corps of the army. For a number of years he has taken the place of the United States Government, and has been paying, from his own purse, pensions to

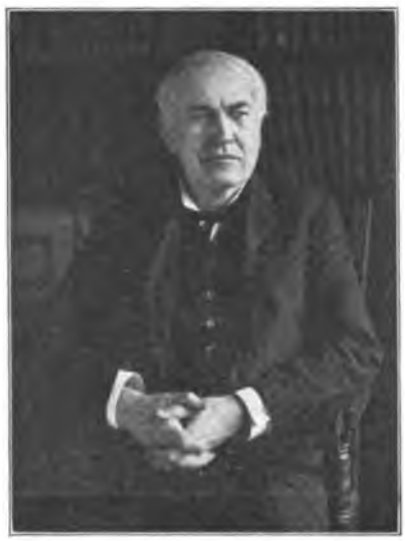
worthy members of the corps and their widows. The great good this largess has done is untold, but the gratitude of the beneficiaries is deep and beyond expression.

Mr. Carnegie, though born a Scotchman, at Dunfermline, in 1835, is a loyal American citizen, but



ANDREW CARNEGIE, NEW YORK, PRESIDENT-ELECT.

his loyalty to his adopted land does not lessen the love he bears for the land of his nativity. He divides his time between Scotland and America, making his residence at Skibo Castle during the summer months and in New York City during the remainder of the year.



THOMAS A. EDISON, VICE-PRESIDENT.

BELVIDERE BROOKS, VICE-PRESIDENT.

D. H. BATES, VICE-PRESIDENT.

CHARLES P. BRUCH, VICE-PRESIDENT.

E. J. NALLY, VICE-PRESIDENT.

FRANK J. SCHERRER, SECRETARY AND TREASURER.

James D. Reid Memorial.

The friends among the old time telegraphers of the late James D. Reid, and other subscribers to the Reid Memorial Fund, will be interested to know that Mr. Charles Keck, the sculptor, has completed the final model of the Reid monument and the model has been accepted by the committee.

The work on the monument itself is now in progress and it is expected that the monument will be erected in Mount Hope Cemetery in Rochester about the latter part of November.

MR. B. B. YOUMANS, of Atlanta, Ga., a member of the telegraph profession, has invented a transmitter as a substitute for the telegraph key. Mr. Youmans says that he has reduced the instrument to the size of about two by three inches and weight about eight ounces, and it can be permanently attached to the table, thus displacing the ordinary key.

Mr. R. A. Brown, Spokane, Wash., agent for this publication, has sold more copies of the new edition of Phillips' Code than any other individual agent.

COLONEL WILLIAM BENDER WILSON, PRESIDENT SOCIETY UNITED STATES MILITARY TELEGRAPH CORPS.

A Reminder of a Civil War Incident.

In rewriting for purposes of condensation the first paragraph of Mr. O. C. Hatton's article published in our issue of September 16, an error crept in. Mr. Hatton wrote that the British Hussars had been surprised "in Belgium." The editor discovered a resemblance of the affair to that described by Kipling in "The Battle of Lungtungpen." Hence the inadvertence. The adventure of the Wisconsin cavalrymen occurred fifty-two years ago, before Kipling's time, but a few survivors remain. A description of the Civil War incident was published in the *New York Sun* on August 30.

Future Meetings of Associations, Societies, etc.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS, at Rochester, N. Y., June 22, 1915. Secretary, P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill.

TELEPHONE PIONEERS OF AMERICA, at Richmond, Va., October 29 and 30. Secretary, Henry W. Pope, 26 Cortlandt street, New York.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Cincinnati, Ohio, 1915. Secretary, Clarence R. George, Houston, Tex.

MR. D. W. DALY, of the repeater department, Western Union Telegraph Company, Washington, D. C., in remitting to cover his subscription, writes: "I have contemplated a trip to New York, but have held back, thinking I would meet none who were with me at 145 and 195 Broadway for more than thirteen years, from July 5, 1870. My prayers are for those who have passed away. My love to those who are living."

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, OCTOBER 1, 1914.

War Tax on Telegrams and Cotton Crop Conditions.

This country finds itself in a strange predicament on account of the European war. It is at peace with all nations, yet it is compelled to levy a war tax in order to meet the deficit due to losses in customs revenues. Its best customers are at war and buying very little of our products.

A bill is now before Congress providing for the raising of $100,000,000 by taxing various articles and business instruments. According to the provisions of the bill, as introduced, telegrams and telephone messages costing fifteen cents or more are to be taxed one cent each, the tax to be paid by the companies. During the Spanish-American War there was a like tax on messages, but the public—that is the senders of the messages—paid it. There is opposition to the bill in general, and how it will fare by the time it reaches the last stages of discussion is for the future to determine.

Another anomalous position the country finds itself in, and a serious one it is, is the inability to dispose of the cotton crop in the South. The largest buyers of American cotton are at war and are devoting their energies to destruction instead of construction. The result of this is that there is no demand for it and the entire crop is dead weight on the hands of growers and dealers. There are now 14,000,000 bales of cotton in the South, and no market for it, and the financial and industrial situation in that section is a very serious one. Any condition that affects the cotton crop in any stage means financial loss to all concerned and consequent general business depression, and that is the position the South is in to-day. In connection with the present situation the question of diversified crops has been raised. On general principles, the practice of limiting all the energies of a people or community to the production of one kind of goods is risky, as is proved in the present instance. Diversity of crops and industries is essential to the general welfare of a people.

Convention of Municipal Electricians.

The convention of the International Association of Municipal Electricians, which was held in Atlantic City, N. J., September 15-18, was successful in all respects. There was a good attendance and the papers read and the discussions thereon were illuminative and instructive.

The paper of Mr. Gaskill, on the subject of "Education of the Public in Using the Fire Alarm System," was extremely interesting and pointed out the importance of citizens knowing how to use fire alarm boxes. Too much importance to this matter cannot be given, since many serious fires occur that are attributable as to their extent to delay in sending in alarms, and this is due in turn to the general ignorance as to the location of the alarm boxes and how to manipulate them. To get the citizens of a place interested in these matters so that they will know how to send in a fire alarm with the least delay is a problem that confronts the fire alarm officials in all cities. The citizens themselves should be brought to realize that the safety of the community in which they live depends, to a large extent, upon their interest in the protective measures provided by the municipal government.

The other papers read were pertinent to the general subject of municipal electrical engineering, and will prove to be of much value in placing the work of maintenance on a scientific basis.

On the whole the proceedings were of the most profitable kind and the character of the discussions showed that the members are very much alive to their duties and responsibilities.

TELEGRAPH AND TELEPHONE IN WAR.—Modern warfare demands speedy transmission of the commander's orders and intercommunication with headquarters. For this purpose are employed the field telegraph, the telephone, heliograph and flag signals. The field equipment of an army telegraph is usually a light wire, hastily strung on temporary small poles, called "lance poles." Frequently insulated wires are laid on the ground, where the radio-telegraphic and visual signal communication is not practical. Telegraph apparatus employed on high resistance and poorly-insulated wire is of the special

type which has been developed in the United States army service. It requires only a few dry cells for operating over long and difficult lines. A compact and portable form of camp telephone has been devised to meet the requirements of rough field service; also a folding type of telephone switchboard of great ruggedness and simplicity for use in field headquarters and camps.

THE INTERNATIONAL TELEGRAPH CONFERENCE, which is scheduled to be held in Paris in 1915, will undoubtedly be postponed on account of the war. The conference is supposed to meet every five years. The last gathering was at Lisbon, Portugal, in 1910.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 60.) Why is all the energy used in turning the molecules of iron out of their normal positions not returned to the circuit? What becomes of the unreturned energy?

When magnetism is rapidly reversed as in the armatures of electric motors and generators what is the effect, and what is the effect called?

Are there any seeming exceptions to the law that like polarities repel? Describe an exception.

If the magnet is placed in the field of a stronger magnet, the like poles being presented to each other, what happens to the weaker magnet?

Does this action hold true with permanent magnets alone?

In a circuit having two opposing electromotive forces upon what does the direction and volume of current depend?

In a circuit having two opposing magnetic fields upon what does the direction and strength of the resultant fields depend?

What part does air play in such a case?

(Page 61.) What are the practical results if the difference between the two fields is moderate? and if strong?

If a wire carrying a current of large volume is dipped into iron filings what happens?

What is the result of stopping the current?

As the wire is not magnetic why does it attract the iron filings?

Is there any indication of opposite polarities in the wire?

How can a section of the field around such a wire be shown, and how do the iron filings dispose themselves?

What would be the effect on the field, as shown by iron filings, of increasing the strength of the current in the wire?

In what way do these electromagnetic field circles of iron filings resemble the lines of force of a permanent magnet?

(Page 62) If two wires are suspended close together and free to move and dipped into mercury at the lower end, what will happen if a current is sent through them?

Why is mercury used in this experiment?

What will happen if the current in both wires is in the same direction? and if in opposite directions?

What takes place around each wire?

What is the resemblance in action of a coil of wire through which an electric current is passing to a permanent magnet?

What is the effect of inserting thin iron rods or a bar of iron in the space inside of the rings of the coil?

(To be Continued.)

LEGAL.

MENTAL ANGUISH.—In a case against the Western Union Telegraph Company the United States Supreme Court holds that the mental anguish laws of South Carolina could not apply to a message from South Carolina to another State, at least where there was no fault in South Carolina. This case was an appeal from the decision of the Supreme Court of South Carolina.

VIRGINIA PENALTY INVALIDATED.—The Supreme Court of Appeals of Virginia, in the case of Bilisoly against the Western Union Telegraph Company, holds that the Virginia penalty of $100 could no longer be recovered in connection with interstate messages, regardless whether the fault occurred in Virginia or not. The Act of Congress, approved June 18, 1910, which itself provides a schedule of fines and punishment in connection with interstate messages, has superseded all State penalty statutes.

LOUISVILLE AND NASHVILLE VS. WESTERN UNION.—The Western Union Telegraph Company secured condemnation against the Louisville and Nashville Railroad in three counties in Mississippi, viz: Harrison, Jackson and Hancock. The Louisville and Nashville then brought a suit to enjoin the telegraph company from exercising any rights under such condemnation and secured an injunction. The motion of the telegraph company to dissolve the injunction granted was overruled. The telegraph company thereupon appealed to the Supreme Court of the State, where all the contentions of the telegraph company were sustained in an opinion handed down in July last. A suit by the Louisville and Nashville against the telegraph company brought in the United States District Court for the Southern Division of Mississippi to restrain the telegraph company from entering or erecting its poles, wires or other fixtures upon any portion of the Louisville and Nashville right-of-way was dismissed for want of jurisdiction. The Louisville and Nashville took the case to the United States Supreme Court, where the decree made was reversed. The Louisville and Nashville has now filed a supplemental bill asking for an injunction against the telegraph company for further operating its line and for an order requiring the Western Union to remove its line from the right-of-way. This is now pending.

THE TELEPHONE.

MR. THEO. N. VAIL, president American Telephone and Telegraph Company, is taking a few weeks' rest at Old Point Comfort, Va.

MR. A. S. HIBBARD, who is associated with the executive department of the American Telephone and Telegraph Company, is returning to Chicago, where his headquarters will be in the Bell Telephone Building. Mr. Hibbard came to New York in 1911 by appointment of Mr. Theo. N. Vail, president, to develop plans for working together the services and facilities of the Western Union Telegraph Company and the Bell Telephone Companies. This work was stopped when the Government required the telephone company to dispose of its telegraph holdings. Since that time, Mr. Hibbard has been engaged on various advisory matters, which may now be carried on from his Chicago office, and he has taken this opportunity to return to his old home surroundings.

AMONG RECENT NEW YORK VISITORS were Messrs. W. T. Gentry, president, and J. Epps Brown, first vice-president, Southern Bell Telephone and Telegraph Company, Atlanta, Ga.; H. J. Pettengill, president, Southwestern Telegraph and Telephone Company, St. Louis, Mo.; P. L. Spalding, president, New England Telephone and Telegraph Company, Boston, Mass.

MR. J. J. CARTY, chief engineer, American Telephone and Telegraph Company, New York, has returned from a vacation spent in Maine.

MR. FRANK F. FOWLE, the well-known telegraph and telephone expert, has closed his New York office, and moved his headquarters to Chicago, Ill. Mr. Fowle is one of the joint receivers of the Central Union Telephone Company.

MR. G. W. CUMMINGS, a well-known telephone man of Chicago, has been appointed city telephone supervisor of that city. Mr. Cummings has had twenty years' experience in the telephone field, and is the author of "Electricity and Magnetism in Telephone Maintenance."

MR. THOMAS K. SPERRY, test-board man at Detroit, Mich., for the American Telephone and Telegraph Company, has been promoted to a position as assistant to Mr. C. W. Wallower, leased wire supervisor of the American Telephone and Telegraph Company, New York.

ASLEEP ON CROSS-ARMS.—A telephone lineman of Pendleton, Ore., recently fell asleep on the cross-arms at the top of a telephone pole. Passers-by thought he had been electrocuted. He explained that the heat had caused him to be sleepy. His belt kept him from falling.

CABLE LIGHTER.—The Pacific Telephone and Telegraph Company employs a cable-laying lighter at Oakland, Cal., in its cable-laying work. When the boat is at the wharf she is connected to the city telephone system. She is equipped with modern apparatus and appliances for cable work, and has arc lights on deck so that work can be carried on at night as well as by day. The lighter is in command of Captain William Thomas.

CHICAGO TELEPHONE COMPANY EARNINGS.—The Chicago Telephone Company has paid into the treasury of the city of Chicago $221,993, which is three per cent of the gross income of the company for the last six months, the proportion due under the ordinance. The exchange revenue of the company for the last six months was $6,535,589, and the toll revenue for the same period was $493,607. Miscellaneous receipts were $392,001, making the total receipts $7,421,197.

CONNECTIONS WITH PRIVATE TELEPHONES.—The New York Telephone Company refused to furnish telephone connections with the private switchboard, erected and maintained by the State Agricultural and Industrial School at Industry. The matter was taken before the up-State Public Service Commission, which has decided that telephone companies cannot be compelled to furnish service to patrons who use telephone equipment other than that supplied by the company.

Death of E. J. Hall.

Edward J. Hall, aged sixty-one years, vice-president of the American Telephone and Telegraph Company, and one of the most prominent men in the telephone business in the United States, died at Watkins, N. Y., on September 17, whither he had gone for his health.

Mr. Hall was born in Perth Amboy, N. J., on March 31, 1853. He entered Yale, and in 1873 was graduated from Sheffield Scientific School. Upon his graduation he went to Buffalo and entered business with his father.

When the parent company of the Bell system was organized, in 1877, Mr. Hall saw the possibilities of the development of the telephone system. The following year he obtained the right to operate in Buffalo under the patents owned by the Bell company and in 1879 organized a telephone company, of which he became vice-president and general manager.

When on January 1, 1885, Mr. Theo. N. Vail, then general manager of the American Telephone Company, was developing the project to organize the American Telephone and Telegraph Company, he asked Mr. Hall to take charge of the development of the new system. At that time long-distance telephone lines were still in their infancy, but Mr. Hall saw the possibilities in the development of this branch of the service and undertook to carry it out on a large scale. On January 1, 1887, under Mr. Hall's direction, the line from New York to Philadelphia was opened to the public.

Mr. Hall often expressed belief in the use generally of telegraphs and telephones. He was greatly interested in the development of the night letter and day letter telegraph service.

Mr. Hall's home was in Morristown, N. J. He was a director in the American Telephone and Telegraph Company, the New York Telephone and Telegraph Company, the New York Telephone Company, the Southern Bell Telegraph and Telephone Company, the Western Electric Company, and other financial and industrial enterprises. He

was chairman of the executive committee of the Western Union Telegraph Company for about three years and devoted himself very closely to telegraph problems.

Mr. Hall is survived by his wife, one son and two daughters.

Mr. Hall's funeral, which took place at Morristown, N. J., was attended by the presidents of many of the subsidiary telephone companies, and the general officers of the Western Union Telegraph Company and of the American Telephone and Telegraph Company, besides a large number of Mr. Hall's associates and employes of the latter company.

Richmond Convention of Telephone Pioneers.

The general programme of the fourth annual convention of the Telephone Pioneers of America, which is to be held at the Jefferson Hotel, Richmond, Va., October 29 and 30, was printed in these columns September 16.

The local committee at Richmond will be glad to make hotel reservations, or other local accommodations, for the members. The minimum rates at the Jefferson Hotel will be $1.50 per day, on the European plan. Mr. J. W. Crews, 709 East Grace Street, Richmond, Va., is chairman of the local committee.

Special arrangements have been been made with the Old Dominion Line for a boat trip from New York to Richmond, and with the Pennsylvania Railroad for a special train from New York to Richmond. Pioneers living in the vicinity of or at a distance from New York, who desire to travel via New York may take advantage of these special arrangements.

The Old Dominion steamer will leave New York, Pier No. 25, North River, at 3 p. m., Tuesday, October 27, arriving at Old Point Comfort at 9 a. m., Wednesday, October 28. The train will leave Old Point Comfort at 9:25 a. m., and arrive at Richmond at 11:30 a. m. The rate from New York to Richmond will be $9.00, meals and berth in state-room included.

The train on the Pennsylvania Railroad will leave New York at 9:30 p. m., Wednesday, October 28, and arrive at Richmond, Thursday, October 29, at 7:50 a. m.

The train fare from New York and vicinity (including Newark), to Richmond, will be $7.10, and from Philadelphia, $5.30. The reduced rate applies only when ten or more persons travel together. Pullman rates from New York or Philadelphia, upper berth, $1.60; lower berth, $2.00; compartment, $6.00; drawing room, $7.00.

The return trip of the Pioneers Special will be made from Washington on Sunday, November 1, at 10 a. m.

The party rate on this train will be: Washington to Philadelphia, $2.72; Washington to New York, $4.52. Pullman seat to Philadelphia, 75 cents; to New York, $1.25.

A rate of 75 cents per person has been obtained for the transportation of the Pioneers on their arrival at Washington, from the boat to their hotel, a sight-seeing trip around the city and transportation from the hotel to the railroad depot.

The Metropolitan Hotel, Sixth Street and Pennsylvania Avenue, Washington, D. C., has offered a special rate of $2.50 per day, including three meals and one lodging.

Messrs. R. H. Starrett, W. E. Huntington and J. E. Knetzer, 15 Dey Street, New York, are the committee on transportation.

The general committee of arrangements consists of Messrs. F. H. Bethell, president Chesapeake and Potomac Telephone Company, New York; A. S. Hibbard and R. H. Starrett.

Mr. R. H. Starrett has been elected acting secretary of the Pioneers of America on account of the illness of Mr. Henry W. Pope.

Substance of Leading Articles in Contemporaneous Telephone Publications.

"Trend of Regulation" is a concise review of the decisions of courts and public service commissions in various States affecting the telephone business. (*The Telephone Review* for September.)

"Public Relations of Utilities in Theory and Practice" is the title of a four-page article by S. R. Edwards, in *Telephony*, September 10. It treats of the general problem of utility regulation, direct or specific legislation regulation versus commission regulation, etc.

New York's Great Telephone Development during the last thirty years is illustrated by a historical sketch of the main central office, 81 Willoughby street, Brooklyn, with pictures of the office as it was in 1888 and is to-day. (*The Telephone Review* for September.)

Inductive Interference.—The report of the joint committee on inductive interference of the California Railroad Commission is published in the proceedings of the American Institute of Electrical Engineers for September. It gives a historical sketch of the subject; the results accomplished up to date; a discussion of rules, etc. The entire subject is covered exhaustively.

Headache.—This is the title of the latest contribution of Dr. Alvah H. Doty to his series of health articles. He tells the causes of this common malady and points out the way to bring about a cure. Dr. Doty is the medical director of the employes' benefit fund committee of the American Telephone and Telegraph Company and of the Western Union Telegraph Company, and is one of the leading physicians in America. (*The Telephone Review*, September.)

The Wanderer's Vision. Mr. H. F. Hansen is the author of an interesting article, entitled "The Wanderer's Vision." It is a story of shopping by telephone in the future. In the future department store, instead of the crowds of customers and long rows of sales people displaying goods, there will be endless rows of telephones, with a clerk at each, taking orders as fast as they can be written. The orders will be sent at once to the shipper and in a few minutes the goods will be loaded on an auto truck, which will deliver them. (*The Telephone Review*, September.)

RADIO-TELEGRAPHY.

REMOVAL.—The Marconi Wireless Telegraph Company of America has removed its northern district general offices and Seattle wireless station to the L. C. Smith Building, in Seattle, Wash.

MARCONI MESSAGE BLANKS.—The new Marconigram blank adopted by the Marconi Telegraph-Cable Company, Inc., in connection with Marconi Wireless Telegraph Company of America, is of pleasing and attractive design. The white lettering on the top is on a maroon background, and vignettes typify "world-wide wireless" service. The terms are printed on the back, as is usual on message blanks of the wire and cable companies.

OPENING OF CALIFORNIA TRANS-PACIFIC STATIONS.—The two Marconi trans-Pacific wireless stations at Bolinas and Marshall, Cal., were officially opened on September 24. Among the guests at the opening ceremonies were Mayor J. Rolph, of San Francisco, and C. C. Moore, president of the Panama-Pacific Exposition. At the luncheon, messages were received from the Hawaiian station and greetings were sent to Governor Johnson and President Wilson. The latter message was relayed at New Brunswick, N. J., station. The two stations and the two in Hawaii are of about 300 kilowatts each, and will work duplex. The two California stations are twenty-five miles apart.

TUCKERTON STATION DISABLED.—The high-frequency alternator at the Tuckerton, N. J., transatlantic wireless station was disabled on September 16, causing the suspension of sending service until repairs can be effected. The government took possession of this station on September 5, and both the Western Union and Postal Telegraph-Cable companies were accepting messages for transmission to Germany through it. The Tuckerton station is the one closed by the United States Government because it had no license, and afterwards taken over by the Washington authorities. It is worked under the Goldschmidt patents, and was established by German and other interests. A Government court of inquiry into the cause of the accident found that the failure of the machine was due to some weakness in material. The disabled machine will have to be sent to Germany for repairs. The court recommends that the Government temporarily install whatever suitable apparatus the Navy Department may have available.

Wireless Telegraph Printing System.

Mr. C. R. Underhill, chief electrical engineer of the Acme Wire Company, New Haven, Conn., has been granted a patent on a printing wireless telegraph system. It is simply his Morse printer adapted for use in connection with wireless telegraph receiving apparatus. In 1907 Mr. Underhill made successful tests between Wilson Point, Conn., and one of the sound steamers, the printer being on the steamer. So far as he is aware he is the only man that ever successfully printed wireless messages.

Wireless Censorship Legal.

United States Attorney-General Gregory has rendered an opinion that censorship of wireless messages by the Federal Government is legal. The legal right of the government to exercise a censorship was raised by the Marconi Wireless Telegraph Company of America.

The Attorney-General gives several citations of law to sustain the opinion, but his main contention is upon the right of the government to use every means at its command to preserve neutrality in war time.

Controversy Between Marconi Company and Government. Siasconset Station Closed.

On pages 510 and 511 of our issue dated September 16 we published the substance of a letter sent to the Secretary of the Navy at Washington by Mr. John W. Griggs, president of the Marconi Wireless Telegraph Company of America, in which Mr. Griggs denied the right of the Secretary of the Navy to demand an explanation of the receipt of a wireless message at the Siasconset station from the English cruiser "Suffolk," ordering supplies.

Secretary of the Navy, Josephus Daniels, on September 19, sent a letter to Mr. Griggs in which he says: "I have to advise you that the President is advised by his Attorney-General that he has full authority, in view of the extraordinary conditions now existing, to close down or take charge of and operate the plant of the Marconi Wireless Telegraph Company of America, should it be deemed necessary to secure obedience to his proclamations of neutrality, and that, acting under the Executive order of August 5 and September 5 last, by which I am authorized by the President to take such steps as may be necessary to prevent the receipt for delivery or the transmittal of unneutral messages, my department will continue, as heretofore, to retain its censors at the plants of your company in order to enforce the neutrality of the United States during the pending conflict in Europe.

"I beg to again call to your attention this department's telegrams of September 2 and September 11, to which no satisfactory reply has as yet been received. Unless a prompt reply to this letter is received, giving a satisfactory explanation of the case which brought about this discussion or containing an expression of intention on the part of your company to observe carefully the rules for the control of radio communication that have been forwarded you and to co-operate freely with this department in the enforcement of those rules, it will be necessary for me to issue orders for the closing of the Siasconset station for all communication."

The Marconi Wireless Telegraph Company of America, on September 24, filed in the United States District Court a bill for an injunction to restrain the Secretary of the Navy and the four naval officers now on duty as censors at the Sea Gate station from censoring the company's messages and possibly closing that station. Mr. J. W. Griggs, president of the Marconi Company, notified Secretary

Daniels of the filing of this bill for an injunction and expressed the hope that the Secretary would be willing to await the result of a judicial decision on the rights of the Government and of his company. Notwithstanding this request, Secretary Daniels, at the direction of President Wilson, ordered that the Siasconset, Mass., station be closed at noon, September 25, and the order was carried in effect.
POSTAL.

Wireless on the Isthmus of Panama.

At the Key West government wireless shore station Mr. William Keepers, formerly stationed at Key West for seven years, is chief electrician in charge. The staff in order of rank or seniority of service at the station is as follows: I. T. Ward, W. M. Bloomenkranz, J. V. Cooper, J. E. Martin and J. E. Reid, operators; S. DeLong, clerk; A. T. Beam, messenger. The "Zone" radio officer in charge of all the United States Government wireless stations and also those of the Panama Government is Lieut. C. W. Cremshaw, with temporary headquarters in Colon.

The Colon wireless station is being rebuilt by the United States Government. All the old buildings are being demolished and new ones of more modern design will be erected. The new structures will comprise a power house, operating house and staff quarters, including separate houses for the bachelors and married men.

There will be four aerials of 1,512, 1,000, 600 and 300 meters. The normal wave length for merchant ship business is 600 meters; between government ships, 1,000 meters, and between government shore stations 1,512 meters. About $25,000 has been appropriated for the buildings and $11,000 for grounds, water, sewerage, roads and landscape work.

Two new skeleton towers, 600 feet apart, each 300 feet high, are in process of erection. They will rest on three bases 60 feet apart, forming a triangle, and set in cement.

The intention is to use this station solely for ship commercial work and certain classes of government business.

A constant watch is, of course, maintained by the operating force.

The radius of the large set will be 500 miles in the daytime and 1,000 to 1,800 miles at night. Under favorable conditions the station will work direct with Washington, D. C., and at all times with Key West and points within that radius. The site of the station is about one-quarter of a mile outside of the city limits of Colon, and faces about north. It is opposite the Eastern breakwater at the entrance to the harbor. The site includes many bearing cocoanut trees, many of which will be cut down to facilitate the handling of the large antenna. This station will take care of the wireless service on the Atlantic side.

The machinery in the power house includes one 25-kw. set, 2 5-kw. sets and 2 2-kw. sets. Power is supplied by the Canal Zone hydroelectric plant at Gatun, which also supplies the Balboa station on the Pacific side. In case of urgent necessity the steam plants at Gatun and Balboa can be brought into use.

The new wireless station of the United States Government in process of erection at Darien, about half way across the Isthmus, will not be ready for some months, the towers not yet being finished.

The Marconi New Brunswick, N. J., Station.

The New Brunswick, N. J., station of the Marconi Wireless Telegraph Company of America is located two miles from New Brunswick on a road that winds along the banks of the Raritan River and the Raritan Canal. It is the transmitting half of the link which will communicate with Wales. [A description of the Belmar, N. J., station was printed in TELEGRAPH AND TELEPHONE AGE of August 16.]

The power house, which is a substantial brick structure, contains the apparatus to change the electricity in form from the sixty-cycle 24,000-volt current to the high frequency oscillating current required to send the dots and dashes across the ocean. It also contains the condenser and discharger rooms and offices. The aerials, of which there are thirty-two, are anchored to the foundations and lead into the building. The motors are of 500 horse power each.

The switchboard gallery, from which the electrical apparatus of the station is controlled, is at the back. From this board the machinery can be stopped or started and the lights turned on or off. On the control table are a wave-meter and a decremeter. The engineer in charge is able to control and keep in touch with the operation of all the apparatus connected with the station from this table. When the transoceanic service is opened he, or an assistant, will be constantly on duty there, ready to send orders or to meet any problems that may arise.

Five transformers take the current from the generator and step it up in voltage sufficiently high to charge the condensers. They carry the full power of the station whenever signals are being sent. All parts of the bus-bar are accessible and so arranged that any transformer may be quickly cut out and a spare unit substituted without shutting off the current.

The cottages for the chief engineer and assistant engineer are substantial, home-like structures, and fitted out with all the modern conveniences of a home. Near by is the hotel where the operators needed to work the auxiliary receiving apparatus and the riggers to keep the aerials and mast system in proper condition will make their home. The hotel, which is constructed of red brick, with a concrete and tile roof, is two stories in height and is provided with broad verandas and windows which command an excellent view of the surrounding country. It has about fifteen sleeping rooms and is tastefully furnished throughout.

Mr. M. M. Shannon, division operator, Pennsylvania Railroad Company, Elmira, N. Y., in remitting to cover a renewal of his subscription, writes: "I feel that I am getting more than my money's worth."

MUNICIPAL ELECTRICIANS.

Atlantic City Convention, International Association of Municipal Electricians.

The nineteenth annual convention of the International Association of Municipal Electricians was held at the Hotel Islesworth, Atlantic City, N. J., September 15, 16, 17 and 18. There was a large attendance and the papers read were of high excellence, and, taken all together, the meeting was very successful and enjoyable.

It was announced that the mayor of the city, Hon. William Riddle, would deliver the address of welcome, but when he found that he could not be present, he delegated City Clerk Edwin Bell to perform the duty. The address was responded to by Mr. C. E. Diehl, treasurer of the association.

The first paper read was on "Water-Proof Cords for Police Boxes," by Price I. Patton, second assistant manager, Electrical Bureau, Philadelphia.

Mr. Patton pointed out the importance of giving attention to the insulation of the telephone receiver cords in police patrol boxes. Officers reporting from a box frequently come in contact with these cords and unless the insulation is good it is possible that they may get a severe shock even if the inner and outer shells of the box are grounded. He described tests made on six different types of telephone receiver cords. Only two of the cords maintained their insulation resistance for any length of time. He thought that much better cords should be used in connection with patrol box work.

Mr. Charles S. Redding, of Philadelphia, read a paper entitled "Measurement of Illumination." The most important points of consideration in street lighting, he said, were uniformity and intensity of illumination. He explained some of the principles underlying photometric measurements and described the Macbeth illuminometer, which is an instrument for comparing illumination, either artificial or natural. The paper was discussed by Dr. C. P. Steinmetz, W. M. Petty, J. B. Yeakle and others.

A paper on "Education of the Public in Using the Fire Alarm System," was read by Mr. Robert J. Gaskill, of Fort Wayne, Ind. His attention had been called to this matter, he said, through several serious fires in his city, due, in a large measure, to not receiving the alarm promptly. An investigation disclosed the fact that, without exception, the delay was caused by the citizens not knowing the location of the nearest alarm box, or how to operate it properly. He believed that a campaign of public instruction, properly carried out, would increase the efficiency of any fire alarm system.

In the discussion, Mr. W. Y. Ellett pointed out the difficulty of educating the public in the use of fire alarm boxes. Most men do not know the location of the nearest fire alarm box. He thought a good way is to instruct school children as to these matters.

Mr. W. H. Flandreau, Mount Vernon, N. Y., pointed out a serious objection to teaching school children. It had been tried in his city and one result was that children turned in false alarms in order to see the fire apparatus rush up.

Mr. W. M. Petty, of Rutherford, N. J., spoke of the successful use of the telephone in his town in sending fire alarms.

The paper was further discussed by Mr. Adam Bosch, Newark, N. J.; J. Grant, of New Haven, Conn., and others.

Mr. A. C. Farrand, city electrician of Ventnor City, N. J., read a paper on "Safe Grounding for Fire and Police Signal Boxes." Instead of grounding the entire signal box shell he strongly recommended the simple grounding of the specific portions of the movable apparatus which the operator is required to touch in sending a signal, and insulating those portions of the casings or containing shells which either the operator or any passer-by may touch. The discussion of Mr. Farrand's paper occupied an entire afternoon.

Mr. C. H. Lunn described the work of the National Board of Fire Underwriters.

In a paper entitled "Mitigating Electrolysis by the Insulated Feeder System," Mr. Frank C. Perkins said that when the advantages from both the electrolysis and economic standpoints are fully weighed it seems rather surprising that insulated feeder systems have not been more widely used in the past. They have been found practical and effective for the mitigation of electrolysis troubles due to stray electric railway currents.

Mr. M. Harry Holtz, of the Electrical bureau, Philadelphia, read a paper on "Cost of Street Lighting," and Mr. Leo Firman, assistant chief of the same bureau, read one entitled "Temperature Coefficient in Cable Testing."

The election of officers resulted as follows: W. H. Flandreau, president; Charles P. Steinmetz, R. J. Gaskill, C. E. Converse and G. V. Tudhope, first, second, third and fourth vice-presidents, respectively; Clarence R. George, secretary; C. E. Diehl, treasurer. Executive committee: W. R. Arbuckle, D. H. Fischer, C. S. Downs, J. H. Thomas, C. W. Pike, C. F. Gall, W. C. Matthias, J. W. Kelly, jr., and E. H. Schmidt.

Cincinnati, Ohio, was chosen as the place for the next convention, the date to be selected later by the executive committee.

EXHIBITS AND NOTES.

The Gamewell Fire Alarm Telegraph Company, New York, exhibited industrial and private fire alarm systems, storage battery installation and storage battery charging and control boards for fire alarm systems. Also the recent developments in flashlight signals for police telegraph service. The company was represented by Messrs. A. L. Tinker, Fred S. Pearce, T. Torrey, A. J. Coffee, A. P. Crocker and Charles Berst.

The Okonite Company, New York, was represented by Mr. J. D. Underhill.

Mr. G. L. Wiley, New York, represented the Standard Underground Cable Company, Pittsburgh, Pa.

A full line of Vac-M lightning arresters was exhibited by the National Electric Specialty Company, Toledo, Ohio.

Other exhibitors were Leeds and Northrup, Philadelphia, represented by Messrs. A. S. Young and C. S. Redding; J. G. Biddle, Philadelphia, represented by Mr. H. H. Sticht; Stanley and Patterson, New York, represented by W. M. Petty; Kellogg Switchboard and Supply Company, Chicago; L. S. Brach Supply Company, New York, represented by A. G. Brach and G. Gort, the National Metal Molding Company, Pittsburgh, Pa., represented by H. C. Moran, and the Star Electric Company, Chicago, represented by F. C. Stover.

A rejuvenation of the Jovian Order was held on Wednesday evening and on Thursday evening a dinner was tendered to the members by the Gamewell Fire Alarm Telegraph Company.

Those present were:

Atlantic City, N. J.—M. S. Van Houlie.
Altoona, Pa.—C. S. Downs.
Allentown, Pa.—Mr. and Mrs. P. J. Beisel, D. W. V. Bell.
Ansonia, Conn.—W. J. Tonkice.
Baltimore, Md.—A. M. Pacholder, Mr. and Mrs. J. B. Yeakle and daughter Bertie.
Bayonne, N. J.—Mr. and Mrs. W. R. Arbuckle.
Bridgeport, Conn.—Mr. and Mrs. A. E. Platt.
Buffalo, N. Y.—A. A. Carlisle, J. G. Kraetz.
Cambridge, Mass.—F. C. O'Hearn.
Camden, N. J.—B. W. P. Friend, J. W. Kelly jr.; M. Kelly, W. H. Miller.
Chelsea, Mass.—H. G. Nutter, F. C. Proctor.
Chicago, Ill.—C. Berst, Mr. and Mrs. A. P. Crocker, A. H. Friend, F. C. Stover.
Corning, N. Y.—Mr. and Mrs. F. P. Foster.
Davenport, Iowa.—A. G. Goldschmidt, W. Moeller.
Elmira, N. Y.—W. Y. Ellett.
Elizabeth, N. J.—J. Manon, F. R. Williams.
Erie, Pa.—W. Crane.
Fort Wayne, Ind.—R. J. Gaskill.
Grand Rapids, Mich.—F. S. Vincent.
Harrisburg, Pa.—C. E. Diehl.
Hoboken, N. J.—Mr. and Mrs. A. Frank.
Houston, Tex.—C. R. George.
Indianapolis, Ind.—Mr. and Mrs. John Berry.
Los Angeles, Cal.—R. H. Manahan.
Louisville, Ky.—C. F. Gall, P. G. Kern.
Meadville, Pa.—A. J. Balizet.
Memphis, Tenn.—R. E. Moran and R. E. Moran, jr.
Mobile, Ala.—C. S. McCosker.
Mount Vernon, N. Y.—Mr. and Mrs. W. H. Flandreau.
Newark, N. J.—Mr. and Mrs. A. Bosch and Miss Helen Bosch, N. A. Carle, W. H. Kernan, W. K. Vanderpool.
New Haven, Conn.—J. Grant, A. L. W. Kittredge.
New Rochelle, N. Y.—Mr. and Mrs. A. J. Bell.
Newton Highlands, Mass.—Mr. and Mrs. F. W. Cole.
Niagara Falls, N. Y.—M. J. Donohue, J. A. Griffin.
New York.—A. G. Brach, E. C. Chamberlin, T. Dwight, G. Gort, C. E. Johnson, O. Kemp, J. W. Mackay, E. P. Morris, Mr. and Mrs. N. J. Oehmen, S. Patterson, F. Pearce, H. A. Sticht, T. R. Taltavall, A. L. Tinker, J. W. Tully, J. D. Underhill, J. H. Van Buren, G. L. Wiley, R. C. Wilson.
Norfolk, Va.—R. A. Smith.
Oakland, Cal.—G. V. Tudhope.
Oswego, N. Y.—G. W. Tully.
Philadelphia, Pa.—E. T. Aiken, W. F. Bartlett, B. F. Brown, R. L. Cunningham, H. T. Burr, L. D. Firman, S. Greenfield, M. H. Holz, W. K. Kerford, E. Kerschner, F. E. Maize, P. I. Patton, C. W. Pike, W. T. Poulterer, C. S. Redding, M. B. Rosevear, E. D. Saint, P. Spencer, T. Sproule, Mr. and Mrs. C. M. Thompson and daughter, A. S. Young, J. C. Vogel.
Pittsburgh, Pa.—F. S. Pearce, H. C. Moran.
Portchester, N. Y.—A. Bell.
Richmond, Va.—W. H. Thompson.
Rochester, N. Y.—E. H. Schmidt, daughter Selma and son Frederick.
Rutherford, N. J.—W. M. Petty.
San Antonio, Tex.—C. E. Conners.
San Francisco, Cal.—A. J. Coffee.
Saratoga Springs, N. Y.—W. H. Leggett.
Schenectady, N. Y.—C. P. Steinmetz.
Scranton, Pa.—J. H. Thomas.
Solvay, N. Y.—H. J. Morey.
Suffolk, Va.—W. T. Jones.
Toledo, Ohio.—J. T. Greene, M. Winchester.
Trenton, N. J.—Mr. and Mrs. O. M. Schaefer and Mrs. M. Schaefer, J. H. Stenge.
Troy, N. Y.—P. H. Corbett, J. Kinney, J. Riley.
Utica, N. Y.—T. F. Manon.
Ventnor City, N. J.—A. C. Farrand.
Wallingford, Conn.—Mr. and Mrs. A. L. Pierce.
Washington, D. C.—W. J. Canada, Mr. and Mrs. W. R. Hamplin.
Watertown, N. Y.—W. E. Gaffney.
Wilkesbarre, Pa.—P. H. McManus.
York, Pa.—W. E. Fastnacht.

Mr. David Reed, superintendent of fire and police-alarm, Denver, Col., has asked for 100 more fire-alarm boxes for the city. There are now 190 street fire-alarm stations and forty private stations in Denver.

The Annual Report of the Electrical Bureau of the City of Philadelphia for the year 1913 has just been issued. It consists of a pamphlet of 140 pages and contains several illustrations. Mr. Clayton W. Pike is chief of the Electrical Bureau.

Springfield, Ill., Fire-Alarm.—A new fire-alarm system has been installed by the Central Union Telephone Company, at Springfield, Ill. Under the new system the fire department has two direct trunks from the telephone office and all calls of fire will be connected directly. Indicators are used in the engine-houses.

Mr. G. E. Cromwell, an old-time and military telegrapher, now living in retirement at Damascus, Pa., in renewing his subscription for another year, writes: "I want to know about all that is going on in the telegraph world, and your paper supplies that want."

THE RAILROAD.

MR. G. A. CELLAR, superintendent of telegraph, Pennsylvania Railroad, West, was a recent New York business visitor.

MR. C. W. GALLOWAY, general manager of the Baltimore and Ohio Railroad, Baltimore, Md., has issued a circular urging that telegraphing be done only where necessity requires the use of wires and in this way operations will be quickened by avoiding delays to important messages which congestion sometimes seriously interferes with.

MR. H. A. LOGUE, superintendent telegraph and signal engineer, Cumberland Valley Railroad, Chambersburg, Pa., was a recent New York visitor.

FRANK BARR, aged sixty-two years, formerly vice-president and general manager of the Boston and Maine Railroad, and a former telegrapher, died at Winchester, Mass., recently.

THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY, Mr. L. B. Foley, superintendent telegraph, has just completed a steel tower, 402 feet high, on the water front at Hoboken, N. J., for wireless service and has installed a five-kilowatt, high-frequency Marconi set at that point. On Saturday evening, September 19, wireless messages were received direct from Hoboken at the Lackawanna wireless station, Buffalo, a distance of 410 miles, on a wave length of 2,250 meters. These messages were copied at intermediate wireless stations located at Scranton and Binghamton, and at Binghamton the dots and dashes were heard in all parts of the wireless room. The test having proved highly successful, a regular wireless service will be inaugurated within the next two weeks.

TELEGRAPH TOLL DIRECTORY.—An official writes: In your issue of September 16 a paragraph appears in the railroad column (page 525) giving Mr. A. J. Ewing, of the Union Station, Wichita, Kans., credit for his enterprise in hanging in a public place a telegraph tariff book, the object being, of course, to induce the public to consult it to ascertain the charges for telegrams to various sections of the country. This is a splendid method of making the telegraph popular and it is to be hoped that Mr. Ewing's idea will become general. It is not necessary to hang up a voluminous document like the ordinary tariff book. It should be prepared in condensed form, the rates shown covering the principal cities and the States lumped.

Mr. Ewing is, no doubt, correct when he states that when persons have access to such information they would be more likely to patronize the telegraph. These public tariff books should have a general distribution. No doubt each district superintendency could arrange for a thorough distribution in public places.

JOHN MCNERNY, aged eighty-two years, in the continuous employ of the Western Union Telegraph Company on the Erie Railway for two years, and on the Lake Shore and Michigan Southern Railroad for fifty-eight years at Dunkirk, N. Y., died at that place on September 16. His son, J. G. McNerny is connected with the Western Union Company at Buffalo, N. Y.

Meeting of Eastern Division of Association of Railway Telegraph Superintendents in New York.

The Eastern Division of the Association of Railway Telegraph Superintendents will hold its next meeting in the Young Men's Christian Association Rooms, at the Pennsylvania Station, New York, on Wednesday, November 11. The meeting will be called to order at 10 a. m. Arrangements have been made for a paper on and discussion of "Inductive interferences from automatic printing telegraph systems to railway telephone circuits."

Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., is chairman of the Eastern Division.

Unnecessary Telegraphing.

At a recent staff meeting in Galveston, Tex., Mr. W. H. Hall, superintendent of telegraph, Missouri, Kansas and Texas Railway, with headquarters at Denison, Tex., read a paper on "Unnecessary Telegraphing." Among other things, Mr. Hall said:

I find that we still have a few officers and employes who believe that the telegraph rules, the telegraph code, etc., were made for the other fellow, and do not apply to them. Recently I was told that the traffic department people were using the code to some extent and using symbol letters and numbers on a large majority of their telegrams; but that the operating department people do not seem to be doing so well.

In August, 1913, the telegraph department issued a telegraph code of about seventy-five code words, covering sentences used many times each day by all departments. Some of the departments are using this code, with a marked decrease in the length of telegrams. Others are not making any use of it.

I heard an employe the other day dictating a telegram, and by the use of four or five code words a message that would have contained probably fifty words was cut down to about twelve. It was a revelation, even to me, of the economy that can be effected by an intelligent use of this code.

As our railway increases in mileage and cities increase in size and industries multiply, there will be a legitimate growth in the number of telegrams, and I have found the management willing to meet this demand for additional facilities, but unwilling to have the telegraph service used for unimportant and unnecessarily long communications.

I believe that fully twenty-five per cent of the messages now being handled by wire could be handled by letter and serve every purpose. Recently, on a certain Middle West railroad, the management came to the conclusion that there was too much telegraphing being done, and, in one relay office, where there had been twenty-four men employed, they cut the force to five. Clerks were put on, and it was left to the discretion of the manager as to what messages should be sent by wire and what messages should be sent by mail; and, while their service has suffered to some extent, still it has been shown that a large proportion of the messages heretofore handled were unnecessary.

Printing Telegraphs in Small Offices.

BY A TELEGRAPH ENGINEER.

On page 467 of TELEGRAPH AND TELEPHONE AGE, dated August 16, is an article on a new printing telegraph system, in which is stated that the instrument can be installed at way or local stations.

The plan is very attractive, but I doubt very much if it will ever be seriously considered by a telegraph company on account of the cost. The simplest and least expensive equipment for small telegraph offices is the plain Morse system, and, notwithstanding all the ingenuity of inventors, nothing has been devised that has endangered the position of that system.

In small offices, where there is little business, it would be folly for a telegraph company to substitute the old reliable Morse system with something that costs more money and requires more mechanical experience and knowledge to maintain than is possessed by the average Morse operator. It would be more difficult to secure operators with mechanical knowledge than it is to get ordinary Morse men or women capable of operating straight Morse instruments which require little more knowledge to maintain than an ability to adjust the instruments.

If inventors desire to distinguish themselves they should apply their attention to devising a system simpler and less expensive, and, at the same time, equally efficient, at least, as the Morse. When any one produces such a system the telegraph companies will be glad to buy the invention, and I feel safe in stating that they will not consider any proposition in this direction that does not meet these requirements. In small offices the business does not warrant expensive apparatus to handle it when the old reliable Morse answers every purpose.

Dr. G. A. Cardwell, the inventor of the system referred to, makes the following statement in reply:

In answer to your correspondent, who points out the uncommercial possibilities of printing telegraph, I agree with him so far as his limited knowledge is concerned relative to automatic devices which are now in commercial use. We do not know of all the surprises which are awaiting us and which will meet with the simple requirements of the commercial telegraph. The Morse telegraph, the flag signal and the light signal are the simplest elements of communication.

Until the advent of the House system, which was the first step in the art of printing telegraph, and now the stock ticker, which has revolutionized local communication, we can only find in the evolution of these systems complexities which make them more difficult to handle; nevertheless, there has always been an available market for their use.

What systems have we to-day in the art of printing telegraph that can operate more than two machines on a trunk line? The machines that we are familiar with are complex, both mechanically and electrically, although they embody the ingenuity of intelligent engineers. However, these well-known printing systems have been a handicap to the commercial telegraph, owing to the high skill and thorough knowledge required to keep them in operation at all times under all conditions. Telegraph and telephone lines are exposed to so many variable influences from external sources that the skill of the electrical engineer to-day is taxed to the extreme to keep even the simple Morse operating at all times. Automatic devices requiring fixed duration of impulses, variable line voltages and current value are going to be highly successful.

It is not known, as yet, that there are other systems where the salient features of simplicity will make them commercially applicable. Any system where the polar duplex principles are the only requirements for the line can be used at all times and under all weather conditions and should be commercially valuable.

The National Electric Distributer Corporation is about to place machines on the market which will meet all the criticisms which have been appearing from time to time. Typewriters of any make can be placed in way stations and operated at three to four times the speed of the present Morse operator, without the attending requirements of skilled or other electrical knowledge. The great loss of time in calling stations is dispensed with. Way stations are as easily operated by this system as the Morse is to-day, but should the operator be absent, or attending to other duties, his machine is always ready to receive incoming messages.

These machines are leased under contract in a manner similar to telephone leases, and this rental price is not prohibitive. If the service is not rendered no pay will be required.

Convention of Railway Signal Association.

The annual convention of the Railway Signal Association took place at the Hotel Champlain, Bluff Point, N. Y., on September 22, 23 and 24, over 350 members being present. The papers read and discussed were of a high order and extremely valuable to the railway signal interests. The manufacturers of signal devices and other supply men were also in attendance. Altogether it was one of the most instructive and important meetings ever held.

Salt Lake City, Utah, was selected as the next place of meeting, the date in September, 1915, to be chosen later.

Mr. T. S. Stevens, of the Atchison, Topeka and Santa Fe Railway, Topeka, Kan., was elected president, and Mr. C. C. Rosenberg, Times Building, Bethlehem, Pa., was re-elected secretary and treasurer.

TELEGRAPHS AND TELEPHONES IN COREA.—According to the latest returns, there are now 11,072 miles of telegraph wires and 29,577 miles of telephone wires in operation in Corea, an increase for the past twelve months, taking in both branches, of 2,352 miles.

Mr. Geo. Wady, of the Canadian Pacific Railway Company's telegraph, Revelstoke, B. C., Canada, writes: "I find TELEGRAPH AND TELEPHONE AGE very useful and instructive and would not like to be without it."

MR. W. H. BAKER, President TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION, has addressed the following letter to the membership:

New York, August 1st, 1914.

TO THE MEMBERSHIP:

The Telegraph and Telephone Life Insurance Association being purely co-operative must depend upon the activity of its members for its success. No matter how active and enthusiastic the Officers and Agents may be, it is the work of the individual member that counts.

Please remember:

That this is your Association.
That it is the oldest of its kind in the United States.
That it is a monument to the fraternity.
That the Officers and Agents serve without compensation.
That we should feel proud of the work accomplished.
That we have paid out in claims almost two million dollars.
That we have never contested a claim.
That we have a Reserve Fund of $340,000.
That safety and not cheapness has ever been our motto.
That it is our duty to help one another.

Keeping all of the above in mind, will you kindly use it as a text in talking to an eligible member of the fraternity, and secure his signature to the enclosed application blank? When filled out, please send it to your Agent, who will arrange for the medical examination, etc.

Truly yours,

WM. H. BAKER, President.

For full particulars, address M. J. O'LEARY, Secretary, P. O. Box 510, New York City

OBITUARY.

MRS. F. W. ROEBLING, SR., aged seventy-five years, wife of the secretary and treasurer of the John A. Roebling's Sons Company, died in Trenton, N. J., on September 17.

P. A. MOAKE, aged forty-four years, a well-known telegrapher in New Orleans, La., died in that city September 11. He was formerly wire chief for the Western Union Telegraph Company.

JOSEPH SCHNELL, aged seventy-two years, a Civil War telegrapher in Binghamton, N. Y., died in that place on September 21. After the war he had charge of the Western Union office in the Erie depot at Binghamton. Later he went into the drug business.

MR. I. S. WHITE, aged fifty years, identified with the Western Union Telegraph and Postal Telegraph-Cable interests at Baltimore, Md., for many years, and for the past three years in Washington, D. C., in another line of business, died in Baltimore on September 17. Mr. White was extremely popular with a large circle of acquaintances.

Death of J. W. Larish.

Joseph W. Larish, a well known telegraph and electrical engineer, died at the Presbyterian Hospital, New York, on September 16, after an illness of four months. Brights disease was the cause of death. Mr. Larish was a member of the old school of telegraph engineers who figured so prominently in the development of the telegraph during the past fifty years. He was born at Fountain Springs, Pa., in 1848, and learned telegraphy in 1864 at Lewisburg, Pa. He became manager at Kane, Pa., in 1866, and went to Kansas in 1867, and for three years was operator in the office of the general manager of the Kansas Pacific Railroad. Returning East in 1870, he entered the service of the Western Union Telegraph Company, at Buffalo, N. Y., where he remained as night press operator for four years, and was made repeater chief, in charge of quadruplex and other repeating apparatus until 1884, when he was appointed manager of the Baltimore and Ohio Telegraph Company at the same place. He was made assistant superintendent in 1886, and subsequently became superintendent of that company at Boston, Mass., which position he held at the time the company was absorbed by the Western Union Telegraph Company, after which he was appointed, in 1887, electrician for the latter company in New England. This position he held until 1902, when he became identified with the Postal Telegraph-Cable Company in New York. In 1906 he became associated with the Telepost Company as electrical engineer and remained in the service of that company up to the time of his death.

Mr. Larish was the inventor of many useful railroad and telegraph devices and was one of the best known electrical experts in the East.

Three Important and Valuable Electrical Books for Students.

"Electrical Instruments and Testing," by Norman H. Schneider, is the latest work on this important subject, and has been brought up to date. It is an extremely practical book, and every telegrapher who is preparing himself to fill positions in the engineering branch of the service should make a copy of this work his text-book in testing. It is thoroughly reliable, and was written by a practical engineer. The section on the testing of telegraph wires and cables was written by Mr. Jesse Hargrave, a well-known telegraph engineer, and the illustrations, of which there are many, are very clear and understandable. The price of this book is $1.15 per copy.

"American Telegraph Practice," by Donald McNicol, is another book to which we desire to call especial attention. This book contains the latest information and descriptions of telegraph apparatus and systems, and it constitutes a complete course in telegraph engineering. It is well illustrated and a careful study of its contents will give the student an immense advantage in the line of promotion. The book deals with every detail of the telegraph engineering and construction services and is written in so clear, English that anyone with average intelligence can readily grasp the facts set forth. The telephone in its relation to telegraph operation is also covered to a liberal extent. It is a book that gives one a desire to know it from beginning to end, and, with patient effort, this result can be easily attained. The price of this book is $4.00.

"Handy Electrical Dictionary," by W. L. Weber. This little book, which is of vest-pocket size, is a necessary companion of the two books referred to, as it supplies the key which unlocks the meaning of the technical terms met with in these volumes. To the beginner this little dictionary is really indispensable. It will remove all doubt as to the meaning of technical words and phrases and is a positive help in the study of electricity. Progress in study is much more satisfactory and really enjoyable when one knows that he is on the right road and thoroughly understands what he is reading. This book is a library in itself, and is complete, concise and convenient. The price is 25 cents per copy for cloth binding, and 50 cents for leather binding.

PROFITABLE ELECTRICAL MERCHANDISE.—The Western Electric Company has just issued a new mailing folder, entitled "Profitable Electrical Merchandise." This catalogue covers the complete line of dealers' helps which the company offers to the electrical trade to assist in the sale of washing machines and vacuum cleaners. It is well illustrated.

THE WESTERN UNION ELECTRICAL SOCIETY of St. Louis, Mo., has issued its constitution and by-laws in neat pamphlet form. The society was organized June 1, this year. The officers are: G. R. Alger, president; Albert Turner, secretary; J. F. McCarron, treasurer.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment No. 574 to meet the claims arising from the deaths of W. C. Lewis, at Minneapolis, Minn.; S. H. Deverell, at Toledo, Ohio; F. K. Aram, at Atlanta, Ga.; V. G. Shearer, at Jacksonville, Fla.; R. H. King, at Atlanta, Ga.

THE SAN FRANCISCO TELEGRAPH TOURNAMENT.—Mr. D. A. Mahoney, a well-known New York telegrapher, has been appointed Eastern representative of the Panama-Pacific International Telegraphers' Tournament Association, which is now arranging plans for holding a tournament in San Francisco, Cal., during the Panama-Pacific Exposition in that city in 1915. This appointment will prove a very popular one, as Mr. Mahoney has been identified with similar undertakings in past years. Mr. E. Cox, chief operator of the Postal Telegraph-Cable Company at San Francisco, is chairman of the committee having the affair in charge. Mr. D. F. Ingold, chief operator, Western Union Telegraph Company, San Francisco, is also a member of the committee.

DISC TELEGRAPH RECORDS.—Diamond medal telegraph records for the graphophone are just the thing for telegraph students to obtain practice from. These are double records, that is, they have records on each side, and can be used on the phonograph or any other make of talking machine. There are eight discs in the set, sixteen lessons in all, and the lessons lead the student on by easy stages.

These double discs are for sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at $1 each.

THE CENTRAL TYPEWRITER EXCHANGE of New York is the oldest establishment of its kind on Broadway, having been in existence since 1896. It is now making a specialty of "all cap" Remington No. 6 and Underwood No. 4 machines. It has been demonstrated that the "all cap" type mill is fully twenty-five per cent faster for "message work" than the "shift-key" machine. Mr. D. A. Mahoney is looking after the "Central's" interests among the telegraphers and those wishing to secure first-class typewriters at a moderate figure would do well to communicate with him, as he gives his personal attention to all orders.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

M. L. Schwinger, operator, has resigned to accept a position with the International News Service at Waterbury, Conn.

Simon J. Murphy has resigned and will enlist in the United States Navy for one year for radio service.

Miss Beatrice Smith, an operator in this office, has resigned to return to her home in Ireland.

PHILADELPHIA POSTAL.

Among recent visitors at this office were Messrs. C. C. Adams and C. P. Bruch, vice-presidents, and J. P. O'Donohue, division electrical engineer, New York; C. E. Sornberger, manager, Williamsport, Pa., C. E. Diehl, of Harrisburg, Pa., and C. F. Schucker, of Gap, Pa.

The Athletic Association will hold a benefit at Dumont's the week of October 19.

WESTERN UNION INDIANA NOTES.

Manager W. H. Janes, of Greencastle, Ind., has returned to his post of duty after an absence of several weeks on account of sickness.

Miss A. D. Harris, who substituted for Mr. Janes during his absence, has been appointed manager at Warsaw, Ind., vice Mr. H. C. Green, resigned.

Mr. B. F. Stevens, of Linton, Ind., has been appointed manager at Mount Vernon, Ind., vice Mr. C. W. Carr, resigned. Mr. Stevens is succeeded at Linton by Mr. J. A. Mason.

Telegraph and Telephone Age

No. 20. NEW YORK, OCTOBER 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Police Telegraphs.

Police telephone and signal telegraphs are comparatively little known among the masses, and yet, when one thinks of the important utility of such systems, it seems surprising that the average citizen knows so little about them. In large communities, where such a system is installed, every man who has a thought for his fellow-man and for the welfare of the community in which he lives should make it his duty at least to familiarize himself with the objects of a police signal system and how to bring it into use in case of emergency.

The following description of a standard police telegraph system will be of interest. The system consists of patrol or signaling stations suitably located throughout a municipality, these stations being connected by means of aerial or underground circuits, with a central station or precinct headquarters, where the receiving and recording apparatus is located.

The system is arranged for transmission of telegraphic report and emergency signals, and also for telephonic communications between patrol stations and the central station. The telegraphic report and emergency signals are recorded automatically in the central station, giving the exact location of the patrol station operated, also printing the minute, hour, day, month and year at which the signal was transmitted.

The system embraces all the valuable improvements yet produced, and the following may be mentioned as some of the principal and important points of value:

By increasing the efficiency of the force it exercises a powerful influence for the prevention and punishment of crime.

It gives to every citizen, however remote from headquarters, the means of instantly summoning police assistance.

It enables the authorities to humanely care for the unfortunate victims of accident or sudden illness.

It affords an opportunity of conveying arrested disorderly persons to the station in a properly arranged wagon, without the lamentable exposure, with its attendant bad influences so common under the old style of arrests.

It is an excellent auxiliary to a fire-alarm system, and enables the possessor of a private box to call police assistance directly to his door without leaving the premises.

It enables the force to work with the greatest efficiency, thus reducing the annual expenditure for the maintenance of the department, which saving will, in most cases, pay for the construction of the system within a short time.

It promptly furnishes a means of dispersing crowds, checking disturbances or riots, arresting disorderly persons, thereby decreasing the chance of serious outbreaks, which often end in murder, robbery or arson.

It enables the patrolman to remain on his beat. If he makes an arrest, or wishes assistance, he has only to go to the nearest signal box, make his wants known, and, in a short time, assistance is at hand and he is relieved of his prisoner.

It increases the power and dignity of a police officer, and, to a very great degree, it lessens the chance and necessity of personal encounters with the roughs who frequently combine for his injury.

Every patrolman carries a key to the street stations or signal boxes, and, as the locks of all boxes in a system are uniform, his key will open any station.

Keys may be given to responsible citizens, with which they can operate the signal boxes without opening the door, thus making every key-holder, to a considerable extent, a policeman; for he carries with him the power to summon police assistance to any point wherever he may see their services are required.

The advantage of signals which are recorded automatically over those given orally cannot be overestimated. In cases of excitement, experience has abundantly proven that, while the telephone is a very valuable auxiliary to the police signal telegraph, wrong impressions are often unwittingly conveyed by the speaker or received by the listener, while with an automatic printed message there can be no variation or mistake. The mechanical result is invariably the same. The telegraphic signal, with the indelible record on the tape at the central station, fixes positively the location from which the signal has been transmitted, and prevents any pos-

sibility of collusion between the patrolmen and the man on duty at the desk.

When trouble occurs demanding the presence of a police officer in any part of a district covered by a signaling system, the signal can be instantaneously communicated to the district headquarters, and the reserves hurried to the place from whence the signal originated.

The fact that patrolmen are required to report at certain specified times from the signaling stations on their posts aids materially in securing attention to duty on the part of the force.

Telegraph and Telephone Patents.

ISSUED SEPTEMBER 15.

1,110,373. Telegraph Key. To R. L. Boulter, Los Angeles, Cal.

1,110,376. Automatic Telegraph System. To D. H. Cameron, North Sydney, Nova Scotia, Canada.

1,110,420. Microphone Attachment for Telephones. To H. W. Christensen, Boston, Mass.

1,110,460. Automatic Telephone-Exchange System. To F. Schoenwolf, Chicago, Ill.

1,110,613. Automatic Telephone System. To A. H. Dyson, Chicago, Ill.

1,110,634. Telephone System. To F. A. Lundquist, Chicago, Ill.

1,110,669. Coin Collector for Telephones. To A. E. Case, Chicago, Ill.

1,110,913. Train Dispatcher's Telephone Circuit. To H. C. Edgerton, Passaic, N. J.

ISSUED SEPTEMBER 22.

1,111,024. Two-Party Telephone System. To H. F. Joeckel, Camp Point, Ill.

1,111,253. Loud-Speaking Transmitter. To H. C. Egerton, Ridgewood, N. J.

1,111,566. Telegraph Repeater. To R. T. Davenport, Williams, Ariz.

1,111,574. Line Protector for Telegraph and Telephone Systems. To T. Gonzalez y Sebasco, Havana, Cuba.

1,111,695. Type-Printing Telegraph Apparatus for Line and Radio-telegraphy. To A. N. Hovland, Christiania, Norway.

ISSUED SEPTEMBER 29.

1,111,742. Automatic Toll Recorder for Telephone Systems. To E. G. Godfree, Melbourne, Victoria, Australia.

1,111,792. Selective Signaling System. To E. R. Gill, Yonkers, N. Y.

1,111,876. Telephone System. To C. S. Winston, Chicago, Ill.

1,112,140. Telephone System. To D. S. Hulfish, Toronto, Ontario, Can.

1,112,167. Telephone Transmitter. To J. L. Spence, New York.

1,112,392. Telephone Receiver. To J. L. Spence, New York.

Mr. B. N. Roney, of the Western Union Telegraph Company, Bloomington, Ill., writes: "Thanks for renewing my subscription. The AGE continues to be indispensable to me."

PERSONAL.

MR. M. F. ROBINSON, of Sanford, Fla., the well-known old-time and military telegrapher, who spent the summer at Belmar, N. J., has returned to his home in Florida.

MR. R. S. KEITH, of the telegraph department of Henry Clews and Company, bankers and brokers, New York, recently visited Old Point Comfort, Va., where a brother, a veteran of the Civil War, resides.

MISS LOIS MICHAUX HORNER, daughter of Mr. R. W. A. Horner, of the Western Union Telegraph office at Lynchburg, Va., will be married to Mr. W. S. Nelson on November 11.

MRS. B. F. THOMPSON, wife of Mr. B. F. Thompson, in charge of the telephone service, Baltimore and Ohio Railroad, Baltimore, Md., accompanied by her son, arrived in New York on October 10 from Europe.

MR. W. T. KYLE has joined the sales force of the Okonite Company at its general office in New York. Mr. Kyle for the past six years has been connected with the Duplex Metals Company as district sales manager.

MR. AGUSTIN SAL, inspector-general of national telegraphs of the Argentine Republic, Buenos Aires, who visited this country last spring, has been presented with a handsome medal in recognition of his work in behalf of the service in his country.

SENATOR WILLIAM L. IVES, an old-time telegrapher, now living in retirement in Brooklyn, is making a trip through the central part of the State. Mr. Ives was born in West Troy, N. Y., October 24, 1841, and is visiting the scenes of his boyhood days.

DR. A. E. KENNELLY, professor of electrical engineering at Harvard University, and formerly in the telegraph cable service, has been given general direction of research work in the Massachusetts Institute of Technology, Electrical Engineering Research Laboratory, under the plan of co-operation between the two institutions.

MR. CHARLES BRIGHT, F. R. S. E., London, England, the well-known writer and authority on cable matters, delivered an address, entitled, "A Nation's Awakening," on September 25, in Tonbridge, near London. In his address Mr. Bright gives a brief account of the causes that led up to the present European war, and how the war is being conducted.

PROF. MORSE'S SONS.—In our issue of September 16 announcement was made of the death of James Edward Finley Morse, son of Prof. S. F. B. Morse, inventor of the telegraph. This was the youngest son by the professor's first wife. There seems to be an impression in some quarters that this was the professor's only son. This, however, is not true. Of Professor Morse's family by his second wife there are now living two sons, Mr. Edward Lind Morse, who is a resident of Stockbridge, Mass., and William Goodrich Morse, of San Diego, Cal.; also a daughter, Mrs. Franz Rummel, who resides in Paris, France. Mr. Edward L. Morse attended the reunion of the Old Time Telegraphers and Historical Association at Atlantic City, N. J., in September, 1911.

MR. JOHN EGAN, a well-known old-time telegrapher of San Francisco, who worked in New York many years ago, was recently retired from the service at San Francisco, Cal., on account of old age. Mr. Egan entered the service of the Montreal Telegraph Company December 1, 1864, and on December 1, this year, will have attained his golden jubilee. He says in a recent letter: "I have many happy recollections of 145 Broadway, where I worked from 1870 to March, 1872."

MR. GISLI J. OLAFSSON, the head of the telegraph and telephone service in Iceland, with headquarters at Reykjavik, which is the capital of that island, who was in this country for three weeks, inspecting the telegraph and telephone service, sailed for home from New York on the steamer "Hermod," October 3. Mr. Olafsson proved a very interesting personage. It is the first time that a telegraph official from Iceland had visited the United States, and Mr. Olafsson was greatly interested in all that he saw. In his country, which has a population of 85,000, there are over 1,165 telephones and 840 miles of telephone and telegraph wire. There are 113 telegraph and telephone offices, manned, of course, by native operators. The Continental code is used. A submarine cable connects Iceland with the British Isles, a distance of about 300 miles. It will be interesting to note that the steamer on which Mr. Olafsson sailed was bound direct for Iceland. This is the first time on record that there has been direct steamship communication from that country with the United States. This has grown out of the fact that communication with the Continent of Europe and England has been discontinued on account of the war. Mr. Olafsson went as far west as Chicago. He stated that the development of the telephone in America had advanced beyond his most sanguine expectations and as compared with Europe the development was marvelous. He examined the various telegraph and telephone plants while in New York, including the new Western Union main office at 24 Walker street. He expressed surprise at the magnitude of this great telegraph office. Mr. T. A. McCammon, city superintendent, E. T. Burrill, chief operator, and Mr. T. M. Ragen, wire chief, and W. A. McAllister, superintendent of the Central Cable Office, extended courtesies to the visitor, who proved to be well posted in telegraph and telephone affairs, as well as on trade conditions. Mr. Olafsson was accompanied by other government officials, who are seeking to establish closer business relations between the two countries, Mr. Sveinn Bjornsson, M. P. Layor, of Reykjavik, and Mr. O. Johnson, merchant of Reykjavik.

ELECTRICITY IN WAR.—At the meeting of the New York Electrical Society, held at the Grand Central Palace, New York, on October 9, Captain S. S. Robison, United States Navy, delivered a lecture on "Electricity in War." Captain Robison reviewed the extensive use of electricity in modern warfare, including coast defence, mining of harbors, handling of big guns, signal devices, lines of communication, searchlights, submarines, etc.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. F. LEONARD, superintendent, New York, made a trip of inspection through Connecticut recently.

MR. ALWYN J. DOYLE, chief clerk, Indianapolis, Ind., has been appointed manager at Terre Haute, Ind., to succeed Mr. A. J. Morrison.

MANAGERS have been appointed as follows: Frank Wallace, Michigan City, Ind.; C. T. Downer, Greenwood, Miss.; Miss M. T. Kahle, Beloit, Wis.; E. J. Coutures, Sanford, Me.

CHATTANOOGA OFFICE.—The local office of this company at Chattanooga, Tenn., is being remodeled and refitted with the latest telegraphic equipment. When the improvements are completed, it will be a model office.

MILWAUKEE EFFICIENCY SOCIETY.—A society was formed recently in Milwaukee, Wis., known as the "Milwaukee Efficiency Society." Mr. P. L. Lee, manager of the Postal Telegraph-Cable Company's office, was elected secretary. The society has about seventy-five members made up of representatives of the leading houses in the city.

TARIFF CIRCULAR.—The Postal Telegraph-Cable Company has issued a tariff circular, dated October 1. It gives a great deal of general information, in addition to tariff changes, new offices, etc. Mr. Isaac Smith, superintendent of tariffs, has done the work well.

New Postal Office in Philadelphia.

The Postal Telegraph-Cable Company has just closed a lease for a long term of years of space in the Finance Building, on the south side of Penn square, near the corner of Broad street, Philadelphia.

The entire fourteenth floor will be occupied by the operating department and the superintendent's offices. The large ground floor store room, No. 1420 Penn square, will be utilized for receiving department, manager's and cashier's offices and delivery department. The basement space underneath will be used for linemen and supplies.

The structure is a new, modern and fireproof office building of substantial and handsome construction. It is now nearing completion and the space leased by the Postal company will be specially partitioned, arranged and equipped for the needs of the company's various departments. Ample locker rooms, rest rooms and toilet facilities are being provided for the operating department. The switchboards, instruments, furniture and other equipment of this department will be new and up to the highest standards.

The operating room will be connected by pneumatic tubes with the receiving and delivery departments on the ground floor. This floor will be handsomely fitted up, and so arranged as to best facilitate the conduct of the business.

The delivery department, as well as other departments, will be designed and arranged with a

view to the convenience and comfort of employes, including the installation of dressing rooms and shower baths for the use of messengers.

The office, which is in the heart of the best business district in Philadelphia, will be conspicuous by reason of its handsome sign display and will be convenient to patrons by reason of its location on a busy thoroughfare, between the Pennsylvania Railroad station and the principal hotels, banks and office buildings of the city.

The company will get possession of the premises early next year, and it is expected that the office will be open for business in May or early in June.

A Live Postal Bulletin.

The Sixth District Bulletin, issued by the Postal staff at Chicago, contains in its September 25 issue many items of general interest. From these we make the following selections:

"Science, not rule of thumb; but harmony, not discord; co-operation, not individualism; maximum output in place of restricted output; development of each man to his greatest efficiency and prosperity is what is wanted, according to F. W. Taylor. Let's adopt it for a Sixth District Ideal."

"Efficiency is the modern watch-word and in its broadest meaning signifies simply the possession of the right sort of knowledge and the ability to use that knowledge effectively. There is no longer much chance for success to come as the result of haphazard work. You must train for success, if you are to achieve it."

"Business is sensitive. It comes only where it is invited and stays only where it is well treated. Don't get into a rut. The only difference between a rut and a grave is the width and depth."

"Did you ever notice how easy it was to do anything after you once got started? If not, start something and see how easy it is."

"In efficient plants or offices all operations must be dispatched on schedule. Dispatching means taking the steps or measures to get things done according to plans, standard and schedules and getting them done on time. What the train dispatcher is to the trains under his supervision so the manager or chief operator of your office should be to the employes under his supervision."

Postal Telegraph-Cable Company of Texas.

Mr. W. L. Jones, general manager of this company, Dallas, Tex., announces the following changes in the service:—

Mr. G. B. Willingham, of the Austin, Tex., office of this company, has been appointed manager at Forth Worth. He is succeeded as manager by Mr. H. E. Ott, of the Austin office.

Mr. J. G. Taylor has been appointed manager at Waco, Tex., vice A. G. Steele, resigned.

ANNIVERSARY OF THE EDISON ELECTRIC LAMP.—The thirty-fifth anniversary of the invention of the electric incandescent lamp by Mr. Thomas A. Edison will occur on October 21.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. THOMAS E. FLEMING is acting as editor of the *Western Union News*, in addition to his other duties. Mr. Fleming has had considerable experience along newspaper lines, which is now bearing fruit.

CONFERENCE OF SUPERINTENDENTS.—On October 6 a general conference of district commercial superintendents was held in the office Mr. A. G. Saylor, general manager, New York. Among those present, besides Mr. Saylor, were district commercial superintendents A. C. Terry, Pittsburgh, Pa.; J. W. Reed, Philadelphia, Pa.; C. F. Ames, Boston, Mass.; W. A. Sawyer, New York; J. F. Nathan, commercial superintendent, New York; J. Simmonds, division cable manager, J. A. Hill, F. Giles, A. C. Kaufman and A. Woodle, New York.

MR. W. H. SCHROEDER has been appointed assistant to the general manager, Gulf Division, Dallas, Tex.

MR. M. B. WYRICK, division plant superintendent, Chicago, Ill., was a recent executive office visitor.

MR. P. G. HILL, of the division plant chief's office, Chicago, has been transferred to the office of the general superintendent of plant, New York.

MISS C. G. EKSTRAND has been appointed assistant chief operator of the telephone bureau of the general operating department at 24 Walker street, New York.

THE DISTRICT COMMERCIAL MANAGERS of the Metropolitan district recently met in conference in the office of Mr. A. G. Saylor, general manager Eastern Division.

MANAGERS have been appointed as follows: E. C. Gregor, Douglas, Ariz.; F. D. Nash, Santa Fe, N. M.; M. M. Maisel, Albuquerque, N. M.; W. E. Hunt, Silver City, N. M.; C. W. Clowes, East Las Vegas, N. M.; J. L. Nye, Glendive, Mont., vice R. W. Barnard, resigned; C. P. Kelly, Glen Cove, N. Y.; L. S. Smith, Hempstead, L. I.

THE ELMIRA, N. Y., office of this company is being enlarged. Mr. J. J. Brickwedde is manager.

THE JACKSONVILLE, FLA., office is being thoroughly renovated in anticipation of a heavy tourist season. The work is being done under the supervision of Mr. L. L. Apperson, division plant supervisor.

THE HAMILTON, OHIO, office of this company, C. E. Jones, manager, has just been remodeled and brought up to date in every particular, making it one of the finest and best equipped offices in the western division.

MR. M. H. LINES, manager at Jacksonville, Fla., was married in Chicago, Ill., on September 23, to Miss Etta Genevra Holdeman, of the latter city. The employes of Mr. Lines' office presented the couple with a handsome gift on their return to Jacksonville on October 1.

MR. L. L. LEITH, commercial agent third district, has been appointed district commercial manager at Charleston, W. Va. Mr. H. O. Evans has been appointed to succeed Mr. Leith.

MR. J. W. MCMAHON, manager Bridgeport, Conn., has been elected a member of the Bridgeport Business Men's Association.

MR. J. W. GRASSE, inspector, second district, Mountain Division, has been transferred to the force of W. C. Titley, division plant superintendent, Denver, Col.

MR. FRED H. AUSTIN, former manager at San Antonio, Tex., has been appointed special commercial agent, with headquarters at Dallas, Tex. Mr. W. E. Herring succeeds Mr. Austin as manager at San Antonio.

MR. O. C. FAUPEL, manager at Hartford, Conn., has been elected a member of the Hartford City Club.

MR. T. A. DARLING, manager at Fort Worth, Tex., has been appointed manager at El Paso, Tex., vice S. B. Jones, resigned. Mr. A. C. Farmer has been made manager at Fort Worth, succeeding Mr. Darling.

MR. E. T. GOUGH has been appointed manager at Baton Rouge, La., to succeed Mr. H. B. Gale, who has been transferred to Houston, Tex., as assistant manager.

OUTING.—Seventy employes of the plant department in Connecticut recently held their third annual outing at Brennan's Grove, near New Haven, Conn. Various forms of entertainment, including a game of baseball, were indulged in.

PENSIONERS.—Twenty-one pensioners on the company's rolls have died during the year up to October 1.

LINE-BUILDING CONTEST AT ATLANTA.—At the recent annual barbecue and field day of the Telephone and Telegraph Society of Atlanta, Ga., there was a line-building contest between picked teams of the Western Union Telegraph Company and Southern Telephone and Telegraph Company. The Western Union team won. It was captained by foreman Eubanks.

NEW ORGANIZATION IN BRIDGEPORT, CONN.—A number of the employes of this company in Bridgeport, Conn., organized the "Western Union Society of Connecticut," on October 3. The purpose of the organization is to study the requirements of the public as relates to the telegraph and to improve conditions throughout the State. Temporary officers were elected as follows: President, J. W. McMahon, Bridgeport; vice-president, E. J. Murray, Hartford; secretary, W. H. Bergen, Waterbury; treasurer, Miss K. W. Miller, New Haven. Among those present at the meeting were W. A. Sawyer, district commercial superintendent, New York; F. S. Lewis, district commercial manager; J. Simmonds, division cable manager, New York; A. C. Kaufman, manager commercial news department, New York, and J. W. Gaffey, district commercial manager for Connecticut. Managers and other employes of various Connecticut offices were also present.

T. M. Brennan, Chief Clerk, Western Union Operating Department, New York.

Mr. T. M. Brennan, now chief clerk, formerly assistant manager of the new Western Union operating department, New York, is one of the few telegraphers of the old school remaining in the service, and, judging from his activity and mastery of details, he is good for many more years of active work.

Thousands of operators throughout the country know "T. B," having at one time or another in their careers come in contact with him, for he is the man who searched their records, tested their ability and employed or rejected them. He has the reputation of knowing more operators than any other man, and has the remarkable faculty of remembering faces and names. He was never fooled the second time by the same man. It should be said of Mr. Brennan, too, that he has taken a fatherly interest in hundreds of cases where advice was needed, and he has always dealt fairly with all.

Mr. Brennan was born in Ireland on Christmas Day, December 25, 1844, so that "Merry Christmas" to him has a double meaning. Coming to New York in 1850, he began his telegraphic career on October 11, 1861, when he became a messenger

T. M. BRENNAN

boy for the American Telegraph Company, at an office then located in the drovers' yards at Madison avenue and Forty-fourth street. He subsequently became an operator and worked in that office under Manager Theo. N. Vail, now president of the American Telephone and Telegraph Company. In 1862 he became a local branch office manager of that company, afterwards being employed at various other offices in New York and Brooklyn, subsequently going to the superintendent's office at the old main office at 145 Broadway. In the merging of the American and Western Union companies Mr. Brennan, in 1870, was made night chief of the city department of the Western Union. Ten years later, in 1880, he was transferred to day duty as chief of force and assistant manager of the operating department, and in 1912 he was appointed chief clerk of the operating department, a position which he still holds.

In his capacity in passing upon the qualifications of operators, Mr. Brennan has employed many operators who became distinguished in other lines of activity.

One of the things in which Mr. Brennan has taken the greatest interest during his whole time in the service has been the organization of telegraphers' benefit, aid and savings associations. He is one of the oldest members and treasurer of the New York Telegraphers' Aid Society; member of the executive committee, Telegraph and Telephone Life Insurance Association (formerly the Telegraphers' Mutual Benefit Association); member of the Gold and Stock Life Insurance Association, director in the Serial Building Loan and Savings Institution, organized by telegraphers, and conducted by them, and now the oldest association of its kind in New York; a member of the Morse Club, organized by New York telegraphers, to preserve the memory of Professor Morse, whom he had the honor of meeting several times. All of these associations of telegraphers are in a most flourishing condition, rendering great help to the members and their families, and Mr. Brennan has always most earnestly recommended the younger members of the fraternity to join at least one of them, and all of them when possible.

The Serial Building Loan and Savings Institution helps in saving, the others help in sickness and trouble, and in saving, too, for they are much lower in their charges than other associations of the kind.

L. A. Ott, Manager Western Union Telegraph Office, Dallas, Tex.

Mr. Lemuel Alexis Ott, whose appointment as manager of the Western Union Telegraph office at

L. A. OTT, DALLAS, TEXAS

Dallas, Tex., was announced in our October 1 issue, was born at Murfreesboro, Tenn., September 14, 1878, and began his telegraphic career as a messenger for the Western Union Company at Chattanooga, Tenn., in September, 1893, afterwards being appointed clerk and later operator. Between 1900 and 1902 he worked for the same company at Dallas, Tex., and from 1902 to 1904 he was manager of the Corsicana, Tex., office. In the latter year he left the Western Union service to engage in the brokerage business, which, however, he left later in the same year to accept the managership of the Oklahoma City, Okla., office of the Postal Telegraph-Cable Company of Texas. Four years ago he was transferred to the management of the Dallas office of the same company. Seven months ago he again became identified with the Western Union Telegraph Company's interests at Dallas and has since then occupied several important positions. The present promotion to the head of the Dallas office is a fitting recognition of Mr. Ott's ability.

THE CABLE.

CABLE STEAMER WRECKED.—The cable steamer "Buccaneer" was lost recently while on a voyage from Mauritius to Tamatave in the Indian Ocean. The crew was saved, but the vessel became a total loss.

Service by Cable.*

It is fifty-six years ago that the first transatlantic cable was opened for business with messages of good will and respect between President Buchanan and Queen Victoria. There was a tremendous celebration, holidays and feasting, and truly it can be said that the cable was a long step forward in the art of human intercourse. Now there are 280,000 miles of cable submerged in the various oceans, divided into 2,500 systems, thirteen of which are owned by the United States Government. There are now annually exchanged more than 25,000,000 words between the United States and England, and these messages travel at a marvellous rate of speed. A commercial message of nine words recently circled the globe via the Postal-Commercial system and connections, in sixteen and one-half minutes. It traveled a distance of 26,613 miles and was relayed sixteen times.

At the opening of the Commercial Pacific cable in 1900, President Roosevelt sent a message around the world in nine and one-half minutes. This message, however, was given right of way over everything, and the operators had been warned in advance not to delay it. The other was treated as an ordinary commercial message.

It is hard to imagine the conditions which preceded the opening of the first cable. We can get some idea of them from the conditions which now prevail where the battle news is so strictly censored that we can merely sense what is going on at the front. Certainly the Americans who are awaiting news of relatives and friends marooned at different points in Europe, and especially in Germany, would have fared as well, so far as quick information is concerned, if they had been dependent upon the clipper ship carrying mails and "advices."

*From the New York *Commercial*.

Despite the fact that facilities for quick communication have increased immeasurably there is good evidence that the historian and not the reporter must be depended upon to tell in detail what is happening only a few minutes away by cable. We fear, too, that the historian will have almost as much difficulty in getting together precise and dependable data as he did in ancient times. For the war lords who have tried to blind the eyes and throttle the voice of the press in this greatest struggle of all times will probably be reluctant to tell the exact immediate causes of the war. Further, to follow the events which are occurring along a battle line of 250 miles in length would take an army of reporters with the freest use of the wire and code.

Despite the handicaps which surround the gathering of news, however, the cable has done marvellous things in the present crisis. It has given the average American newspaper reader a perspective and a viewpoint better than those within sound of the guns, excepting the highest officials. The people of Germany, for instance, must be content with the most meagre bulletins, and even in democratic Britain the grim Kitchener has threatened to close down any newspaper which uses war news not passed by the censor. To this side of the Atlantic come news and despatches from both sides.

It was the cable which gave to Japan the sign that the time was ripe when she could with impunity drive the Germans out of China, and truly the cable must have helped the Kaiser to knowledge as to the attitude of the non-German world, which undoubtedly surprised him. More than all the cable has given the governments of all the warring nations to understand that "a decent respect to the opinions of mankind demand that they state the causes"—to quote the masterpiece of Jefferson—the reasons for their action.

The laying of the first cable did more than facilitate commerce and intercourse between nations. It bound peoples together, and while the crowding of nations for the best "place in the sun," the friction engendered when race comes in contact with race, and the antipathy excited by the human desire for a test of power when armed men face each other, have resulted in a great war, it is very plain to be seen that the instant service of the cable has made governments involved, even the most autocratic, eager to win the approval of the one great neutral power which is in position to clothe and feed them all.

CANADIAN NOTES.

W. J. O'Connor, aged forty-two years, night chief operator Canadian Pacific Telegraphs, Ottawa, Ont., died September 8.

Great North Western Telegraph Election.—The thirty-third annual general meeting of the shareholders of the Great North Western Telegraph Company was held in Toronto, September 30. The following directors were elected: Z. A. Lash, K.C., president; Adam Brown, vice-president; James Hedley, Hon. J. K. Kerr, K.C., Newcomb Carlton, Aemilius Jarvis, F. B. Hayes, E. Y. Gallaher. The other officials are: George D. Perry, general manager; A. C. McConnell, secretary and auditor, and D. E. Henry, treasurer.

THE TELEPHONE.

Mr. G. D. Milne, treasurer, American Telephone and Telegraph Company, New York, has been elected a director of the Southern Bell Telephone and Telegraph Company, to succeed the late E. J. Hall.

Mr. E. D. Nims, first vice-president and treasurer, Southwestern Telegraph and Telephone Company, St. Louis, Mo., has returned from Europe.

Mr. H. S. Brooks, general commercial superintendent, long-distance lines, New York, has resumed his duties after a year's rest in Europe. He is much improved in health.

Messrs. Guido Pantaleoni and Charles R. Bangs have been elected directors of the Southwestern Telegraph and Telephone Company (New York Corporation) to succeed Messrs. Charles H. Wilson and James K. Wass. Mr. Pantaleoni has also been elected director of the Missouri Corporation of the same name, succeeding Mr. James K. Wass.

Telephones in New York.—There were 550,895 telephones in service in New York City on October 9. This represents an increase of 25,754 since January 1.

Automatic Telephones in Argentina.—An automatic telephone system of 5000 lines is being installed in Rosario, Argentina. A similar installation of 2000 lines at Cordoba is said to be giving excellent results.

The Private Branch Exchange switchboard on the balcony of the receiving room of the Western Union Telegraph Company at 16 Dey street, New York, consists of a three-position board with twenty-six trunks, fifteen tie lines and 185 extensions.

London Telephone Statistics.—On March 31 of this year there were 240,870 telephone stations in London, an increase of 14,636 for the year. In the year previous the increase was 14,731. Development study shows that the number of stations connected with the London telephone system in 1922 should reach nearly 500,000.

Severe Punishment for Being German.—According to *The Telephone News* all Germans now in London are without telephone service. When the war first broke out there were about 30,000 Germans in the English capital. At the order of the government, Germans who have been telephone subscribers were disconnected and will be refused further service.

Training Telephone Operators.—The Bell telephone companies in Pennsylvania and Delaware maintain several schools for the purpose of securing and training the number of young women necessary to meet the ever increasing demand for efficient telephone operators. In these schools, the applicants who have qualified for entrance are instructed, during a course lasting from three to four weeks, in the work of operating and the duties and responsibilities pertaining thereto. Students are paid during the period of instruction.

A. T. & T. Co. Report.—The American Telephone and Telegraph Company has reported to the Massachusetts Public Service Commission that its net income for the year ended June 30 was $42,199,962, as compared with $41,294,021 in the preceding year. Of this total $40,981,667 came from investments in subsidiary concerns, against $39,528,348 from this source in 1913. A balance of $32,803,173 left, after all charges had been met, was equivalent to 9.52 per cent on the company's stock. The previous year's balance was $33,211,597. The balance sheet showed that the company had written off $16,700,000 from the book value of securities owned, and had laid aside $11,000,000 less as reserve against contingencies than in 1913. The total reserve against depreciation, contingencies and the employes' benefit fund amounted, at the close of the year, to $31,656,653, as compared with $41,940,246 when the preceding fiscal period ended. Total assets, as of June 30, amounted to $642,520,583.

Chinese Exchange in San Francisco.—The Chinese telephone exchange in San Francisco is built in conformity with the best Chinese architecture. The interior is elaborately frescoed with dragons and Chinese designs, the woodwork being finished in ebony and gold. The exchange for many years has been under the direction of Loo Kum Shu, a native-born Californian. Fourteen Chinese girls are constantly employed at the handsomely carved switchboard. These operators are both fluent English and Chinese scholars and handle between 7,000 and 8,000 local calls per day.

Convention of Telephone Pioneers.

The fourth annual meeting of the Telephone Pioneers of America will be held in Richmond, Va., on October 29 and 30, with headquarters at the Jefferson Hotel.

On October 29, the morning session will be occupied by registration and the business meeting, and, in the afternoon, papers of interest to all the membership will be presented. In the evening, the annual banquet will be held in the Jefferson Hotel.

On October 30, a special steamer will leave Richmond at 9 a. m. for a day's trip on the historic James River, reaching Old Point Comfort for dinner at the Chamberlain Hotel. At 7 p. m., the trip will be continued by night steamer to Washington, where the meeting will disband.

The American Telephone and Telegraph Company has invited members of the Association, their wives or immediate members of their families accompanying them to be its guests at the banquet at the Jefferson Hotel on the evening of October 29; upon the day trip on the James River; at the dinner at Old Point Comfort, and on the night trip to Washington.

Arrangements for transportation, or for accommodations in Richmond, may be made by communicating with the transportation or local committees. Messrs. R. H. Starrett, W. E. Huntington and J. E. Knetzer, New York, constitute the committee on transportation. Mr. J. W. Crews, 709 East Grace street, Richmond, Va., is chairman of the local committee.

The minimum rate at the Jefferson Hotel, which is conducted on the European plan, is $1.50 per day.

Special arrangements have been made with the Old Dominion Line for a boat trip from New York to Richmond, and with the Pennsylvania Railroad for a special train from New York to Richmond. Pioneers living in the vicinity of or at a distance from New York, who desire to travel via New York, may take advantage of these special arrangements.

The Old Dominion steamer will leave New York, Pier No. 25, North River, at 3 p. m., Tuesday, October 27, arriving at Old Point Comfort at 9 a. m., Wednesday, October 28. The train will leave Old Point Comfort at 9:25 a. m., and arrive at Richmond at 11:30 a. m. The rate from New York to Richmond will be $9.00, meals and berth in stateroom included.

The train on the Pennsylvania Railroad will leave New York at 9:30 p. m., Wednesday, October 28, and arrive at Richmond, Thursday, October 29, at 7:50 a. m.

The train fare from New York and vicinity to Richmond will be $7.10, and from Philadelphia, $5.30. The reduced rate applies only when ten or more persons travel together. Pullman rates from New York or Philadelphia, upper berth, $1.60; lower berth, $2.00; compartment, $6.00; drawing room, $7.00.

The return trip of the Pioneers Special will be made from Washington on Sunday, November 1, at 10 a. m.

The party rate on this train will be: Washington to Philadelphia, $2.72; Washington to New York, $4.52. Pullman seat to Philadelphia, 75 cents; to New York, $1.25.

A rate of 75 cents per person has been obtained for the transportation of the Pioneers on their arrival at Washington, from the boat to their hotel, a sight-seeing trip around the city and transportation from the hotel to the railroad depot.

Mr. R. H. Starrett, 15 Dey street, New York, is acting secretary of the Pioneers, in place of Mr. Henry W. Pope, who is confined to his home by illness.

The first convention (organization meeting) of the Telephone Pioneers of America was held at Boston, Mass., November 2 and 3, 1911; the second convention at New York, November 14 and 15, 1912, and the third at Chicago, October 16 and 17, 1913.

Following is a list of officers for 1914: President, Theo. N. Vail; vice-presidents, T. D. Lockwood, T. B. Doolittle, C. F. Sise, G. E. McFarland; secretary, H. W. Pope; treasurer, G. D. Milne. Executive committee: A. S. Hibbard, chairman; C. G. Du Bois, C. E. Scribner, E. F. Sherwood, J. T. Moran.

President Theo. N. Vail will probably open the meeting, and he is expected to read a paper.

The association now has upward of 1,200 members.

Telegraph and Telephone Age

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REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

NEW YORK, OCTOBER 16, 1914.

Scientific Management of Telegraph Interests.

How to maintain a safe margin between the income and expense accounts of the telegraph companies is the largest problem with which the officials have to deal. It is not only a large one but a difficult one, and calls for extraordinary ability in order to preserve the proper balance. Judicious economy seems to be the only way to meet the situation, with emphasis on the word "judicious."

Scientific management of large interests calls for the use of the best means available to produce the best results. It does not mean reduction of salaries, but it does mean the exaction of the greatest amount of intelligent service the individual is capable of rendering. It means that there must be no friction between departments and individuals, but co-operation, and harmonious action—no waste of any sort.

Competent authorities agree that it is economy to employ first-class help in the performance of any service, and to pay the best wages in order to secure the best results. The plant itself must be kept in first-class order for the same reason. The problem of the engineers is to get the most business over a wire safely and reliably in unit time, and, in order to do this, it is necessary to have good material. And so it is in every department of the service.

The necessity for scientific economy lies mainly in the fact that the cost of handling business is constantly increasing, while the income does not increase to a corresponding degree. The companies are beset with many difficulties that no one a few years ago ever dreamed would arise. The legal departments have become a large and important part of the organization for the reason that the company's interests must be guarded against the tendency of national, state, city and town legislation to hamper the action of telegraph companies and lay heavy burdens upon them. These aggressions are not growing fewer.

The steady increase in the cost of construction materials, apparatus and supplies, in general, adds another burden to the companies, and these, together with the operating costs, such as salaries, etc., render it highly necessary for the exercise of strict economy, in order to make the business reasonably profitable to the stockholders.

The rates on telegrams, on the other hand, do not increase, and the public little appreciates the strain put upon the telegraph companies in their endeavors to maintain existing tariffs unchanged. An exhibition of the slightest desire or necessity to advance rates would be immediately met with great public opposition and would lead to interminable legal difficulties.

It is not difficult, therefore, to understand why strict but judicious economy should be practiced, and it is the duty of every employe to uphold his company in its endeavor to accomplish the best results, and heartily co-operate in its plans. By so doing, he is protecting his own interests, as well as those of the company which employs him, for the two are so closely interwoven that if one suffers the other must suffer also.

Unnecessary Telegraphing on Railroad Wires.

An illustration of how a good idea, once expressed, takes root in the minds of others, is found in the spreading movement among railroad officials to stop the abuses of telegraph facilities on their roads. The railroad wires on most roads are sorely burdened with communications that could just as well be transmitted by mail, much to the detriment of legitimate wire business. Railroad officials are awakening to the situation and are taking repressive means in the case of unimportant and irrelevant messages. This misuse of the wires is not new; it is a growth which has assumed such proportions that the time has come when the evil must be eradicated.

As railways increase in mileage, and as cities grow and industries multiply, railroad telegraph business will naturally increase, and it is essential that business principles be applied to the service.

Telegraph codes are used on some roads to reduce the burden on the wires, and, with intelligent use, they, no doubt, can be made to serve a valuable purpose. On a certain Western railroad the force in a relay office was reduced from twenty-four men to five by proper sifting of the telegraph business, the manager determining which messages should be sent by wire and which by mail.

The War Situation.

In meditating upon or discussing the European war the question "is it not possible to avert wars" naturally presents itself to the mind. Two theories have been proposed to bring about such a desirable result. They are diametrically opposed to each other, yet both have many sincere advocates. One is that in order to preserve peace among the nations they must arm and be prepared for war, and the other favors general disarmament.

To the reflecting mind there is much incongruity in the theory that in order to avoid war a nation must be prepared for war. The two ideas are conflicting, and it cannot be said that the proposition is in harmony with the spirit of the times. There is too much of the chip-on-the-shoulder idea about it. Any nation that advocates such an ideal is sure to bring war upon itself sooner or later. If, for instance, the United States should erect forts along the frontiers of Mexico and Canada and these countries did the same thing, how long would the forts face each other in silence?

Disarmament, it seems to us, is the proper solution, and, although the idea has hardly passed beyond the first stage, it is vigorously claiming the attention of the civilized nations. The leaven is at work and the time is not far distant when the children of men will be brought to the realization that it is the duty of man to hasten the day when "peace on earth and good will toward men" will be a practical reality. The natural tendency of civilization is to promote peace and happiness, and not to destroy.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

What is the meaning of the term "permeability?"

What is the comparative permeability of iron and air?

(Page 63) What is the effect of extending one end of the iron core of an electromagnet and pivotting an armature thereto?

By arranging contacts so that they will be opened and closed by the motion of the armature, what instrument is thus represented?

Upon what does the strength of pull on the armature of a relay depend?

What is the effect of the air gap on the lines of force?

What is the reluctance?

What instrument illustrates the reaction between two magnetic fields?

Study the illustration on page 64, showing the skeleton arrangement of a telephone ringer.

(Page 64) How are the fields disposed in the two coils?

What is the effect of reversing the current?

What class of current is used in the operation of a ringer?

What is the frequency mostly employed?

Upon what does the polarity of the field set up by the "idle" coil depend?

With no current in the coils, how is the armature magnetized?

Why are both ends of the armature North, and of what sign is the centre?

(Page 65) Cite another example of reaction between two fields.

Describe the construction of a telephone receiver; what are the different parts used in its make-up?

How is the air-gap in the telephone magnetic circuit reduced?

What part of the iron diaphragm of a telephone vibrates?

What makes the diaphragm so sensitive to slight changes in field strength?

How are the two coils of the receiver connected?

(Page 66) How small a current will a telephone receiver detect?

A coil of wire pivoted at the centre behaves like a magnet when a current is passed through it: How can the direction of the current be determined by the position the coil assumes?

If we look along the wire in the direction the current flows, how does the magnetic field rotate?

What convenient simile may we employ to determine the direction of rotation of the lines of force?

Can lines of force cross one another? If not, how do they flow?

If a current flows through two adjacent wires, how will the wires tend to place themselves with reference to each other?

(Page 67) How will a compass needle tend to place itself if held close to a wire carrying a current?

What does this phenomenon suggest?

What would be the effect upon the needle if the same wire forms a loop around the needle?

What effect would two complete turns have on the needle?

Why is the deflection of the needle increased by increasing the number of turns of wire around it?

How can the sensitiveness of a galvanometer be increased?

Is there any limitation to increasing the sensitiveness by adding turns of the wire?

Why cannot turns of wire be added indefinitely?

(To be Continued.)

TELEGRAPH AND TELEPHONE EXTENSIONS IN PANAMA.—Telegraph and telephone facilities are being rapidly extended in the Republic of Panama in anticipation of a greatly increased demand for lines of communication with the opening of the canal. The Department of Public Works recently ordered 1,800 miles of telephone and telegraph wire, the larger part of the order being placed in the United States. The first new line to be constructed will be to David.

RADIO-TELEGRAPHY.

WIRELESS IN RUSSIA.—Twenty radio-telegraph stations have been erected by the chief department of posts and telegraphs at various places on the Russian sea coasts. They are all equipped with the newest Marconi and Telefunken appliances.

WIRELESS IN HONDURAS.—The government of British Honduras has begun the erection in Belize of concrete foundations for the towers of a wireless-telegraph station, which it is planned to have in operation before December, 1914. The two towers will be 250 feet in height, and power developed will be five kilowatts.

WIRELESS LICENSE FOR A LEPER.—It is stated that Archibald Thomas, a leper confined in a colony on an island near New Bedford, Mass., will receive a license from the Navy Department as an amateur wireless operator if he is able to pass the prescribed examination. The radio inspector at Boston will conduct the examination by telephone.

POCKET WIRELESS.—It is stated that the German Government has offered a large sum to Professor Domenico Argentieri, of Aquila, Italy, for his pocket system of radio-telegraphy. Professor Argentieri has refused the offer, preferring to place the invention at the service of his own government. The apparatus is capable of intercepting messages from the Eiffel Tower, 730 miles from Aquila.

MEETING OF RADIO ENGINEERS.—The Institute of Radio Engineers held its October meeting at Columbia University, New York, October 7. Dr. Alfred N. Goldsmith presented an illustrated paper on "Radio Frequency Changers." The most recent forms of radio frequency changers, particularly those depending upon the properties of iron, were considered, together with their possible application to radio-telephony.

THE MARCONI INJUNCTION SUIT.—The suit in equity brought by the Marconi Wireless Telegraph Company of America to enjoin the Secretary of the Navy of the United States from further interference with the transmission and reception of wireless messages at the stations of the company located at Sea Gate and Sagaponack, L. I., was argued before Judge Veeder, in the United District Court. The assistant attorney-general appeared and argued that the court had no jurisdiction, and on October 8, Judge Veeder dismissed the bill on the technicality.

G. E. Clarke, Superintendent of London Office of Marconi Company.

Mr. George E. Clarke, superintendent of the city office of the Marconi Wireless Telegraph Company, London, England, is a former cable operator, and has had a wide experience. He is a native of Brighton, Sussex, England, where he was born on September 15, 1872. His first telegraph service was in the railway office at Brighton, later becoming connected with the government telegraphs at the same place. In 1891 he entered the service of the Commercial Cable Company in London. He was senior cable operator at London in charge of the stock exchange offices for ten years. Mr. Clarke was engaged in the New York office of the Commercial Cable Company from July, 1911, until August 31 of this year, when he resigned to accept his present position.

Mr. Clarke is well known to London business men and is well qualified for his new position.

OBITUARY.

C. V. ELLER, an operator in Chicago, died in that city September 13.

FRANK WINGET, manager of the Western Union Telegraph department, *Daily News* office, Chicago, died September 26.

RICHARD W. SEARS, aged fifty-two years, died on September 28, at Waukesha, Wis. He was an old-time telegrapher and founder of Sears, Roebuck Company, Chicago. Mr. Sears had accumulated a fortune of $25,000,000.

FRANK J. KIHM, aged forty-eight years, reporter and telegraph editor on the "Brooklyn Eagle," and a widely known telegrapher, died in Long Island City, N. Y., October 2. Mr. Kihm was a native of New York City, and was one of the most rapid telegraphers of his day. He developed phenomenal speed as a sender, and, in 1892, won the world's championship at a tournament. For this achievement he received a medal from the late John W. Mackay, founder of the Postal Telegraph-Cable Company. He was one of the first operators employed by the United Press, when the latter was organized. Mr. Kihm was on the staff of the "Brooklyn Eagle" for more than twenty-eight years, and his superior ability as an operator won for him wide fame.

JOHN H. TOPLIFF, aged sixty-eight years, a well-known old-time telegrapher, died in St. Louis, Mo., October 5. Beginning as a messenger boy in the office of the Western Union Telegraph Company at Syracuse, N. Y., he became an operator at the age of fifteen. He went to St. Louis forty years ago and was chief operator for the Western Union. Twenty years ago he was appointed manager of the Cupples Branch, Postal Telegraph Station, and remained in that position until three years ago, when he retired on account of ill health. Mr. Topliff worked for the Franklin Telegraph Company at 11 Broad street, New York, during the winter of 1867-68. Among his associates there were B. F. Cogger, Thomas Curry, Thomas P. Wheeler, E. V. Weedin, C. H. Sawyer, Cort Cunningham, Mort Smith, C. J. Sheehan and others well known in their day.

The Late John McNerny.

BY JOHN A. TOWNSEND, ROCHESTER, N. Y.

The death of John McNerny, for sixty years in telegraph service, calls, I think, for a more extended notice than the few words published in your issue of October 1.

I knew Mr. McNerny somewhat intimately during nearly the whole time of my telegraph service at Dunkirk, N. Y., covering a period of fifty-six years.

After about two years' service on the Erie Railway as lineman, he moved to Dunkirk, in 1854, I think, and took the position of foreman of repairs and construction of all wires on the Eastern Division of the Lake Shore and Michigan Southern Railroad, between Buffalo, N. Y., and Erie, Pa., and remained with that company until his death, which occurred September 16, last. He was highly esteemed by the officials of the railroad and of the Western Union Telegraph Company for the sterling efficiency of his line work, and was liked by all who knew him for his social qualities. He was active in church work and a prominent member of the various societies of the members of St. Mary's Catholic church in Dunkirk. His eldest daughter was the wife of Dan J. Maloney, Dunkirk, who is now the Western Union foreman of construction and repairs in that portion of western New York lying in the counties of Allegany, Erie and Cattaraugus in the district of superintendent A. C. Terry, Pittsburgh, Pa. Several daughters of Mr. McNerny have been in Western Union service for a number of years at Buffalo, N. Y., as assistants to the manager in the receiving and delivery departments at the main office. His only son, John G. McNerny, is foreman of repairs and construction of all Western Union lines within the city of Buffalo. The operating force misses a brilliant member in his declining to serve at the key, except in emergencies. He learned to operate when quite young, makes a beautiful pen copy, receives readily quite rapid senders and sends equally as well. He relieved me once for two weeks as manager and operator at Dunkirk, while I went on a vacation, and I could not wish for better service than he rendered in every way. He has often been urged to permanently enter operating service, but preferred his outdoor work to the sedentary work of an operator.

John McNerny deserves special mention, not only for his lengthy personal service in telegraph harness, but, also, for having reared a numerous offspring who have served long and creditably in the same.

Mr. McNerny will always be remembered with affection by a host of friends, among whom I am proud to be numbered.

INDUSTRIAL.

CONSOLIDATION OF EDISON INTERESTS.—The Edison Business Phonograph Company and the Mexican National Phonograph Company, both New Jersey corporations, have filed articles of dissolution. Their business will be absorbed and carried on by the Thomas A. Edison, Inc.

"HOME TALK" is the title of a folding pamphlet just issued by the Western Electric Company. Inter-phones for the home are excellently illustrated and their practical application is well shown in a large half-tone engraving. Diagrams of call-bell and inter-phone circuits are also illustrated.

DISPATCHERS' SELECTIVE SIGNALING SYSTEM.—The General Railway Signal Company, Rochester, N. Y., has recently perfected, in connection with G. R. S. selector equipment, a system, by means of which the dispatcher can control train-order signals and take-siding signals located at various stations on his division and can determine, whenever he so desires, the indication displayed by each signal. The system may also be utilized to indicate to the dispatcher a train passing a certain point corresponding to the operators' "O S" or train report.

Serial Building Loan and Savings Institution.

The usual yearly examination of the business of the Serial Building Loan and Savings Institution at the hands of the banking department of the State of New York has recently taken place, and the report of the result has been transmitted to the association. The examiner reports resources of the association as $804,157.22, which is its maximum to date, and that it is still growing in a healthy manner, and has a surplus over all its liabilities of $38,527.88.

The Serial is the leading association in the State in the movement to consolidate the influence and strength and credit of these associations into a great central institution, to be called the Land Bank of the State of New York, for the purpose of securing state-wide co-operation between the associations. This harmony between the associations will not be followed by any financial consolidation between them, but to enable the central institution to receive a portion of the investment moneys which is always seeking security for long terms. The central institution will make those investments entirely through the associations. This will be a great benefit to the home builders who borrow the association funds, by reducing their interest rates while the association is still able to keep up its rate of dividend to its own depositors.

The organization of this central institution has the strong support of the banking department of the State, and is recognized by the great financiers as sound and progressive. The Land Bank will be in operation early next year, or as soon as the present abnormal financial conditions, due to the European war, have subsided.

New Edition of Phillips' Code.

The demand for the new edition of Phillips' Code is so great that it is evident that there was a sore need for a work that would more thoroughly cover present-day telegraph service. In the new book there are about 700 additions to the older code, which brings it up to date. The work was revised by Mr. E. E. Bruckner, and was based on a systematic plan, and when the rules of abbreviating are once understood the meaning of the various symbols in most cases suggests itself. An idea of the systematic arrangement of the words may be had from two or three examples. For instance, the word "contempt" is represented by "ctm," "attempt" by "atm," "cvk" represents "convoke" and "pvk" "provoke." Every progressive telegrapher should have a copy. To be without this book places an operator practically in the second grade. Price, $1.00 per copy. Address, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

From 21 Wall Street to 195 Broadway.

BY W. D. SCHRAM, YONKERS, N. Y.

The recent removals of the Western Union operating department in New York from 195 Broadway to the new building on Walker and Lispenard streets, and of the offices of the company to its new building at 16 Dey street, bring forcibly to mind the previous removals that had been made from 21 Wall street to 145 Broadway, corner Liberty street, and from this latter location to 195 Broadway, where so many happy days in the company's service had been passed. They also bring to mind the very many good fellows who followed those movements, many of whom afterwards left the service to enter other business and many who have died.

My own service, which covers a period of about fifty-five years in New York City, beginning in 1858 at 23 Wall street, in a building which stood on the site of the new Morgan Building, was continued at 195 Broadway, until recently. The office at 23 Wall street was, when I entered the service there, in charge of Mr. C. T. Smith, who afterwards had charge of the lunch room at 195 Broadway. Mr. Smith died several years ago. This building was a small one fronting on Wall street, with an entrance in the middle, the telegraph-receiving office occupying the room on the corner of Broad and the store in Wall street was occupied by Hammond, a leading jeweler of the day.

The operating room occupied the entire upper floor, with a small battery-room at the eastern end. During rainy weather the operators were obliged to work with spread umbrellas over them to protect them from the rain coming through the roof.

The operators, as nearly as I can now remember, were William Porter, A. S. Downer, A. S. Brown, Walter Leaming and myself.

After working in that office some time I resigned and accepted employment in the American Company's office at 21 Wall street, on the opposite corner of Broad street, where in addition to the Morse equipment, two House printers were in the service, with operators Henry Bishop, Doc. Cure and others. Operator Cure had a night trick, and, as he used paper, he was unable to keep copied up very closely; many a time a great quantity of paper got ahead of him, causing many perplexing situations.

The receiving office on the first floor was in charge of Mr. Clasback, N. T. Curtis and John Oltman, who afterwards became a member of the New York Stock Exchange, and who died suddenly at the New York Athletic Club, and others whose names have escaped my recollection.

From here the office was moved to 145 Broadway, corner of Liberty street, where I entered the office of the New York, Albany and Buffalo Company, located on the second floor. This was a fine office for those days, and was under the charge of Charles L. Whiting, who afterwards moved to Buffalo, and entered the iron business. The operators were A. S. Brown, James Hawn, Richard Stevens, who, I believe, lately died in California; Enos Barton and myself.

Half of the force was off duty every day at 4 o'clock, and of those remaining on duty all but one would go to supper, while the one on duty sent the day's receipts to Utica, the headquarters of the company. Upon the return of the one who went to supper, the other went home, leaving one operator to close the office. "Extra" was paid after 9 o'clock, I think, and the one who remained on late managed to find work enough to do to keep him a short time after midnight, so as to make another hour.

From 145 Broadway I was transferred to take charge of the Gold Board office at 16 New street, where quite a business was done. The Gold Board was presided over by a Mr. T. A. Hoyt, who, I believe, was a minister, and who afterwards left to take charge of a church somewhere in the West. He was a very large, fine-appearing man, and was very much liked.

After removing the general office from 21 Wall street, an office was kept at that number, and when the manager resigned, I was, in addition to the Gold Board office, given charge of that office also. The late M. H. Kedding later relieved me at 21 Wall street, the Gold Room being closed, and I was transferred to the management of the receiving department at 145 Broadway, where I remained until the office at 195 Broadway was opened. I entered the office of J. C. Hinchman, general supeintendent, where I remained until transferred to the office of Charles A. Tinker, who was named as general superintendent in place of Mr. Hinchman. Here I remained in a very pleasant office with pleasant associates for a number of years, until the advent of a new administration.

May the Western Union always prosper.

Safety Rules in Electrical Work.

The Bureau of Standards, Washington, D. C., has issued a circular (No. 49), containing safety rules to be observed in the operation and maintenance of electrical equipment and lines. The bureau has, for the past year, been engaged in the study of safety rules and has found, from analyses of electrical accident data available, that a large proportion of accidents are preventable by the observance of definite operating precautions. As a result of its investigations this code of safety rules has been drawn up and is now offered for criticism, discussion, and, as far as possible, for general adoption. Among the rules are eight on signal-line operation, which classification includes overhead or underground telegraph, telephone, police, fire, district messenger, or other signal lines. Dr. S. W. Stratton is the director of the bureau.

FIRST TELEGRAPH LINE IN THE OIL REGION.—The first telegraph line into the oil region was from Pittsburgh to Franklin. It was built in 1862, and extended to Oil City in the following year. On this line the first operator at Franklin was Mr. A. B. Gildersleeve, now a resident of Wilkinsburg, Pa. Later this line was purchased by the Western Union Telegraph Company and was known as "No. 13 to Oil City" for many years.

The Goat Ate the Orders.

BY THOMAS M. RAGEN, NEW YORK.

For many years he had been known as "Old Man Burns." Apparently, the title "Old Man" had been given him because of his advanced years, but few persons addressed him other than "Mr. Burns," though old timers in the little mining town up in the Pennsylvania hills sometimes referred to him as "Mike" or Michael.

When a youth he had come over from the Little Isle Across the Sea, a black-haired, sturdy Irish lad, who had little trouble in finding employment in the coal mines.

A few years later we find him the station agent and telegraph operator at the same little village, where he had also chosen a life partner. A large family of sturdy boys and girls later blessed his home.

At sixty years of age we find gray hairs framing his handsome face, which was always serious. Always attentive to duty, there were few men on the line more respected than Old Man Burns. His advanced age, now, however, had lessened the elasticity of his muscles, so that his efforts at transmitting Morse characters were not always productive of results; in fact, at his very best now, his sending was decidedly poor.

No. 9, the westbound express, due at the little mining town shortly after noon, was the pet train of the big railroad system. It had long been the proud boast of the railroad officials that the farmers along their road could set their watches by this train.

One warm, sultry day in mid-summer it became necessary to send a train order for No. 9 to Old Man Burns, which was copied and repeated back by him in regular form, and held until the conductor would sign it when the word "correct," which completed the order, would be transmitted by the train dispatcher. With danger signal properly displayed and the order repeated back to the dispatcher, nothing then remained but the conductor's signature and the word "correct."

Old Man Burns placed the book containing the train order for No. 9 on the table directly in front of the open window, unmindful of the presence of several goats that were scouting around the little depot. The intense heat and heavy mid-day meal was a combination that Old Man Burns fought for a little while, but lost in the fight, and soon fell into a sound sleep.

One of the goats that had been hovering near the depot, a saucy William, grew more bold than the others and was soon before the open window where lay the train order book containing the orders for No. 9. Soft silky paper such as he now beheld was a luxury not to be found on tomato or salmon cans, and the goat quickly went to the feast, while Old Man Burns was still in the arms of Morpheus.

The sound of No. 9 approaching awoke Old Man Burns from his sleep just as the goat was finishing the last gulp of the dainty train order book, and the effects on Old Man Burns was demoralizing. First he tried to catch the goat, which soon outdistanced him in a short foot race. Then he dashed back to the telegraph office and tried to say something to the train dispatcher. His efforts at making Morse characters was a failure and it took several minutes before he could calm himself enough to make the dispatcher understand that he wanted orders for No. 9. The dispatcher could not understand why he was being asked for orders when he had before him the copy of the orders he had sent to Old Man Burns some time before, and told him he, the dispatcher, had sent the orders to No. 9.

"The goat ate them" was all the dispatcher could make out. The orders were repeated to Old Man Burns, and in a few minutes No. 9 was started westward again, but goats were not allowed to mobilize any more around the little railroad depot, and it was also necessary for Old Man Burns to explain the matter to the railroad officials.

If Iron Should Become Non-Magnetic.

Prof. J. A. Fleming, the well-known English scientist and electrical engineer, tells what would happen if iron should lose its magnetic properties.

If iron were non-magnetic, by some freak of nature, without otherwise losing its mechanical properties, our modern civilization would collapse. Crowds would go, as usual, to their railway stations, metropolitans, tubes and main lines, only to discover that no electric trains are running. The generators at the supply stations would all have ceased to act. Officials would frantically endeavor to find out why the current was cut off, but all telephones and telegraphs would be dead. No electric light could be obtained, no electric bells rung by current from generators; no taxicabs or motor buses could move, because their magnetos, for the same reason, would be perfectly useless. No main-line trains would run, because all signals would be unworkable.

No anarchist, in his wildest dreams, could imagine a more complete knock-out blow dealt to our civilization than would thus be effected. Darkness, starvation and unemployment would, in one month, reign in all great cities. All shipping would be sealed up in port, or lost on the high seas, because the compasses had ceased to direct. Factories would be idle and electric power supply cut off at the source. All business would be arrested. Truly; the losing of iron of its magnetic properties would be a great calamity.

Mr. J. W. McMahon, manager, Western Union Telegraph Company, Bridgeport, Conn., writes:

"I send in my name to the journal of Fame,
And a two dollar bill for subscription;
Your paper is read 'fore going to bed,
And its tales of every description.
Fortified in mind for the day's daily grind,
And imbued with a keen inspiration,
I can work with "some ease" and swift, if you please,
On problems of vexing duration.
"This poet-laure-et" while telegraphing yet,
May probably climb higher some day?
And throughout every stage, I'll subscribe to the AGE,
For Knowledge surely does pay."

The First Telegraph in Australia.

The Melbourne, Australia, *Argus* publishes an interesting account of the first telegraph wire erected in Australia. It was early in 1854, and the citizens, who knew nothing of the telegraph, on seeing a long line of poles with a wire stretched between them assumed that the government was going into the public laundry business and the clothes were to be dried on the wire.

May 1 being the sixtieth anniversary of telegraphy in Victoria, Mr. T. R. James, the first manager of the telegraph department, gave some interesting reminiscences of the early telegraph days in Australia.

During 1853 Mr. S. W. McGowan, an officer of the postal department, had brought out from England three telegraphic sets of instruments and ten miles of wire for the experiment. Mr. McGowan was appointed inspecting superintendent of the telegraph department, and Mr. James, then a lad of twenty, was made manager. On May 1, 1854, the first message was sent from Melbourne to Williamstown.

For some time before the line was open for the transmission of public messages, the two ends had been in communication. The first actual test message received in Melbourne was taken on March 3. The line came down William street, past the old cemetery, and Mr. James, with the recording instrument placed upon the tombstone of an old colonist, received it, and sent a reply. Among those present on this occasion were Governor Latrobe and members of the cabinet. In this company the first click of the electric telegraph in the southern hemisphere sounded from the instrument on the tombstone.

Before the official opening on May 1, one important message was flashed over the wire from Williamstown. This news was of the declaration of the war with Russia in the Crimea.

Mr. James had obtained his knowledge of telegraphy from Dr. Davy, then head assayer for the Government of Victoria. Dr. Davy's work as a pioneer of the science of electricity is acknowledged by many authorities. He it was who invented the relay, and he had even made researches in wireless telegraphy, having sent messages for a distance of half a mile across the Thames in 1837. Mr. James believes that he would have made wireless telegraphy a practical science, instead of a laboratory experiment, had he been spared a few years longer. "He came to me one day," said the old telegrapher, "and said, 'I think, James, I have found the missing link in wireless telegraphy.' He asked me to let him have some instruments, and we arranged that he was to come into town, and that I was to lend him a room. 'But,' I said, 'before you do anything, take out your patents.' He replied that he could trust me. Still I urged him to take out his patents, and he went home saying that he would do so. His patents were never taken out, for he died shortly afterwards. Most of his papers were destroyed. If he had drawn plans they were never found.

"A frequent visitor to my office," continued Mr. James, "was Governor Latrobe. I only had one stool, so I could not offer him a seat, but he used to stand and watch the instrument at work, and tell me of his life in other lands."

The telegraph department having begun with this humble ten miles of wire, soon threw out its slender metal tentacles across Victoria. In December, 1854, the Williamstown line was extended to Geelong; and in 1857 the first telegraphic message came from Bendigo. The office at Bendigo was a tent, and Mr. James can recall the heat of the burning January day when the first click of the first message came through. Ballarat was linked up at about the same time, and from these two towns the wires ran out into the country, farther and farther each month. So quickly did the extension go on that it was in July, 1858, when the first connection was made with another state capital. Adelaide was the first to be connected, for on that date Sir Henry Barkly and the Governor of South Australia exchanged telegraphic congratulations. Only three months later Sydney was linked to Melbourne. The first sea connection was with Tasmania, to which, by way of King Island, a cable was laid from Victoria, with its terminal station at Circular Head. This cable, which was not very successful, only working a few months, was laid in 1859. Ten years later the Eastern Extension Company laid a second wire across the floor of Bass Strait.

The department now cast its eyes further afield. The submarine cable had become an accomplished fact, and the idea of connection with London was no longer a mere dream. A cable was laid to Port Darwin from Java in 1871, and South Australia was bisected by a transcontinental line of wire from Adelaide to the northern port. The cable was laid before the line was finished, and for some months the gap was bridged by messengers on horseback, who rode fifty miles or so from Port Darwin to the line-end. But this was not for long, and in 1872 London spoke to Adelaide. Curiously enough, many of the merchants of Australia resented this great, new factor in the development of the continent. It hit them where no man likes to be hit—in the pocket. "It would be worth £5,000 to me," said one importer to Mr. James, "if, for one month, the wire would not act." Ships had been kept off the coast until stocks of food had reached famine prices, and cornering commodities in this way for three months at a time was now no longer possible. Besides, there was the regular quotation of world prices. And the wire went on acting.

In 1890 the telegraph department moved into the general post-office. Its ten miles of wire had become 9,000 miles. There was a staff of 300, and 316 instruments. By this time the "sounders" had been introduced by Mr. James, who was still manager. The first of these new instruments was installed in 1874, and two years later the duplex system, and later still the quadruplex.

On June 30, 1893, Mr. James retired from the service at the age of sixty.

Responsibilities gravitate to the person who can shoulder them, and power flows to the man who knows how.—*Elbert Hubbard.*

How Submarine Cables are Made, Laid, Operated and Repaired.

(*Continued from page 460, August 16*)

HOW CABLES ARE REPAIRED.

The first indication that a cable is broken or faulty is the failure of the receiving apparatus to properly record incoming signals. Cables are interrupted either by complete severance of the conductors or by leakage in the insulation. When a conductor is completely broken there is an absolute loss of electrical continuity, but in the case of a leakage there is an escape of electric current in the cable without complete loss of continuity. These leakage faults are the most difficult to localize.

When the receiving instruments indicate that there is either a break or a fault in the line a test is immediately made from each end of the line. These tests are taken with very sensitive apparatus, constructed on the same principle as the mirror galvanometer heretofore described. A battery is applied through a galvanometer into the interrupted cable. An instrument containing a series of coils of very fine wire of various resistances is also employed. The instrument is so constructed that a resistance of one ohm to several thousand ohms can be attained. Several methods of testing are employed in the localization of complete or partial interruptions of cables, the most general being the Wheatstone bridge balance. In this a galvanometer, or similar sensitive instrument, is joined up between the arms of the bridge. The circuit is arranged identically the same as the circuit described for working duplex, except that the galvanometer takes the place of the recorder, and resistances of known and variable values take the place of the artificial line. It will be seen from the diagram illustrating the duplex circuit (see page 460, August 16) that a current passing into the apex marked *A* divides, part going to the line and the other part entering the resistance boxes. So long as the resistance in the line is greater than the resistance in the resistance boxes, or vice versa, a current applied to the apex will throw the spot of light of the galvanometer from the zero point. Therefore, the resistance in the cable, up to the point of the break, can be determined by altering the resistance of the resistance boxes until the beam of light remains stationary at the zero point, when the resistance in the line must equal the resistance in the boxes. After having made a series of confirmatory tests in this manner it is a simple matter to calculate the distance in miles from the shore. The unit of resistance is called an ohm, after the great German physicist who discovered and expounded the laws of the electric current. As heretofore explained the exact resistance per nautical mile of the conductor of the cable is known to the company. Supposing, therefore, that the known resistance per mile is two ohms, and the measuring apparatus indicates a total resistance in the broken cable of 800 ohms. The break would thus be ascertained by dividing the 800 ohms by two, which would place it 400 miles from the shore. With this information the captain of the cable repairing steamer is able to determine by his charts showing the position of the cable, the latitude and longitude in which the break has occurred, and the ship proceeds to the repair. Having arrived at a point near which the cable is broken, a mooring with a buoy attached is put overboard to mark the position.

BUOY PUT OVERBOARD BY CABLESHIP TO MARK POSITION OF CABLE.

(*To be Continued.*)

Mr. F. C. Hackett formerly prominent in telegraph circles as manager of various large offices, now in another line of business at Toledo, Ohio, writes in renewing his subscription for another year: "It is always a pleasure to receive your publication."

MUNICIPAL ELECTRICIANS.

Standard Construction for Fire Alarms and Police Circuits.

Mr. C. S. Downs, city electrician, Altoona, Pa., in his paper on "Standard Construction for Fire Alarms and Police Circuits," read at the annual convention of International Association of Municipal Electricians at Atlantic City, N. J., September 15, 16, 17 and 18, said that if it is necessary to place police and fire signaling wires upon electric-light poles, the electric-light wires should be strung upon standard ten-pin cross-arms instead of the average six-pin cross-arms, and should be placed on the top of the pole. Distribution from the electric-light wires should then be made from the ends of the arms directly to the tops of the buildings, instead of being strung at various angles from the poles, thus jeopardizing wires that may be beneath them. Mr. Downs suggested that the signaling wires be placed not less than four feet below the electric-light wires, and where possible the spacing should be at least six feet. In his estimation, the telephone and telegraph wires should be placed below the city wires, because experience has shown that the chief trouble with fire-alarm and police signaling circuits has been because the lighter telephone and telegraph wires drop across electric-light wires and come in contact with the city wires. The mid position on the pole also avoids the necessity of having linemen climb over high-tension wires in order to work upon the signaling wires. In many cities the police and fire-alarm signaling circuits are carried on extensions to the top of the pole, while in other cities the fire and police circuits have the lowest position on the pole.

Sending Fire Alarms.

BY J. T. M'GRATH

As an old fire department man I was much interested in reading in your journal [October 1] of Mr. Gaskill's paper, read at the recent convention of municipal electricians in Atlantic City, about the public ignorance as to sending alarms of fire.

The municipal authorities provide the means for the public to send in calls for the fire department, but stops there. They should also see to it that the citizens are instructed in some way how to use these means. The citizens themselves should also take an interest in these matters and meet the authorities half way. Of course, we all understand the cause of this seeming public apathy, but I think that a publicity campaign intelligently conducted would have the effect of bringing the citizens to a realization of the importance to themselves and to the community in which they live of knowing what to do in case of fire. This is a very simple duty and requires only a few moments' time to learn. I think it is safe to say that ninety-five per cent of the people of any city or town do not know how to send in a fire alarm.

In this connection another very important matter is brought to light and that is the existing lack of uniformity of fire alarm boxes and method of operation. Some boxes are provided with a pane of glass at the front which has to be broken in order to gain access to the transmitting mechanism, and others require a trip to the corner grocery or a private house to get the key to the box. The store may be closed and the occupants of the house may be absent, in which case the alarm cannot be sent from that particular box.

I read of an instance the other day where the jar caused by the closing of the fire alarm box door sent in a false alarm. This would indicate that the mechanism is too sensitive.

Uniformity in design and operation of boxes is, it seems to me, highly essential, and the municipal electricians should co-operate to bring about this desirable result. This, together with a wider public knowledge of how to use the boxes, would, no doubt, have the effect of greatly reducing fire loss.

Public Instruction as a Means to Increase the Efficiency of the Fire Alarm System.*

BY ROBERT J. GASKILL, SUPERINTENDENT FIRE ALARM AND POLICE TELEGRAPH, FORT WAYNE, IND.

From conversations I have had with a number of fire alarm superintendents I discover that we have been very much inclined to think that if our systems were in perfect operating condition there would be no other requirement for efficiency. While I can only speak authoritatively of the conditions as I found them locally, a year's investigation has convinced me that efficiency covers a wider field than mere operative perfection.

My attention was forcibly directed to this phase of the matter about a year ago when we had several rather serious fires due, in a large measure, to our not receiving the alarm promptly. An investigation into this failure disclosed the fact that without exception the delay was caused by the citizens not knowing the location of the nearest box, or how to operate it properly.

To illustrate this point, I will relate several incidents that occurred some time ago. In a flower store the watchman was putting some coal into the furnace when there was an explosion, the force of which threw the burning coal out onto the floor. The watchman, finding that he was burned too severely to turn in the alarm, called to a citizen who was passing at the time and requested him to give the alarm. Immediately the citizen ran across the street to a fire alarm box, broke the glass in the key guard, opened the outside door, but did not pull down the hook. Of course, the fire department did not come. Another citizen called the police department, which soon had the patrol wagon at the scene of the fire Finding that the fire department was not there, an officer hurried to the box where the citizen had been, and sent in the alarm. The fire department immediately responded, but by that time the fire had gained such headway that the building was gutted with a total loss. The nearest engine house

* Extracts from paper read at convention of International Association of Municipal Electricians, Atlantic City, N. J., September 15.

was less than one thousand feet from the scene of the fire, and was equipped with motor apparatus.

At a garage fire a citizen ran one block to the nearest fire alarm box, broke the glass in the key guard, and then returned to the fire without having pulled the box. As the fire department did not arrive promptly, another citizen called the department by telephone and wanted to know its reason for not coming. After learning the location of the fire the operator dispatched apparatus immediately, which extinguished the fire, but only after several cars were consumed.

At a residence on one of our boulevards children started a fire in the basement while their mother was visiting next door. The children ran to their neighbor's home and told their mother about it. The neighbor quickly went to the telephone and called for the fire department number, which is No. 19, but received instead No. 18, which is the number of the telephone belonging to the *Journal-Gazette* office. The office force, thinking that some one was giving in the fire as a news item, answered: "All right; we will be right out;" and the citizen thought that he had notified the fire department of the fire. After some time had elapsed another citizen, who knew the location of the nearest fire alarm box and how to operate it, arrived at the fire, ran about one block to the nearest box and sent in the call. This delay caused the fire to gain such headway that the building was almost entirely destroyed.

I might continue and relate a number of other incidents of a similar kind that have happened, but I think that enough has been shown to emphasize the fact that had the citizen in each case been informed as to the location of the nearest fire alarm box, and known how to operate it properly, the department would have been immediately notified of the exact location of each fire, and probably would have extinguished it with a minimum loss.

As to the manner of informing the public in regard to the location of the boxes and the proper way to operate them, ways and means will suggest to each person according to local conditions and the type of box installed.

Some cities use the box with the turn-handle, where all that is necessary to send in an alarm is to turn this handle to the right until the bell rings. Other cities use the trip-lever type, with the key to the outside door in the lock at all times and protected with a key guard and a glass door; to use this type the glass is broken, the outside door opened, and the trip lever pulled. Other cities use this same type of box, with the exception that the key to the outside door is hung in a key guard on the pole. Other cities have the trip lever extending through the outside door and protected by a glass panel. Still other cities, particularly some of the smaller ones, have the key to the outside door deposited with some citizen living in the immediate vicinity of where the box is located. When this type is used it is necessary to procure the key from the citizen before an alarm can be sent in.

A review of the manner in which we carried on the campaign to instruct the public in the proper way of using the system, and to instruct it as to the location of the boxes, will probably be of interest, and will suggest ways how some may help conditions locally.

We have all of our boxes and supporting poles marked in a conspicuous way by being painted with a bright red color, the paint reaching twelve feet from the ground; the painting is repeated as often as is necessary to keep the poles conspicuous. In the business district we mount the boxes on the electroliers, and have a red band around the top globe, with the words "Fire Alarm" in white letters in the red band. If it can be accomplished without the cost being prohibitive, we contemplate placing a red light over all of the boxes in the city, so that they will be visible at night as well as day.

We make it a point to attend all public gatherings that are held in a building, and that continue for two or more days. Here we set up an exhibition of the fire-alarm system, and detail a squad of firemen to handle it and instruct the citizen in the way the system operates. We generally have one or two boxes in convenient places and permit the citizens to pull them, and watch how the signal is received on the gong, indicator and register. We find that by permitting the citizen to pull the box and then watch it register, we can make an impression that would not be possible in any other way. In addition to giving verbal instructions, we distribute folding cards, explaining, in a simple way, how to operate the box and where the boxes are located.

We use a mailing card to good advantage in some cases. This card explains why it is better to use the fire-alarm box than to telephone in case of fire.

We also use the daily papers as much as possible where the use can be accomplished without expense to ourselves, and find that, with very little effort, we can induce the reporters to work in the instructions in connection with fire stories, and thus attract the public attention. Besides presenting this information to the public en masse, we are very careful never to miss an opportunity of instructing the individual citizen, and we meet with numerous ways to accomplish this in our daily routine.

Now as to the good we have been able to accomplish locally by this campaign of public instruction, and as to the increase in the efficiency of the fire-alarm system, I will cite the fact that comparing the first seven months in 1913, with the corresponding seven in 1914, the increase of straight box alarms over telephone alarms has been about 25 per cent and the confusion in telephone alarms has decreased in proportion.

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THE RAILROAD.

P. F. Frenzer, Superintendent of Telegraph, Union Pacific Railroad, Omaha, Neb.

Mr. Peter F. Frenzer, recently appointed superintendent of telegraph, Union Pacific Railroad, with headquarters at Omaha, Neb., was born in that city, November 5, 1868, and entered the telegraph service as a messenger at Omaha, Neb., in 1882. A year later he became an operator for the Sioux City and Pacific Railway at West Point, Neb. Since that time he has been employed by the Chicago, Burlington and Quincy Railroad, and the Western Union Telegraph Company, and in October, 1890, he entered the service of the Union Pacific Railroad as operator, becoming successively chief operator, manager, and, finally, superintendent of telegraph.

Wireless Telephony on the Union Pacific Railway.

In our issue dated September 16 was printed a brief item about the contemplated installation of wireless telephony on the Union Pacific Railway. Dr. F. H. Millener, the inventor of the system, who has been conducting experiments for the road in composite wireless and wire telephony, announces that his apparatus is now commercially practicable. His plans contemplate the establishment of wireless telephone stations at five points along the line, including Grand Island, Neb., and Ogden, Utah. At Green River a 200-foot tower will be erected on the high butte in the rear of the station, and with a five-kilowatt generator at Cheyenne and a ten-kilowatt generator at Green River, it is thought that all difficulties will be overcome. Dr. Millener states that he can talk to a moving train over a distance of 100 miles. The antenna on the cars consists of two wires running the entire length of the car, and this is connected with other cars of the train at the ends. The current supply for the operation of the system is obtained from a generator in the baggage car.

Railway Signal Association Convention.

At the convention of the Railway Signal Association at Bluff Point, N. Y., September 22, 23 and 24, the committee on automatic block signals was instructed to prepare specifications for apparatus and materials used in automatic signal construction; for field work on automatic block construction; for dry-batteries and for switch indicators. It presented specifications for a signal-cell caustic-soda primary battery, and for a direct-current vibrating highway-crossing bell.

The committee on wires and cables recommended a change to be made in specifications for galvanized steel signal wire; specifications for galvanized messenger wire; recommended sags for messenger wires of various sizes and strengths that may be used to support cables of the weight and for the spans given by tables; specifications for rubber-insulated tape and specifications for friction tape.

The committee on storage battery and charging equipment was instructed to prepare specifications for apparatus and material used in storage-battery work, and plans and specifications for operating switchboards. It was also directed to report on the comparative economy of various methods for charging storage batteries, also to prepare necessary descriptive matter covering the use of storage batteries in signaling.

The committee on electric railway and alternating-current signaling was instructed to prepare specifications and requisites for apparatus and materials for alternating-current block signal systems; to investigate the inductive effects between signal circuits and adjacent electric circuits, and formulate recommendations, also to investigate the hazard due to the paralleling of high-tension and low-tension wires.

The special committee on lightning protection made a report on air-gap arresters for use on circuits of 250 volts or less; vacuum arresters for use on circuits of 175 volts or less, and choke coils for use on circuits of 250 volts or less. The report was accepted as information.

Railroads and the Telephone.

The railroads of the United States could not handle the immense amount of business which goes over their lines if they were not equipped with telephone service, says the *Telephone Review*. A large railroad freight transfer station is a busy place, with many telephones and all of them constantly in use straightening out tangles and keeping the shipments on the move. But a new benefit provided by the telephone to the public and the railroads has been discovered by one of the largest transfers in the East.

All the railroads in the United States send freight to this station, and there are many misdirected packages or bills of lading. This station, therefore, started to collect telephone directories of the principal cities of the United States, and when, for example, a way bill reads "John Smith, Wilmington, Del.," and the package is marked "Wilmington, N. C.," the telephone books of these two cities are consulted. Usually this determines the destination and the shipment is promptly forwarded, but if the consignee has no telephone, the goods which he may need are often delayed for a long time until the shipper furnishes the correct address.

RAILWAY TELEGRAPH SUPERINTENDENTS.—Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., and chairman of the Eastern Division of the Association of Railway Telegraph Superintendents, has called a meeting of that division, to be held at the Pennsylvania Station, in New York, on November 11. Among the subjects to be brought before the meeting will be a paper on "Inductive Interferences from Automatic Printing Telegraph Systems on Railway Telephone Circuits." The discussion of this paper will probably bring out a great deal of valuable information on the general subject of interference. There is promise that the meeting will be well attended. The annual meeting of the parent association will be held in Rochester, N. Y., June 22, next year.

Friendship Circle Club.

At New Orleans, last May, the wives of the active and associate members of the Association of Railway Telegraph Superintendents living in Chicago and suburbs were called together by Mrs. Wm. Bennett and organized the "Friendship Circle Club," the object of the club being to form a closer social bond between the members. There are now twenty-two members, with officers as follows:

Mrs. Wm. Bennett, president; Mrs. P. W. Drew, vice-president; Mrs. F. H. Van Etten, treasurer; Mrs. J. H. Finley, secretary. The club has been entertained at the home of Mrs. Bennett, at Willmette, on July 27, and at the home of Mrs. J. H. Finley, Western Springs, September 22. On Labor Day, together with their families, several of the members met at Lincoln Park for a basket picnic.

Plans are underway to make these monthly meetings more interesting and instructive by having musicales, lectures and matinée parties. It is thought that the idea is too good to keep among the ladies exclusively, therefore some of the meetings are to be open to the men, and the programme and luncheon for the occasion will be especially prepared to cater to their tastes. The interest is increasing, and the object of getting better acquainted and having more in common seems to be realized.

Membership in Old Timers' Association.

Old time telegraphers, as a rule, are proud of their connection with the telegraph, and this sentiment is promoted and kept alive by the Old Time Telegraphers and Historical Association. Every old timer, whether in the business now or not, is eligible to membership and should join the association for the sake of keeping alive the memories and recording the achievements of former days.

Following is the by-law on "Qualification for Membership:"

"Any person in good standing, who, prior to twenty-five years before the date of making application, was employed in the telegraph service, and thereafter for five years, shall, upon payment of $2.00 (an initiation fee of $1.00 and $1.00 dues) be eligible to membership."

It is earnestly hoped that all those who are eligible to membership will write for application blanks, and thus become affiliated with one of the most excellent associations in the United States.

Blanks can be obtained upon application through Mr. J. B. Taltavall, Committee on Membership, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Easy Lessons in Technical Telegraphy.

Every student in telegraphy will find a copy of the "Correspondence School Lessons in Telegraphy" a great help in his studies. It is a telegraph school in itself and is a real practical work; it gives the student a solid foundation to build practice upon. It is elementary but fundamental, and no ambitious telegraph student can afford to be without a copy.

The first chapter deals with the simple mathematics necessary to apply to the facts and problems met with in every-day practice. Then follow chapters on electricity, gravity battery, circuits, ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement, magnetism, electromagnetism, self induction, the induction coil, the relay, the local circuit, the key, Morse circuit, "earth's" switches and switchboards, single circuits in bad weather, line leakage, static induction, testing, testing instruments, repeaters, the duplex, etc.

The book is amply illustrated and the subjects are treated in the text in simple language, so as to make it understandable to the student. Each chapter is followed by a few review questions which are very helpful in keeping the memory fresh as the student progresses.

The price of this excellent work is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Edition of Jones Diagrams.

The new edition of Jones "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers" will be ready for delivery in December. The work has been greatly enlarged and brought up to date, after having undergone a thorough revision. It will be bound in flexible leather covers.

The price will be $2.00 per copy.

Miscellaneous.

EXPENSIVE POLES.—Mahogany and ebony telegraph poles are used on a telegraph line in Borneo.

PRINTING TELEGRAPHS IN ARGENTINA.—A page-printing telegraph system is being adopted on the Argentine telegraph lines.

ELECTION.—The annual meeting of the Philadelphia, Reading and Pottsville Telegraph Company was held in Reading, Pa., October 4. These officers were elected: President, Theodore Voorhees; treasurer, H. E. Paisley; secretary, George Ziegler.

GUARDING WIRE COMMUNICATION IN LONDON.—In order to guard telegraph and telephone communication in London the government has surrounded the general post-office with a high fence of heavy steel mesh wire. This measure was taken to prevent any attempt to dynamite the building.

INTERNATIONAL ELECTRICAL CONGRESS TO BE POSTPONED.—It is understood that the organization committee of the International Electrical Congress has recommended an indefinite postponement. The Congress was to have been held at San Francisco next year, during the Panama-Pacific Exposition.

PHILLIPS'S MAGAZINE.—The September number of *Phillips's Magazine* has made its appearance. It is full of articles interesting to telegraph people, and is liberally illustrated with portraits of well-known telegraphers, besides other persons of note. This magazine is published bi-monthly by the Phillips Manufacturing and Trading Company, of New York and Bridgeport, Conn., of which Mr. Walter P. Phillips is the leading spirit.

MR. W. H. BAKER, President TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION, has addressed the following letter to the membership:

New York, August 1st, 1914.

To the Membership:

The Telegraph and Telephone Life Insurance Association being purely co-operative must depend upon the activity of its members for its success. No matter how active and enthusiastic the Officers and Agents may be, it is the work of the individual member that counts.

Please remember:

That this is your Association.
That it is the oldest of its kind in the United States.
That it is a monument to the fraternity.
That the Officers and Agents serve without compensation.
That we should feel proud of the work accomplished.
That we have paid out in claims almost two million dollars.
That we have never contested a claim.
That we have a Reserve Fund of $340,000.
That safety and not cheapness has ever been our motto.
That it is our duty to help one another.

Keeping all of the above in mind, will you kindly use it as a text in talking to an eligible member of the fraternity, and secure his signature to the enclosed application blank? When filled out, please send it to your Agent, who will arrange for the medical examination, etc.

Truly yours,

Wm. H. Baker, President.

For full particulars, address M. J. O'Leary, Secretary, P. O. Box 510, New York City

The San Francisco Telegraph Tournament.

The executive committee of the Panama-Pacific International Telegraphers' Tournament Association of San Francisco held a meeting on October 2, when much business was transacted pertaining to the successful outcome of the fast telegraph tournament planned for next year. Mr. J. I. Hilliard, of Hutton and Company, bankers and brokers, was elected treasurer, and Mr. B. Pogue, of the Pacific Telephone and Telegraph Company, was selected a member of the executive committee in place of Mr. Brickhouse, who has taken up his residence in British Columbia. All telegraph, telephone, railroad and wireless interests are now represented, and it looks as though the executive committee will be liberally supported by all those favoring the tournament. The programme of the tournament so far agreed upon embraces nine events. The first event is for railroad operators; second event, ladies' contest; third event, press contest; fourth, old timers' contest; fifth, brokers' contest; sixth, wireless contest; seventh, commercial contest; eighth, machine sending vs. hand sending; ninth, championship event, sending and receiving. It is likely that the tournament will be held the latter part of May.

Among those in the East who have consented to act on the advisory committee are Thomas A. Edison, David Homer Bates, Walter P. Phillips, J. B. Taltavall, of New York; Andrew S. Weir, of Philadelphia. Mr. D. A. Mahoney, 203 Broadway, New York, is the Eastern representative of the association.

Mr. Walter P. Phillips, in a letter endorsing the San Francisco telegraph tournament, addressed to D. A. Mahoney, the eastern representative, writes: "I very much appreciate your efforts to assist in making a success of the projected telegraph tournament at San Francisco. These demonstrations are largely responsible for the development of men like Gibson, McClintic, Conkling, Bruckner, Ellington and their kind, who never would have been known outside of their own intimate circles but for the tournaments.

"The very first one, in 1868, brought forward, as telegraphers to be universally known forever more, Patrick Henry Burns, of Boston; E. M. Shape, of Milwaukee; William D. Gentry, of New York; William E. Kittles, late of the War Department, Washington, but employed at the time in Fall River, Mass., as press operator; R. J. Hutchinson, M. C. Bagley, Fred Catlin, and others, of New York.

"The tournament in 1884, which took place at 187 Broadway, New York, brought forward as prize winners several others who were comparatively unknown hitherto: W. L. Waugh, William M. Gibson, Frank J. Kihm, J. W. Roloson, M. J. Doran and E. Delaney. The best time made was 500 words in ten minutes and ten seconds.

"The tournament of 1890, which took place at Hardman's Hall, New York, brought forward as prize winners several others who were comparatively unknown hitherto: B. R. Pollock, jr., Frank English, J. G. McCloskey, D. Wark, H. D. Paulhamus, M. H. Toomey and J. D. Hinnant. The best time made was 260 words in five minutes.

"The tournament of 1893, which also took place in Hardman's Hall, brought forward, besides all the stars who were already known to fame, C. L. Hayes, E. B. Logan, G. B. Howe and C. B. Squires. The best time made was 248 words in five minutes.

The tournament of 1898, which took place in Madison Square Garden, New York, brought forward F. M. McClintic, Charles F. Edney, David C. Grant, E. V. Weedin, jr., Fred E. Keene and L. F. Jaimison, H. V. Emanuel, P. J. Faulkner and J. Rosenbaum.

The tournament of 1902, which took place at Atlanta, Ga., brought forward new men as follows: F. C. Matthews, W. C. Murray, C. W. White, J. I. Hilliard and F. G. Johnson. The best time made was 517 words in ten minutes, the winner of the first prize being F. M. McClintic. This has been the record for twelve years.

The tournament of 1903, which took place at Philadelphia, introduced new men as follows: R. C. Bartley, C. J. Cone, J. W. Harrison, G. A. Hodgson, I. D. Maize, E. Payson Porter (the last two a pair of talented oldsters) Harvey Williams, C. J. Chryst, D. Roy Newcomb, Geo. B. Pennock and a host of others. The best time made was 500 words in nine minutes and fifty-two seconds. This was done by William M. Gibson, who wrested the diamond medal from F. M. McClintic and still retains it.

"The tournament of 1906 brought into prominence David J. Ellington, of Mississippi; H. J. Finn, of Boston, the former sending and the latter receiving twenty-five commercial messages in eleven minutes, forty-four and four-fifths seconds, and Ellington, sending 350 words of press reports in eight minutes, and performing several other remarkable feats, which gave him a majority of the points, was declared winner of the world's championship for all-around telegraphing, and in addition to the $100 cash prize, he was awarded the second Carnegie International trophy valued at $250.

"As far as my own contribution goes I shall surely make one, but, just at the moment, I think I shall put my offering in the shape of prizes to be awarded to those who beat the Morse senders, using my substitute for C L O R Y and Z. This so-called Morse-Phillips alphabet is as accurate as continental and a third faster. It has been sent as fast as the original Morse and there is no reason visible to me why its use should not become world-wide. It will not be the first Yankee "cut off" that has been viewed askance and subsequently adopted abroad because it was a more economical means to an end than the one in use.

"The British workman was the implacable foe of the Brown and Sharpe machinery, the automatic screw machines, the Hoe presses, and other devices without end, which are in high feather in England to-day, and, naturally, what our British cousins think good enough for them is eventually accepted by the other nations which are in no hurry to change anything unless they have to, and it was years before the quadruplex was reluctantly recognized. That, however, was because of the prejudice of two men, Messrs. Preece and Fischer, who held telegraphic destination in the palms of their hands for many years. Some allowance has to be made for

the gross stupidity of the British workman, but the telegraph people are as bright and intelligent as their fellows anywhere on earth. Both were enamored of the duplex invented by J. B. Stearns, but even the brilliancy of Edison's genius did not dazzle them as to the demerits of the quadruplex in its original form. They reminded me of Galileo, who, when asked if he believed in capillary attraction, replied: "Yes, up to sixteen and a half feet." Beyond the duplex they were doubting Thomases as applied to multiplex telegraphy. The article by Gerrit Smith, in the TELEGRAPH AND TELEPHONE AGE, is a striking story of how he and his friend and coadjuter, George A. Huntington, carried the day in the presence of Sir William Thomson, late Lord Kelvin, and many other British telegraphic big wigs, thereby making the quadruplex a permanent feature of modern telegraphic mechanism as operated in England."

The Telepathic Smile.

BY L. C. BOOCHEVER, ATLANTA, GA.

It's the smile of a person whom we do not actually see.

It's the image in the mind's eye of a smile that we imagine, or desire to see.

It's the kind of a smile that you imagine the fellow at the other end of the telephone is using when he talks to you in a calm, dispassionate, business-like and courteous manner.

It's the kind of a smile that you imagine the fellow, from whom you receive a letter, that's to the point, wears when he writes.

It's the kind of a smile that you imagine the fellow on the other end of the wire has on when he sends you good, clean stuff; when he's paying attention to business; when he's making no unnecessary remarks; when he's patient with the operator at the small office, the railroad office, the branch office; when he isn't obsessed with the idea that the fellow at the other end is a "ham," is over-rated, is a "bad actor," and so forth.

In short, the telepathic smile is the discarding of the "Holier-than-thou" attitude and the adoption of the "With-malice-toward-none and charity-toward-all" slogan.

The fellow on the other end is going to smile—watch for it and reciprocate.

REPORT OF SOCIETY OF MILITARY TELEGRAPH CORPS.—The annual report of the Society of the United States Military Telegraph Corps for 1914 has just been issued. It embraces the reports of the president, secretary-treasurer and chairman of the Congressional committee, also a list of surviving members of the corps, so far as known (1914), and a list of sons and grandsons (1913), so far as known to the secretary. Mr. David Homer Bates, secretary of the society, has shown admirable taste in the get-up of the pamphlet.

FORMER TELEGRAPHERS AS HOTEL KEEPERS.—What relation there is between telegraphing and keeping hotels we have not been able to determine, but we know this to be a fact that we have on our subscription books the names of twenty or twenty-five former telegraphers who are now successful hotel keepers.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

Among recent visitors at this office were W. D. Brinson, manager St. Joseph, Mo.; Walter G. Wenman, assistant superintendent Commercial Cable Company, New York; L. V. Lewis, formerly of this office, now with the Union Switch and Signal Company, Pittsburgh; C. C. Keller, printer attendant, Cleveland, Ohio; Geo. Silvey, Gap, Pa.; J. S. Ellis, assistant foreman, New York.

RICHMOND, VA., WESTERN UNION.

Mr. R. C. Folger, chief clerk to District Commercial Superintendent J. S. Calvert, is taking a short vacation.

Telegraph and Telephone Age

No. 21. NEW YORK, NOVEMBER 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

The Telautograph.

The telautograph is an instrument by which messages written at one station in handwriting are reproduced by electrical means at one or more distant stations. The reproductions are made at the same time that the message is written and all the characteristics of the original are reproduced.

The instrument operates on the well-known principles of the direct-current voltmeter. The magnetic field is electrically produced and two variable currents controlled by the transmitter are used to actuate the two moving coils of each receiver, which in turn impart to the pen of the receiver the movements made by the pencil in the hand of the operator.

The interior type uses three line wires, two for the motions of writing and one for the operation of raising the pen and lowering it to the paper. The exterior type uses but two line wires.

When more than one receiving instrument is to be operated upon the line the receivers are connected to the line in multiple. The amount of power required to operate each instrument is about one ampere at 120 volts.

Two variable currents for the writing motions are secured by moving the rollers attached to the transmitting pencil over rheostats which carry current from the power circuit. These rollers serve the shunt currents into two line wires, somewhat on the principle of a potentiometer. To accomplish the penlifting the penlifting magnet is connected to the third wire and current is supplied to it from the transmitter and controlled by a small switch beneath the writing platen, the switch being actuated by the lowering and raising of the pencil from the paper and operating in a manner similar to a reversed telegraph key.

The paper shifting of the receiver is accomplished by means of a relay in the receiver. The relay is actuated by the left line current. The contacts of the relay open and close a local circuit which supplies the current for the field magnet and the paper shifter.

This relay has two contacts which must be set as follows: The front contact, or the one on the end of the German silver spring, must make when the relay is energized, and break when de-energized. The back, or under contact, must make when relay is de-energized and break when energized.

The paper-shifting at the transmitter is done in practically the same manner, except that the circuit is completed by the closing of the positive power contact on the electrical master-switch.

In the receiver is a "short-circuiting" buzzer which short-circuits one of the two coils in the field magnet and is in its turn short-circuited itself, so that it acts as an interrupter of the current flowing through this coil. By this means a ripple is caused in the magnet flow and thus induced in the moving coils. The purpose of this is to place in slight mechanical vibration the moving parts of the receiver, thus making them more sensitive to variations in the writing current and reducing the friction of the moving parts of the receiver.

The ink for the receiver pen is held in a supply bottle at the side of the platen. This supply bottle has a hole near the bottom and being tightly corked, the atmospheric pressure on the outside prevents the ink from flowing out. The pen, which is a modification of an ordinary drafting pen, rests in this hole with its tip in the ink, when not in use, and when writing returns to the ink bottle each time the paper is shifted. The pen takes up its supply of ink from the hole in the bottle by capillary attraction.

Among some of the specific uses of the telautograph may be mentioned the following: Leased wire service. By the use of the telautograph on leased telephone, telegraph or other wires, direct written communication can be obtained between buildings and between urban and suburban or more or less distant points. Banks, bankers and brokers, trust, insurance and other companies may thus connect their main and branch offices. Manufacturers and coal, lumber, building supply, commission and other merchants may thus send delivery and shipping orders in writing from their offices to their city and suburban factories, or to their warehouses or storage yards.

In hotels the telautograph may be used to supplement the telephone in conducting the business of the

hotel. The telephone companies furnish for this supplemental purpose a special private branch exchange switchboard providing space for complete telautograph equipment for each operator. Thus most of the business of the hotel is centralized at the telephone switchboard, where, by use of their telautograph equipment, the operators can forward guests' orders promptly and accurately in writing to the department which executes them.

The telautograph may also be used in department stores, by electric light and power companies, in newspaper offices, in offices, and in many other places which readily suggest themselves, and it is extensively used in railway terminals.

The telautograph makes its record in black and white and eliminates every element of uncertainty.

Telegraph and Telephone Patents.

ISSUED OCTOBER 6.

1,112,469. Antiseptic Holder for Telephone Mouthpieces. To J. G. O'Donnell, Washington, D. C.

1,112,497. Telephone System with Automatic Ringing. To R. I. Utter, Chicago, Ill.

1,112,549. Apparatus for Amplifying or Detecting Electrical Variations. To G. W. Pierce, Cambridge, Mass.

1,112,655. Apparatus for Receiving or Relaying Electric Signals. To G. W. Pierce, Cambridge, Mass.

1,112,841. Selector Apparatus. To H. O. Rugh, Sandwich, Ill.

1,113,052. Safeguard Life and Telephone Attachment. To I. E. Rosenthal, Argenta, Ark.

1,113,149. Wireless Receiving System. To E. H. Armstrong, Yonkers, N. Y.

ISSUED OCTOBER 13.

1,113,274. Telephone Trunking System. To C. S. Winston, Chicago, Ill.

1,113,354. Automatic Trunking System. To A. E. Keith, Hinsdale, Ill.

1,113,395. Telephone System. To C. S. Winston, Chicago, Ill.

1,113,429. System of Cable Working. To J. Gott, Hove, England.

1,113,499. Sound-Magnifying Appliance for Telephonic and Telegraphic Purposes. To H. Smith, Magdeburg, Germany.

1,113,537. Telephone-Lighting System. To J. A. Boze, Waxahachie, Tex.

1,113,649. Non-Interrupting Extension for Party-Line Telephone System. To L. Keller, Los Angeles, Cal.

1,113,937. Telephone Testing System. T. E. A. Mellinger, Chicago, Ill.

TELEGRAPH INSPECTOR SENTENCED FOR TREASON.—John Lingenau, inspector of the telegraph office at Tilsit, Germany, near the Russian frontier, has been courtmartialed and sentenced to ten years' imprisonment for high treason, committed during the Russian occupation of Tilsit. He was charged with aiding the Russians in locating the underground cable which contained telegraph and telephone wires.

PERSONAL.

MR. T. A. EDISON, Mrs. Edison and their son, Charles, spent a week in Detroit last month as the guests of Mr. Henry Ford. They travelled from Orange to Detroit by automobile.

MISS FANNY KENNEDY DIEHL, daughter of Mr. C. E. Diehl, superintendent of fire and police telegraph, Harrisburg, Pa., will be married to Mr. W. S. Raub, at Harrisburg on November 11.

MR. JAMES UNCLES, a well-known member of the telegraph fraternity, and for many years engaged in commercial electrical pursuits, is now representing J. H. Bunnell and Company of New York as one of its travelling representatives.

MR. GEORGE M. MYERS, of Kansas City, Mo., accompanied by Mrs. Meyers and their daughter, were New York visitors on October 22. Mr. Myers is an old-time telegrapher and was president of the Old Time Telegraphers and Historical Association for 1913-1914. Mr. Myers will visit Washington before returning home.

MR. J. O. CARR, of the Morkum Printing Telegraph Company, is in New York installing printing telegraph instruments in the various newspaper offices for the Associated Press. Mr. R. L. Bailey, of the same company, is also in New York installing printers on the Chicago and New York circuit of the Postal Telegraph-Cable Company.

MR. E. E. BRUCKNER, a well-known member of the telegraph profession of Spokane, Wash., where he has been employed by the Associated Press, has located in Chicago, where he is studying law, with the object of entering the legal profession. Mr. Bruckner is author of the revised edition of Phillips' Code. He is a master of telegraphy and possesses scholarly attainments.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. C. ADAMS, vice-president, New York, has returned to his office after a short rest.

MR. H. D. REYNOLDS, superintendent, Buffalo, N. Y., was a recent executive office business visitor.

MANAGER C. M. GRIER, of Macon, Ga., has been active in inaugurating a "Go-to-church-on-Sunday" movement in that town. He and his office force, including the messengers, went to church on October 18.

RIGHT OF WAY ON SOUTHERN PACIFIC.—The United States Circuit Court of Appeals has affirmed the judgment of the United States District Court in Oregon, enjoining the Western Union Telegraph Company from interfering with the proposed grant of right of way by the Southern Pacific Company to the Postal Telegraph-Cable Company in Oregon.

NO MAGNETIC CLUB FALL DINNER.—President C. F. Leonard, of the Magnetic Club, New York, announces that the regular fall dinner of the club will be dispensed with this year because of condi-

tions existing in this country as a result of the European war.

MANAGERS have recently been appointed as follows: A. B. Noblesick, Hannibal, Mo.; C. G. Murphee, Selma, Ala.; T. B. Scott, Jackson, Miss.; Mrs. C. A. Watton, De Land, Fla.; F. M. Hall, Morristown, Tenn.; R. C. Hall, Lansing, Mich.; S. Yelnek, Columbus, Neb.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

THE BOARD OF DIRECTORS held a meeting on October 21 to ratify the actions of the executive committee since the previous meeting of the board.

MR. J. P. EDWARDS, division traffic superintendent, Atlanta, Ga., has been appointed division traffic superintendent of New York City, a newly created position. Mr. S. B. Haig, division traffic superintendent of the Eastern Division, continues in charge of the Eastern Division outside of New York City.

MR. S. L. BURTS has been appointed division traffic superintendent at Atlanta, Ga., vice J. P. Edwards, transferred to New York.

MR. J. J. WELCH, traffic engineer, Chicago, has been transferred to a like position in New York, to succeed Mr. B. C. Bellows, resigned.

MR. L. D. BEALL, of the office of the commercial general manager, New York, is visiting his old home at Hampton, Va.

MR. W. L. JACOBY, vice-president, and Mr. C. P. Pollak, superintendent, American District Telegraph Company, New York, are making a trip of inspection throughout the New England States.

MR. T. J. DROHAN, former district commercial agent, St. Louis, Mo., has been appointed city commercial manager at Chicago.

MISS R. H. AYERS has been appointed manager at Ypsilanti, Mich., to succeed Mr. J. H. Manning, who has been retired on a pension after a continuous service of forty-eight years.

MR. GEORGE R. SHULTZ, manager of the Punta Rassa, Fla., office of this company, where he has been identified with the service since 1866, was a visitor in New York last month while on his annual vacation.

MR. W. E. PEIRCE, of the Western Union New Orleans, La., office, has gone to California, where he will re-enter the service of the company.

"CHECKS" ON ROLLER SKATES.—Several of the "checks" in the general operating department, Walker-Lispenard Building, New York, perform their duties on roller skates provided by the company. It is stated that the elapsed time from "drops" to terminal wires is materially reduced.

FINANCIAL STATEMENT.—The Western Union Telegraph Company reported to the Public Service Commission of Massachusetts, on October 19, gross earnings of $45,582,305 in the year ended June 30, a gain of $467,597 over the preceding year. Operating expenses required $5,002,284 less than in 1913, with a total expenditure of $36,685,576, and because of the large saving in costs net revenue from wire lines of $8,842,818 was $5,412,881 more than in the previous year. To this was added miscellaneous income amounting to $1,070,831. After meeting all charges a balance of $3,702,554 was left for dividends, and a surplus of $211,990 after dividends had been paid. The surplus for 1913 was $134,113. The total profit and loss surplus on June 30, 1914, was $9,744,616.

Western Union Old Guard.

It has been suggested that the few operators at the new Western Union operating headquarters, 24 Walker street, New York, who came originally from 145 Broadway, through 195 Broadway, are deserving of special honors at the hands of the company. Referring to our records (page 405, July 16 issue), we find that there are only five who are entitled to this distinction, namely, T. M. Brennan, W. J. Quinn, L. E. Weller, C. A. Myers and Miss S. Dougherty. The office at 145 Broadway was evacuated on February 1, 1875, and the transfer from 195 Broadway to 24 Walker street was made on June 28, this year. The 195 quarters were therefore occupied thirty-nine years and five months.

THE CABLE.

SERVICE SUSPENDED.—Cable service beyond Guam, via Yap, to the Dutch East Indies, is suspended.

CABLE RATES REDUCED.—A reduction of rates for cablegrams has been made to the British West Indies and British Guiana.

BROKEN CABLES REPAIRED.—Two breaks in the cable of the Mexican Telegraph Company, one near Galveston, Tex., and the other near Vera Cruz, Mexico, have been repaired by the company's steamer "Relay."

NEW CABLE STEAMER.—A new cable-laying and cable-repairing steamer, the "Transmitter," has been added to the fleet of the Eastern Telegraph Company. The boat is 221 feet long, thirty feet wide and has a gross tonnage of 903 tons.

THE BRITISH ADMINISTRATION announces that cable addresses registered prior to July 1, this year, may now be used as the address, but not as the signature of cablegrams, between each and any of the following: British territory, including Egypt, territory of Belgium, France and Russia and the United States of America. There is no telegraphic communication with Belgium at present.

RESUMPTION OF DEFERRED CABLE SERVICE.—The French administration is again accepting deferred cablegrams in plain English or French for transmission on the French Government lines and cables. This restores the deferred service to France, Switzerland and Italy. The Eastern Telegraph Company and the Western Telegraph Company are again accepting deferred plain language cablegrams.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to October 28 as follows:

Between Madagascar and La Reunion, and between La Reunion and Maurice, June 23; Cap St. Jacques and Doson, July 17; Azores and Emden (two cables), August 5; Bundaberg and New Caledonia, August 19; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Vancouver and Fanning Islands, September 7; Paramaribo and Cayenne, September 27; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Itacoatiara and Manaos, October 14.

Bay Roberts, N. F., New Cable Station.

The Western Union Telegraph Company has erected a new cable operating station at Bay Roberts, N. F., also nine dwelling-houses and a staff house for the accommodation of its cable operating staff.

The new cable station is a modern building of fire-proof construction, being built of cement, tile and structural steel throughout, including roof, floors and partitions. The equipment of the station for operating all of the company's cables landing at Conception Bay is new and of the latest development in the art of ocean cable operation.

The dwellings and staff house are frame buildings and contain all modern conveniences, including steam heat and electric lighting. The staff house contains twenty-two sleeping rooms, besides accommodations for a housekeeper and help. It has a living-room, library, dining-room, billiard-room and kitchen all fully furnished and equipped for the comfort and convenience of the unmarried employes of the station. The dwelling houses provide homes for the married men.

Three cables to Great Britain and three cables to Nova Scotia and New York are operated from the Bay Roberts station and the staff numbers about thirty-five people, with Mr. C. B. Dunham as superintendent.

How the Fanning Island Cable Station Was Captured and Destroyed by the Germans.

The story of the recent destruction of the British cable station on Fanning Island, about 400 miles south of the Hawaiian group, by the German cruiser "Nurnberg," is told by Captain E. L. Tindall of the steamer "Kestrel," who has just returned from a trip to Fanning Island, made under commission from the British cable board in London.

The last message flashed from Fanning Island, which is used to relay messages from British Columbia to Australia, came September 7. Ten days later Captain Tindall started on his trip with a full cargo of supplies and cable materials necessary to repair the damage surmised to have been done. He tells his story as follows:

"We arrived at the north end of Fanning Island at daybreak on September 25. I gave orders for the chief engineer to bank the fires so that no smoke would be visible. We crept up cautiously, and from the masthead of the 'Kestrel' we surveyed the surrounding water for the presence of a war vessel and found none. I then proceeded around the island and to the harbor entrance. We noted a ship's boat with a crew which was apparently grappling for the broken cable.

"We were greeted upon our arrival by Superintendent A. Smith and his staff, and our welcome was a genuine one. The devastation caused by the Germans was apparent before we landed, and evidence of the free use of gun-cotton and dynamite could be seen many yards from the shore. The landing buoy to which vessels have made fast was demolished.

"Although none of the residents of Fanning Island had suffered any personal injury from the German landing force, the feeling against the British Government in not giving this important station their naval protection is quite marked.

"While the people of Fanning were expecting the presence of a German cruiser for about three weeks, no one really thought that Germans would attempt to seize the island, especially as the British Government knew the whereabouts of the 'Nurnberg' and the 'Leipsig.'

"The women of the island were very suspicious, however. They kept a man on the lookout for two weeks, and on the morning of September 7 two vessels, which proved to be the 'Nurnberg' and a collier, were sighted. Both flew the French flag, and so sure were the Fanning islanders that these were friendly vessels that preparations were made to launch a boat from shore and show them an anchorage. It had hardly started on its friendly mission when two boats loaded with Germans put off from the 'Nurnberg' and came in full speed for the shore.

"They did not even wait for the boats to ground on the beach, but jumped into the water waist deep and, with fixed bayonets and drawn revolvers, commanded the surprised little gathering of Fanning islanders to surrender. They rushed on shore and mounted a Maxim gun, which was trained on the cable headquarters. Marines were posted all around the station while officers and sailors, armed with rifles, made their way to the office building.

"The cable employes were hard at work and were paralyzed to see a German officer at the door of the operating room with a revolver.

"'Take your hand off those keys, all of you!' he commanded. All but one of the operators complied. He did not hear the command because of the receiver strapped over his head. And not until one of his companions shouted to him did he realize his position.

"The men were made to line up against the wall while the sailors with axes smashed the delicate and valuable instruments. A good deal of valuable mechanism was left intact, showing that their knowledge of cable instruments was crude.

"A cable message had been posted conspicuously which stated that the 'Nurnberg' or 'Leipsig' was

due any day. One of the German officers saw this, and with a smile said, 'Rather interesting, don't you think. I'll take this as a souvenir.'

"Another party was engaged near the shore end of the cable, trying to locate it. Failing in this, heavy charges of dynamite were planted and the cable blown to atoms. A crew from the collier grappled for the cable further out to sea with the intention of doing further damage. Still another party planted dynamite and gun-cotton in the engine-rooms, the boiler-rooms, refrigerating plant and in the dynamo-rooms. The explosion from these charges was terrific, but no one was hurt. A search was then made of the offices and a number of valuable papers were taken.

"These papers were taken aboard the 'Nurnberg' and a few hours later an officer returned and hastily summoned a detachment of men. The papers had revealed that several valuable instruments were buried; that a quantity of buried arms and ammunition existed and that there was $3,000 in the office safe. The latter was blown open and the money taken.

"The officer in charge of this section of the expedition apologized and said that this was the first time in his life that he had acted the part of a burglar. The buried instruments were blown up and the guns and ammunition seized.

"Through all of this devastation the courtesy extended by these German officers was most marked. They expressed themselves as being greatly surprised that no armed resistance was offered, as they had every reason to believe that Great Britain had taken the precaution to defend this important outpost.

"The officers and men worked with feverish haste and seemed anxious to get away. The private quarters of the employes were left unmolested.

"A little humor was interjected into the occasion when one of the German sailors borrowed a saw from one of the cable employes and felled a giant flagpole at the top of which flew a British flag. The pole was cut into sections and the saw and the flag were taken aboard the 'Nurnberg' as souvenirs.

"The officers of the 'Nurnberg' seemed to have a complete knowledge of what was going on in the outside world and seemed to be in possession of as much information as those who had been in daily cable communication with the main land. The collier was carefully disguised and there was no sign about her which would reveal her identity. She is about 2,200 tons register. She had a complete grappling outfit aboard her and her men seemed to be experts in this work.

"The Germans completed their work in about twelve hours and steamed away, west southwest toward the Marshall Islands.

"When we left Fanning Island on September 27 the cable connecting Suva with Fanning had been repaired and it was expected that the section connecting with British Columbia would be repaired in a few weeks.

It is estimated that the damage done to the cable station at Fanning Island will amount to over $150,000. There are twenty-six white men, four white women and 200 natives on the island.

CANADIAN NOTES.

Mr. W. Marshall, Toronto, Ont., superintendent of the Ontario Division, Canadian Pacific Railway telegraphs, and Mr. W. J. Camp, assistant manager, Canadian Pacific Railway telegraphs, Montreal, Que., have returned to duty after spending about ten days at Sharbot Lake trying to catch some fish.

J. Townsley, aged seventy-three years, a pioneer of the Canadian telegraphs, died in Montreal, Que., October 19. He took a prominent part in the work of the Canadian Pacific's telegraph service from the inception of the company until his retirement, and superintended the building of the company's telegraph system from Port Arthur east to Halifax and Canso. He was for many years superintendent of the Canadian Pacific Railway telegraphs until he retired on pension on January 1, 1911.

Forest Fires.—Radio telegraphy is being used in Canada in reporting on forest fires.

THE TELEPHONE.

Conference.—Presidents and other officials of the Associated Bell Telephone Companies met in conference in New York the latter part of October. After the meeting they went to Richmond, Va., to attend the convention of the Telephone Pioneers of America. Among those present were Mr. W. D. Gentry, president, and Mr. J. Epps Brown, vice-president, Southern Bell Telephone and Telegraph Company, Atlanta, Ga.; Mr. B. E. Sunny, president, Chicago Telephone Company; Mr. P. L. Spalding, president, New England Telephone and Telegraph Company, Boston, Mass.

Mr. Philip Hamlin, third vice-president of the Mountain States Telephone and Telegraph Company, Denver, Col., has resigned to assume the presidency of the Interstate Utilities Company, which controls telephone properties in northern Idaho and eastern Washington.

Mr. B. A. Kaiser, special agent, American Telephone and Telegraph Company, New York, is on the Pacific Coast on company business.

Mr. P. Kerr Higgins, a well-known telegraph manager, and formerly general manager of an independent telephone system, with headquarters at Waco, Tex., is now located in the new Bank of Commerce Building, at St. Louis, Mo.

Installers' Entertainment.—The telephone installers in the Metropolitan division, New York, will hold a minstrel show and vaudeville performance at the Telephone Club, New York, November 6.

The Boston Plant Chapter of the Telephone and Telegraph Society of New England, Boston, Mass., will hold an entertainment and banquet at Copley Hall, Tuesday evening, November 3. A feature will be an election-return wire.

Long-Distance Telephony in Australia.—Telephone communication between South Australia and Victoria has been established. The construction of the line has occupied about eighteen months, the total distance being 480 miles with no intermediate stations.

THE TEXAS TELEPHONE COMPANY, Waco, Tex., capitalized at $2,000,000, has filed articles of incorporation at Austin, Tex. The company is an independent concern which has consolidated five smaller systems operating in central, south and east Texas. The lines of the new system traverse thirty-four counties of the State.

STANDARD TELEPHONE SERVICE IN WISCONSIN.—The Wisconsin State Railroad Commission has issued standards of telephone service applicable to all of the telephone systems of Wisconsin. These rules regulate the number of subscribers on lines, the maintenance of equipment so as to eliminate cross-talk; provide for through lines between cities and villages; and contain other provisions for the proper repair and maintenance of lines. One of the rules provides that at "exchanges serving 500 or more subscribers, ninety-four per cent of the calls should be answered within ten seconds or less."

GOVERNMENT OWNERSHIP OF TELEPHONES.—At the recent convention in Dallas, Tex., of the American Institute of Banking a debate took place as to whether Federal ownership of telephone and telegraph lines would be to the best interests of the country. The Chicago contingent argued in favor of such ownership, while the Philadelphia representatives argued in the negative. The latter won. The winners based their argument largely on the fact that government ownership of telegraph and telephone lines in Europe has provided a service greatly inferior to that given by private corporations in this country.

EARNINGS REPORTS.—The earnings report of the Bell Telephone System in the United States for the eight months ending August 31 shows gross earnings of $149,669,237, as compared with $141,963,035 in the same period last year; total expenses, $110,765,283, as compared with $102,854,840; net earnings, $38,903,954, and $39,108,195. The surplus earnings for the two periods are $6,078,820 and $7,924,557, respectively. The earnings report of the American Telephone and Telegraph Company for the nine months ending September 30 shows a total of $34,602,914.93, as compared with $34,199,981.57 for the same period last year. The expenses were $4,112,484.85, and $3,850,359.64 last year, leaving net earnings, $30,490,430.08, as compared with $30,349,621.93 last year.

MENTAL ANGUISH AND THE TELEPHONE.—In an action brought for damages against the Southwestern Telegraph and Telephone Company for failure to transmit a telephone call whereby an attempt was made to notify the plaintiff of the expected death of his sister, who died and was buried next day, it was held that the plaintiff could not recover, because the evidence was insufficient to show whether the train, on which the plaintiff testified he would have traveled had he received the message, would have arrived in time for him to attend the funeral. It was also held that the relationship of half-brother and half-sister between plaintiff and the one of whose expected death he was notified, is sufficiently close to authorize recovery for mental suffering from being prevented from attending her funeral.

Plucky Telephone Operators.

A story is told of a Belgian telephone girl at Dahlen, who telephoned Belgian officers at the forts that they were not properly placing their shells. By following her instructions they were able to regulate their firing effectively until the telephone girl was killed by a shot which destroyed the office from which she was directing the operations.

The telephone service of Etain, a French village, was left in the hands of a young girl who stuck to her post while shells were bursting all around the telephone office and called up Vordon every fifteen minutes to give an account of what was going on.

The director of posts of Vordon was listening to a message being sent by this girl when she interrupted her communication to say: "A bomb has just fallen in this office." That ended the conversation.

The Telephone in 1877.

Mr. W. B. Eddy, special agent for the New York Telephone Company, Albany, N. Y., is an old-time telegrapher, and was one of the first telegraph men to foresee the importance of the telephone. He became interested in the invention at the very start, when it was clamoring for recognition, and when it had very few friends. He has stuck to the telephone ever since and his faith in it has been abundantly justified.

History records some rather amusing and startling experiences in the efforts to interest the public in the new invention, and considerable light is thrown on this phase of the subject in a letter received by Mr. Eddy from Mr. Edward H. Johnson, dated December 2, 1877. Mr. Johnson was then exploiting the telephone for Mr. Edison. In his letter Mr. Johnson says:

"We have but one set of instruments of the kind and are not making them for sale. I have acquired from Mr. Edison the sole right to use these instruments.

"I am now constructing a special set for giving local exhibitions of the Edison telephones on short wires and thus, by avoiding the use of the Western Union wires, be enabled to give exhibitions much cheaper. I can also make them more varied and attractive than where my singers are out of my own reach, and I have to work a long line. I can now give such an exhibition for the sum of $50.00 and my personal expenses (railroad fare and hotel), parties engaging me to furnish the singers, which they will have no difficulty in doing, owing to the fact that the singing station will be located in their own town.

"This makes a cheap concert, as it is very attractive and can be so varied and amplified as to furnish the entire evening's programme, if desired, or simply made a feature of an entertainment. I do my own talking, operating and setting up and working instruments and require only an operator at the singing station to assist me. I carry my own battery, line wire and instruments complete to give an effective exhibition in a wilderness, if called upon.

"It having been amply demonstrated that this apparatus will work over 200 miles of line, it is now only necessary to let people hear it on this short circuit to gratify their curiosity.

"I am ready to come at a moment's notice."

Collecting Coin from Public Telephone Boxes.

Collecting the money from the coin box public telephone in New York is perhaps one of the most interesting features of the commercial department of the telephone company.

Originally, it was the practice of collectors to wrap the coins in paper tubes, at the station, at the time of collection, and twice a day to call at some bank and exchange the wrapped coin for bills. This method was changed, and the wrapping of coins at the station by collectors was discontinued, all collections being brought into the office and there wrapped by an automatic coin-wrapping machine, operated by electricity.

While this method saved the time of collectors and permitted their making more collections, the wrapping of money took too much time and required more rehandling than seemed necessary.

After several months' experimenting, the Johnson coin counting machine was installed, and the automatic wrapping machine discontinued. The Johnson coin counting machines were operated by hand, and counted the money into bags. The bags of nickels contain 4,000 coins or $200 each and the banks accept them without question. The bags are sealed by a patented sealing device, and a tag is securely attached, giving, besides the company's name, the date, weight of bag, amount of money, and the name of the person who counted the contents and sealed the bag. In the two years that this method has been in operation, the alleged shortages claimed by the banks have been so small as to be negligible.

The Johnson coin counting machines were recently superseded by the standard coin counting machines, a device very similar to the Johnson, but operated by electricity, and which counts nickels at about 2,000 coins per minute, as against 800 per minute by the Johnson hand machine.

By the use of two of these power-driven machines it is possible for the company to deposit in the bank the same day five-sixths of all the money collected; only one-sixth of the amount collected is not received in time and is carried over in the vaults until the next morning.

The telephone company has a fleet of three automobiles. Each car is provided with locked iron boxes, into which the collectors deposit their money. During the course of the month the company handles approximately twenty-three tons of coin collected from boxes.

The company is now working on an entirely new method of collecting through the medium of an inner sealed coin receptacle. This is a sealed box which is placed in the cash compartment at the telephone instrument, and when removed locks automatically. These boxes will be brought into the office, seals broken, and contents counted in a specially constructed machine, which will sort and count nickels, dimes and quarters at the same operation, giving the total count in dollars and cents.

Review of Important Telephone Articles in Contemporary Publications.

POTTERY PRODUCTS FOR THE TELEPHONE TRADE.—Mr. P. B. Findley describes in *The Telephone News* a visit to the potteries in East Liverpool, Ohio, where much of the porcelain ware used in telephone work is made. He tells how the raw material (clay) is prepared for the various articles and the process of their manufacture. It is a comprehensive and interesting description and is fully illustrated. The articles made at the potteries include porcelain insulators, tubes, protector mountings, etc. etc.

ENGLAND'S TELEPHONE SERVICE.—The telephone service in England, especially in London, has been under severe criticism ever since the government undertook to carry on the business, and has been the subject of jokes without number. Mr. J. Brooks, an American, gives in *Telephony* his impressions of the telephone service in that country, and compares it with the service rendered in the United States. The telephone, he says, is a negligible factor in the daily life of the English people, and pay stations are a rarity. A story is told by *Punch* of a London Scot telephoning (after the war started): "Aw'll be hame aboot eight o'clock the nicht." The operator broke in at this point with the remark: "No foreign languages, please."

TELEPHONE CABLE LAYING IN BRAZIL.—A great feat in telephone cable laying, under circumstances of exceptional difficulty, climatic as well as constructional, is described in the London *Electrician*. This cable was considered a necessity, owing to the increasing telephonic traffic between Sao Paulo, the capital of the state, and Santos, its principal port. The existing aerial lines were totally inadequate principally on account of the constant interruptions caused by severe climatic changes on the sierra or mountain range which separates Sao Paulo from Santos, and rises to a height of nearly 3,000 feet. The laying underground of such a cable was at first considered an impossibility, owing to the fact that the road had been abandoned by the government for fifty years, also that the part of it which passed over the top of the sierra ran mainly through rock. The engineering features of the work are described. Since its opening the operation of the cable has been very successful.

ENGLISH FOR BREVITY.—The English language is best suited for telegraphic communications, as ideas can be expressed in it more briefly than in other languages.

RADIO-TELEGRAPHY.

MR. E. B. PILLSBURY, assistant traffic manager Marconi Wireless Telegraph Company of America, New York, has been appointed general superintendent of the trans-oceanic division.

DANISH RADIO STATIONS CLOSED.—The Danish administration has closed the radio-telegraph coast stations at Blaavandshuk and Copenhagen.

BEACH THOMPSON, aged forty-eight years, president of the Federal Wireless Telegraph Company, and a banker in San Francisco, Cal., died in that city October 23.

TUCKERTON STATION REOPENED.—The Tuckerton, N. J., radio station, which was disabled on September 16 by the burning-out of the high-frequency alternator, was reopened on October 25 with an American sending equipment.

TRANSPACIFIC WIRELESS.—The October number of the *Marconi Service Magazine*, transpacific edition, San Francisco, Cal., contains an excellent account of the opening for public service of the high-power wireless service between Bolinas, Cal., and Kahuhu, near Honolulu, T. H., on September 24.

WIRELESS RENTALS.—A charge that the Marconi Wireless Telegraph Company asks an undue increase in rent and an undue extension of the period of its contracts for wireless apparatus for ships has been made in the United States Federal Court by the Standard Oil Company of New York. Mr. John Bottomley, vice-president of the Marconi Company, defends the increase on the ground that the service has been heretofore conducted at a loss, and it was decided, in justice to the stockholders, to make a moderate advance in the rates on contracts which would not be changeable at the expiration of every twelve months.

THE HONOLULU MISUNDERSTANDING ADJUSTED.—The misunderstanding which recently arose between the United States Government (Navy Department) and the Marconi Wireless Telegraph Company of America, regarding the despatch of an alleged unneutral message from the Marconi high-power station at Kahuku, near Honolulu, T. H., has been adjusted by an explanation on the part of the superintendent in charge of the wireless station, who stated that the message, which had been received as an ordinary news item at the station, was transmitted by the operator then in charge, in the absence of the censor and of the superintendent, in the regular course of business, with no intention whatsoever of in any way transgressing the rule of neutrality as laid down by the President of the United States. The station at Kahuku, which was never closed, is conducting its regular business in the usual way, being restricted only by the order of the Navy Department, which precludes the transmission of messages in code by wireless, which order does not apply to the cables or the land line companies and against which order the Marconi Wireless Telegraph Company of America has protested to the United States Government.

Institute of Radio Engineers.

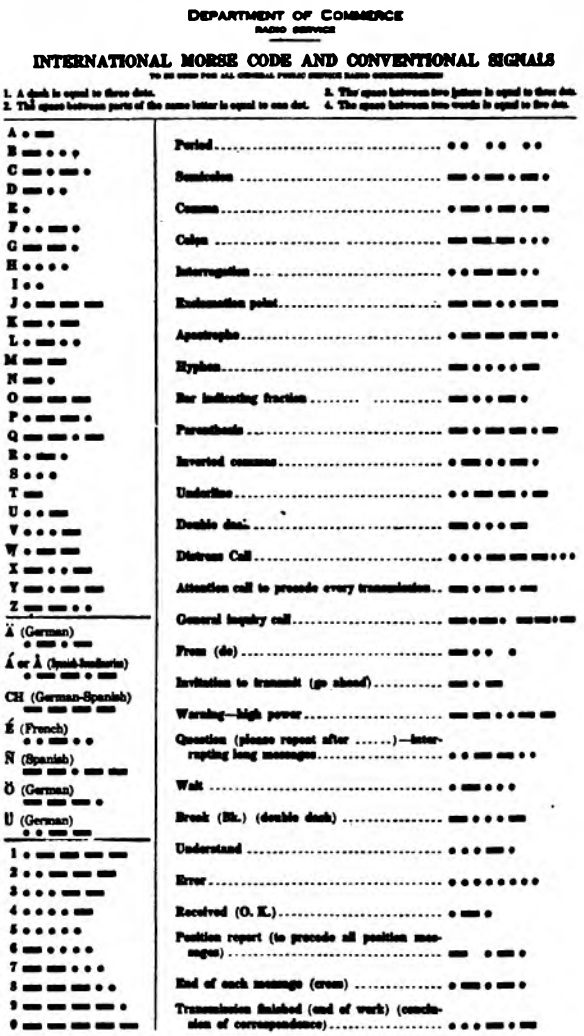
At the Washington section of the Institute of Radio Engineers, held at the Bureau of Standards, October 14, Capt. W. H. G. Bullard, superintendent of the United States Naval radio service, read a paper on "Commercial Traffic of the Naval Radio Service."

At the Boston section, on October 29, a radio paper was read by Prof. Geo. W. Pierce in the Jefferson Physical Laboratory, Cambridge, Mass.

On November 4, at 8.15 p. m., Mr. H. E. Hallborg, of the Marconi Wireless Telegraph Company of America, will present a paper on "Resonance Phenomena in the Low Frequency Circuit," at Columbia University, New York.

The International Morse Code in Radio Service.

The Department of Commerce, radio service, Washington, D. C., has issued a chart showing the international Morse code and conventional signals used for all general public service radio communication. Owing to the general interest in this subject



DEPARTMENT OF COMMERCE
RADIO SERVICE

INTERNATIONAL MORSE CODE AND CONVENTIONAL SIGNALS

1. A dash is equal to three dots. 3. The space between two letters is equal to three dots.
2. The space between parts of the same letter is equal to one dot. 4. The space between two words is equal to five dots.

A • —		Period	• • • • • •
B — • • •		Semicolon	— • — • — •
C — • — •		Comma	• — • — • —
D — • •		Colon	— — — • • •
E •		Interrogation	• • — — • •
F • • — •		Exclamation point	— — • • — —
G — — •		Apostrophe	• — — — — •
H • • • •		Hyphen	— • • • • —
I • •		Bar indicating fraction	— • • — •
J • — — —		Parenthesis	— • — — • —
K — • —		Inverted commas	• — • • — •
L • — • •		Underline	• • — — • —
M — —		Double dash	— • • • —
N — •		Distress Call	• • • — — — • • •
O — — —		Attention call to precede every transmission	— • — • —
P • — — •		General inquiry call	— • — • — — • — •
Q — — • —		From (de)	— • • •
R • — •		Invitation to transmit (go ahead)	— • —
S • • •		Warning—high power	— — • • — —
T —		Question (please repeat after .....)—Interrupting long messages	• • — — • •
U • • —		Wait	• — • • •
V • • • —		Break (Bk.) (double dash)	— • • • —
W • — —		Understand	• • • — •
X — • • —		Error	• • • • • • • •
Y — • — —		Received (O. K.)	• — •
Z — — • •		Position report (to precede all position messages)	— • — •
Ä (German) • — • —		End of each message (cross)	• — • — •
Á or À (Ital-Indiario) • — — • —		Transmission finished (end of work) (conclusion of correspondence)	• • • — • —
CH (German-Spanish) — — — —			
É (French) • • — • •			
Ñ (Spanish) — — • — —			
Ö (German) — — — •			
Ü (German) • • — —			
1 • — — — —			
2 • • — — —			
3 • • • — —			
4 • • • • —			
5 • • • • •			
6 — • • • •			
7 — — • • •			
8 — — — • •			
9 — — — — •			
0 — — — — —			

we reproduce the chart herewith. In this service the American Morse code is not recognized. The chart is very clear and comprehensive and, no doubt, American Morse operators will study it with much interest.

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CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

REMITTANCES to Telegraph and Telephone Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, NOVEMBER 1, 1914.

STATEMENT.

Statement of the ownership, management, circulation, etc., of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th each month at New York, N. Y., required by the Act of August 24, 1912.

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THOMAS R. TALTAVALL, Editor.

Sworn to and subscribed before me this 26th day of September, 1914.

HENRY A. VAN DER PAAUWERT,
Notary Public, Kings County, No. 29.
Certificate filed in N. Y. Co., No. 4.
(My commission expires March 30, 1915.)

Worthless Patents.

Many people believe that when Uncle Sam grants a patent that he delivers something to the patentee that is really worth something and that he will stand back of the inventor and protect the latter from the aggression of business rivals. But in this belief patentees soon discover that they were sadly mistaken, and that if the result of their thought and labor is to be protected against infringement they must protect it themselves through the courts. This, of course, means a law suit with its usual expensive accompaniments.

Every week the patent office mill grinds out patents on alleged inventions that in many cases are as much like other patents already granted as are two peas in a pod. Several telegraph people have been granted patents lately on mechanical transmitting keys, depending upon the vibrations of a spring to make the dots. It would appear that the government is ready and willing to grant a patent on such instruments to anyone provided the price is forthcoming.

The wily patent attorney is largely to blame for this state of affairs. He changes the phraseology of the specifications a little and thus leads the patent office to believe that there is in the invention enough novelty to warrant the issue of a patent. He also knows very well that in the event of an infringement case being taken to court for adjudication that the court invariably decides in favor of the person holding the basic patent.

It has come to our knowledge lately that at least six telegraph people have spent their money in obtaining patents that are worthless. Each of the victims, however, thought that because the government had granted a patent he was in possession of rights of protection which in reality did not exist.

The patent office, as well as the professional patent attorney, is as much to blame for such a state of affairs, and both are guilty of misleading the poor inventor.

Be Master of Yourself.

Comparatively few people realize the importance of being masters of themselves by keeping full control of their actions and thoughts. If a man has not the power to control himself he cannot be safely entrusted with responsibilities. Our lives are powerfully affected by influences outside of ourselves, especially by the words and deeds of others, and it is the duty of every individual to guard against adverse influences if he wishes to do his best work in the world. A well-balanced mind will discriminate between the desirable and undesirable, and the ability to do this and practice it in our daily lives is the measure of strength of character.

EDISON DAY.—The thirty-fifth anniversary of the birth of the incandescent lamp, on October 21, was observed in Orange, N. J., and adjoining places by the raising of flags. The day was known as "Edison Day," and the stars and stripes flew over the Edison laboratory in West Orange. Mr. Edison, however, was absent from home on an automobile trip to Detroit.

SOME THINGS TO PONDER ON.—A thing is not right because we do it. A method is not good because we use it. Equipment is not the best because we own it. The wisest of us has much to learn. It is better by self-criticism to find out and correct our own faults than to have our patrons do it for us.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 67) Upon what does the angular deflection of the magnetic needle depend?

What two forces act upon the needle?

What effect does the field of the earth have upon the needle?

Why are galvanometers suited only for small currents and why are they not available for general work?

(Page 68) What type of instrument has replaced the galvanometer?

What is the effect if a current is sent through a light coil of wire suspended between the poles of a permanent magnet?

Study the construction of the instrument shown in Fig. 20. Why is this instrument shielded from disturbing magnetic influences?

Study the magnetic and electric reactions illustrated in Fig. 21, page 69.

Why is the wire shown in Fig. 21 pulled in a downward direction?

Why cannot lines of force cross each other?

Upon what does the power of reaction depend?

What is the effect of increasing the number of turns of wire in the coil of an instrument such as that under consideration?

What is the essential feature of an ammeter or voltmeter scale?

What is meant by a proportional scale?

(Page 70) What is the controlling force with the D'Arsonval galvanometer?

How is uniform magnetic flux through the coil obtained in all positions of the coil?

How is the instrument made portable? Describe the arrangement of the parts necessary to obtain this result.

How is an ammeter connected in a circuit in order to measure the current therein?

Why is it necessary that the resistance of an ammeter shall be negligibly small?

How is the reduction of resistance accomplished in practice?

How does the current divide between the ammeter and the shunt?

(Page 71) What is the name of the instrument used to measure difference of potential, and how is it connected in circuit?

Why must its resistance be high, as compared with that of the rest of the circuit?

How is the resistance of the voltmeter increased, and what proportions are observed in the relation of the added resistance to the current to be measured?

What is a convenient shunt resistance for general telephone work?

Under what conditions would a D'Arsonval galvanometer act as a direct-current motor?

Answer all of the review questions on Page 72.

(To be Continued.)

Who Originated the Method of Embossing Morse Characters?

The following letters may throw some light on the question as to who originated the method of recording Morse telegraph characters on a strip of paper by a steel stylus?

Gilbert Smith was one of the skillful instrument-makers employed by Professor Morse in 1843-44.

"Washington, D. C., Sept. 4, 1848.

"MR. GILBERT SMITH,

"DEAR SIR: I am desirous of drawing on your memory for some information, during the few months you were employed by Prof. Morse in building the machinery for the telegraph system.

"1st. Please state what you recollect in regard to Prof. Morse's several experiments in regard to some plans of marking on the telegraphic paper for recording the signs.

"2d. What were those different plans.

"3d. What do you recollect in regard to the present mode of writing with a steel point pressing upon the paper and making the indentation now in universal use.

"4th. Was the present plan of marking one of the plans of Prof. Morse's experiments.

"By replying to the above you will much oblige me in assisting me in obtaining historical facts in regard to the progress and improvement of the telegraph.

"Yours truly,
[Signed] "ALFRED VAIL,
"Washington, D. C."

"New York, Sept. 8, 1848.

"MR. VAIL,

"DEAR SIR: Yours of the 4th was duly received, and in compliance with your request I hasten to give you the information asked for.

"In regard to your first question, I recollect that several plans for marking on the telegraphic paper were tried during the time I was in the employ of Prof. Morse.

"In regard to the 2d question, I recollect that one of the plans tried consisted of a wheel, some six or eight inches in diameter, the edge of which was covered with some coloring substance and the paper made to pass over its surface, and then by pressing upon the paper with a point, the marks were obtained.

"In regard to the 3d question, I recollect that yourself or Prof. Morse suggested the plan of making impressions upon the paper instead of using ink or any other coloring substance. I also recollect of making the apparatus to try the experiment and it proved to be the best plan that had been tried.

"4th. The present plan of marking is the same as the last mentioned above.

"Yours, &c.,
[Signed] "G. SMITH."

The World's Series.

BY T. M. RAGEN, NEW YORK.

Each year the pennant-winning teams of the American League and National League baseball clubs meet in a series of games to determine the baseball supremacy of the world. These games are known as the World's Series, and the team winning the first four games is then proclaimed the world's champions. Around these games crystallizes all the baseball enthusiasm of the world.

There are few, perhaps, who stop to consider just how the news of these events is transmitted from the field of conflict and distributed to the world that is so eagerly awaiting the result of every play.

The World's Series is a big event with the Western Union Telegraph Company, which company exclusively handles the telegraph end of baseball. When the leading newspapers of the country sidetrack all other news, even reports from the greatest war in the history of the human family, we can get a better idea of the importance of the wire service necessary to handle it. Hundreds of play houses throughout the country get direct wire service; every town or hamlet that can afford it receives all the news they can; everybody seems to want to know the result of each play the moment it takes place. When "Home Run" Baker or "Hank" Gowdy, or any other player, goes to bat everybody wants to know it, together with everything the players do while at bat or on bases. Here is where the telegraph fits into the World's Series.

Days before the big event every detail is thoroughly taken care of, so that when the word "play ball" is given on the diamond, the telegraph company is also ready to "play." Every assignment of wires and loops are carefully taken up, and each man who has anything to do with any feature of the work is thoroughly familiar with his part.

And finally the big series is on. With keen competition among the newspapers of the large cities, it takes but the slightest interruption of a circuit to get the newspaper management after the telegraph company. Therefore, any trouble on any circuit must be remedied quickly. To meet such emergencies the wire chief knows just what wires he can exchange and loses little time in making any shift required. During the recent series wires were swapped with but a momentary break. In one case several wires were lost between Memphis, Tenn., and Little Rock, Ark. Dispatcher R. H. Tucker, whose headquarters are in the main office in New York, who was supervising the wire work, immediately had "first Dallas" repeatered back to Memphis via another route, bridging the break with very little interruption to the description of the game.

New York was the supreme head. Every wire, loop and repeater assignment was made through that office, and there was little difficulty in finding and remedying any trouble.

There were over fifty circuits into each ball park, located in Philadelphia and Boston. Nearly all of those circuits found their way to New York and from there they radiated to the different sections of the country. To meet the great repeater requirements it was necessary to augment the day force from the night staff, bringing on a force thoroughly familiar and well posted in every feature of the repeater work.

When it was necessary to call a wire chief to a wire all that had to be done was for a man in a newspaper office to press the call button before him and he would receive immediate attention.

The Commercial News Department ("C. N. D.") under the direction of Mr. H. M. Heffner scored its usual success. Reaching out to all parts of the country with its many circuits manned by the finest telegraphers in the profession, the work of this department of the Western Union was wonderfully accurate. Every detail of each game was handled in the quickest manner possible.

It is safe to say that within five seconds after the umpire had given his decision it was flashed to the most distant points, such as St. Louis, Chicago, St. Paul, Galveston, etc.

News of the game was also being rushed to Europe. It was a strange condition of things that the news from this bloodless field of battle should interest those in countries being torn by the greatest war ever known.

So far as the wire service was concerned it was a success. With all the mass of detail there was not one feature that was overlooked or went wrong.

Much praise was bestowed on Harry V. Emanuel, who had charge of the telegraph force in Philadelphia, and John Shannon, who had charge of the telegraph force in Boston, also upon the fine telegraph talent which manned the wires.

The following men figured prominently in the wire work of the series: New York: General wire chief, C. C. Lever; assistant general wire chief, Jos. Gschwind, and the following wire chiefs: W. E. Rath, M. Green, F. W. Streeter, J. E. Ewing, R. H. Bassett, J. Mullin and J. Heidemark on the Southern switch, which handled the Philadelphia end, and the following wire chiefs on the Eastern switch, which handled the Boston end; C. A. Meyer, J. F. Hopkins and N. B. Hall.

Boston: George T. Dee, C. E. Perkins and J. Mullin, wire chiefs.

Philadelphia: J. V. Berger, H. H. Peck, E. D. Farnett, R. C. Murray, J. W. Riley, O. M. Pennypacker, M. G. Moyer and J. E. Watts, wire chiefs. H. C. Pearson had charge of C. N. D. service.

WAR STOPS WEEKLY WEATHER REPORT SERVICE.—The regular advance weekly weather reports issued by the United States Weather Bureau have been suspended on account of the difficulty of obtaining the usual data from Europe, as a result of the war.

Mr. A. H. Bliss, a retired old-time military telegrapher of Chicago, Ill., for many years a prominent member of the Board of Trade in that city, in renewing his subscription for another year, writes: "Your publication links me to the comrades of my young days. I look in your columns for anything and everything that may be said about them."

Scientific Management.*

BY H. E. BROCKWELL.

One of the recent developments in modern business has been termed "Scientific Management." Harrington Emerson, an efficiency engineer of the Santa Fe Railroad, has estimated that preventable wastes on the railroads of the United States amount to at least a million dollars a day, and only through the adoption of the principles of scientific management could this enormous waste be avoided.

Scientific management differs essentially from what has been termed "Expert or Efficient Management." It has its origin in the idea that there is a basis for determining the most efficient method of performing all operations; that is, that the time required to perform any special task can be calculated to mathematical precision by an accurate analysis of its elements.

After repeated experiments along the lines of demonstration of the time required for each step in any special work, the following law is found to be true; that in putting forth the energy to perform work, it is only possible for the employer to be under load for a definite percentage of the day and that if the load is not properly regulated, the efficiency of the work will be decreased. It will be seen, therefore, that the essence of scientific management is the time study of the work to be performed, resolved into an analysis of the various steps of the operation.

While the laws governing mathematics and chemistry have been generally recognized, it is a fact that the laws governing human industry have received very little consideration, and few managers realize that there is a scientific relation between the work to be performed and the energy required.

The word "Efficiency" now has a meaning entirely its own in industrial business, and refers to the relation between actual results and standard requirements. For instance, if one man performs in twenty hours what should have been performed with his facilities in ten hours, he is only half as efficient as he should be, and 100 per cent being the standard efficiency, the efficiency of such a man would be only fifty per cent.

The aim of scientific management is therefore the elimination of all waste, whether of time, effort or means. The principles which underlie and support the science may be tabulated as follows: Definite plans and ideals; the scientific selection of the workmen: competent guidance; reliable and accurate records; determination of standards; standardized operations; a thorough friendly understanding between employers and employes and efficiency rewards.

Under old methods, the boss who can keep his men working all the time is looked upon as a valuable acquisition to an organization. It never occurs to him that certain periods of rest will increase the workman's capacity for work, and yet it may be fully demonstrated that efficiency cannot be secured unless the correct relation between the time under load and the time free from load is maintained.

The principle involved in time study may be applied to the simplest as well as the most complicated operations. While it might be supposed that it would be futile to apply science to the ordinary laborer engaged in shoveling, yet a little thought on the subject will show that a laborer can be studied with very considerable profit. The analysis of the elements of a shoveling operation is the weight of the shovel he uses, the bulk of the material the shovel holds, the position the workman occupies at his work, and the distance he travels back and forth.

One of the essentials of scientific management is the planning in advance of the sequence of the work, and the control of each step from the time an order is placed until completed, and followed by the scheduling of material required for each piece of work, and determining for each order when the materials should be ordered and received.

It is essential to the introduction of efficient management that the principle of co-operation with the workman should be evidenced by an increase in his wages, when through the elimination of unnecessary motions, the output is increased. It will be seen, therefore, that the correct method of the paying of wages is one in which each man's efficiency is determined by means of recording accurately the actual time in which he does a piece of work, as against the standard time set for that task, and rating either above or below the 100 per cent efficiency. At the end of the wage period, the total efficiencies of each man shall be added together, and thus the rate of wages is based upon his average throughout the entire wage period.

Practical application of these principles has been carried out by adopting as standard the best times in which jobs have been previously performed. The workman's hourly rate is guaranteed and when the actual time taken on the job is less than the accepted standard, the workman is awarded an efficiency premium, equalling a part of the saving as represented by the cost as compared with previous costs. The premium may be equal to one-third of the saving. For an efficiency of less than sixty-seven per cent no bonus is paid. For efficiencies over sixty-seven per cent a premium is allowed, increasing gradually for each one per cent of efficiency, until 100 per cent is reached, after which a twenty per cent bonus is allowed.

In introducing scientific management, any undue haste or impatience to accomplish in a short time what should only be expected in months, will culminate in failure. This science involves a radical change in the attitude of the management to its employes. The good will of the working majority of the employes in each class is at least necessary, and the chief problem is to demonstrate to them that what is of permanent advantage to the management is of permanent good to them, and to establish as fundamental in this relation the principle that until waste in every form is eliminated, both will suffer.

*From *Telephony*.

The success of an institution is the sum of the successes of the individuals comprising that institution. —*Telephone News.*

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

The Montreal Telegraph Company opened an office in Toronto in 1847. Mr. John Parsons, an American, was the company's first manager. I engaged with Mr. Parsons as office boy in 1849. I was not then quite twelve years of age. I had been in the employ of the company nearly a year when Mr. Parsons resigned, and Mr. H. P. Dwight, who was then an operator in Montreal, was sent from that city to take charge of the Toronto office. Although sixty-five years have elapsed since that time, I have very pleasant recollections of his coming. My salary had been $1 per week, and the first notable, perhaps I should say the first laudable, act of Mr. Dwight after his installation was to increase my salary to a dollar and a half per week. At that time Mr. Dwight and myself comprised the entire working staff of the Toronto office. Mr. Dwight received and sent all the messages, kept the books, took charge of the cash, waited on customers and, in a word, transacted all the business of the office. I delivered the messages and performed other simple routine office work. The messages for city delivery were few in number and were mostly for persons living a long distance from the office; business men had not yet got into the habit of using the telegraph as an aid to commerce, and the majority of messages were for private individuals and of a social nature.

Mr. Dwight always insisted upon neatness and order in his office arrangements; he also insisted upon punctuality in his assistant. Part of my duties were to sweep out the office, dust the desks and light the fire. Matters were managed very economically in those days, and to facilitate lighting the fire and save the company any expenditure for kindling wood, I was in the habit of cutting up a quantity of chips at my own home and carrying them down to the office wrapped in a newspaper, each morning. I am afraid that I sorely tried Mr. Dwight's patience by occasionally arriving at the office too late. He at first adopted the usual methods for correcting this bad habit in his stoker and chief of the delivery department, but without effecting a permanent remedy. One winter morning, when I arrived at the office slightly behind time with my bundle of chips under my arm, as usual, I was almost petrified to find Mr. Dwight sitting at a brightly-blazing fire reading a paper. The fire was burning more cheerily than usual. The floor was more carefully swept, and not an atom of dust was visible on any of the desks. Everything looked unusually inviting, tidy, and ship-shape. I took in the situation at a glance. Mr. Dwight had taken my place for that morning, and I felt very uncomfortable, but nothing was said until about noon. Mr. Dwight then, in a quiet, but firm manner, drew attention to my numerous sins of omission and commission, dwelling at some length on what my procrastinatory tendencies would lead to, and winding up the lecture by giving me the grand bounce. I retired reluctantly to the hall, while a feeling of degradation and utter hopelessness crept over me. Before I got out of the building, however, Mr. Dwight came along, and, after being further admonished, I was re-instated. This settled the matter, and I was for ever afterwards cured of dilatoriness in the morning.

In the course of a short time I was competent to send and receive messages fairly well.

Mr. O. S. Wood, Prof. Morse's first pupil, was superintendent of the Montreal Telegraph Company, with headquarters at Montreal, and in the early days was often engaged at the instruments. In 1850 the writer of these lines sent his first message from Toronto to Mr. Wood at Montreal, and was encouragingly told by that gentleman that, "for a first attempt he did very well, and to try again some other day when the line was not busy." After this the key had a coercive fascination for me, and, ere long, I became useful as an operator. In 1851, Dr. Irwin, a medical practitioner and operator at Oshawa, was granted a two weeks' vacation and I was sent to Oshawa to take charge of the office. There were no railroads in those days, but the Royal Mail stage coach left Toronto for Montreal at noon daily. I took passage on this conveyance and was dropped off at Oshawa.

The stage was drawn by four strong, active horses, and these were changed every ten miles for fresh ones, regular posts for this purpose having been established throughout the entire distance between Toronto and Montreal. The driver, on nearing these posts, blew an original home-made *reveille*, with a thrilling military twirl in it, on his tin horn, to warn the attendants and those in the neighborhood of his approach. The stage in the winter season carried the mail, and the best possible time was made compatible with the condition of the roads and the weight of the load behind the horses. The stages were wider and longer than those in use at the present time, and could accommodate six or eight passengers inside, besides a number outside. They also had a spacious "annex," or what was called the basket or cradle, hitched on behind, in which was carried the travellers' baggage, trunks, parcels, etc., and these were sometimes quite a load of themselves.

Dr. Irwin, who was unmarried, lived at the house of Mrs. Skae, one of the principal families in Oshawa, and I found it had been arranged that I was to stay at the home of that lady until he returned.

The telegraph instruments at Oshawa were of the most primitive description, and I have often thought of the odd contrivance the doctor had for securing the main wires over night. This was a little orifice cut in the table between the two main posts of the relay. Into this tiny hole a thimble, filled with quicksilver, had been inserted, and with the greatest solemnity and care the ends of the main wires were removed from the relay posts and placed into this cute little receptacle every night before closing the office. Although I could send and receive messages fairly well, I was not yet familiar with the subtle mysteries of the telegraph. I had a profound, though hazy and undefined, notion that there was something uncanny about it. Indeed, I fear I was timorously apprehensive that unless all these minute details were faithfully carried out at

night, the building in which the office was situated might be found blown into smithereens next morning. A weekly paper was published at Oshawa —the *Oshawa Reformer*—and the editor, Mr. Oliphant, came to the telegraph office on the day of publication and received a very brief outline of the latest news and a few market quotations. He copied these attenuated reports as I read them off the tape, and cheered me on by complimenting me on the satisfactory manner in which I fulfilled my duties. The Toronto *Globe* at this time was only published as a tri-weekly and weekly newspaper.

Among Mrs. Skae's interesting family was a young son, John, or, as we familiarly called him, "Johnnie." He was about my own age, a trifle younger, perhaps, and he and I were a good deal together. Whitby at that time, although almost as large a town as Oshawa, was not considered of sufficient importance to entitle it to the honor of a telegraph office. I walked out to that place several times with messages which had been received via Oshawa for residents of the neat little village, and was paid one-and-three-pence, or twenty-five cents, on each occasion for my trouble. Most of these messages were for Scripture's Hotel. Scripture was the name of the man who kept the hotel, and it struck me, as a little chap, that it was a peculiar name for a publican. But the beneficent and alluring qualities of his biblical cognomen were not required to advertise the house, for the proprietor was a born boniface, and it is as true as scripture that his was one of the best-kept hostelries between Toronto and Montreal. The distance from Oshawa to Whitby and return is between nine and ten miles. Perhaps a quarter dollar for footing it that distance was not a too generous remuneration, but quarters were scarce in those days, and I thought myself well paid for the service, and "passing rich" when possessed of that amount. Johnny Skae accompanied me on these trips, and, of course, we divided the amount received for the delivery of the messages.

At this time the only telegraph offices between Toronto and Montreal, beginning at this end, were: Oshawa, Port Hope, Coburg, Belleville, Kingston, Brockville, Prescott, Cornwall, Montreal. These were all, and there were no side lines or branch offices. But right here I would ask permission to speak further of Johnny Skae. He was a quick-witted little fellow, sharp as a needle, and possessed of more than ordinary intelligence. Later Dr. Irwin taught him to telegraph, and about 1854-55 he was employed as operator at Chatham, Ont. He was subsequently sent to the Clifton House, Niagara Falls, where he filled a similar position.

While here Cyrus W. Field, on one of his visits to the Falls, met young Skae and took quite an interest in the bright, natty little fellow. As telegraphy had just about that time been introduced into California, there was a good opening for operators, and Mr. Field advised his young protege to emigrate to that country. After looking the matter over Skae set out for the Golden State, going thence by steamer from New York via Panama and Aspinwall. On arriving at San Francisco, Skae at once obtained a situation as operator, but before long he resigned his position and gave his time up entirely to mining and mining matters, buying claims and operating in mining stocks, etc. In these ventures he was phenomenally successful, and while John W. Mackay was yet a poor man Johnny Skae had amassed a fortune. The fact that Mark Twain devotes an entire chapter to Johnny Skae in his tale of the "Jumping Frog"—written in 1861-62—in which he in a friendly way pokes fun at some of Skae's personal peculiarities, particularly his disjointed and involved phraseology, would seem to indicate that he was a well-known character and occupied a prominent position in certain circles in California at that time. Skae went on increasing in wealth until he was rated as being worth anywhere from ten to fifteen million dollars. He was a big-hearted fellow, and although not ostentatiously extravagant, spent his money freely, if not lavishly. He entertained like a prince, but was temperate in his habits, and avoided dissipation of all sorts. He built a summer residence of great architectural beauty on one of the mountains in that region. This secluded and salubrious retreat was capacious, inviting, quaint and picturesque. The straggling trees and underbrush were removed, the hill sides terraced, and the grounds laid out with exquisite taste. Here were cool, limpid, diminutive artificial lakes fed by pure spring water from the mountains. These lakes abounded with mountain brook trout, and here Skae's friends from the east, literary men, professional men, and capitalists, visited him and partook of his hospitality, and with the deceptive fly beguiled the wary trout from the cool recesses of the ponds. The richest viands and most expensive wines and liqueurs that money could purchase were the order of the day, and with Skae "everything was lovely, and the goose hung high," or rather, we should say, honked high. But it was with Skae as with others before him.. He was soon to experience the storms of adversity. Tribulation and trials were at hand. Reverses, terrible in their effects, finally overtook him, and the crash came. The mines and mining stocks in which he was interested became unpopular and unproductive, and took a sudden and sullen drop. Other financial speculations in which he was engaged ended disastrously. Everything, in a word, seemed to go wrong with him; his once colossal fortune melted away like mist before the morning sun, and presently Skae was forced to face the rude, stern fact that he was penniless. He was "good grit," however, and fought hard to retrieve his fortune; but the times had changed, and although he had no lack of friends, able and willing to assist him, the same facilities for making money rapidly which prevailed when he arrived in California did not now exist, and after vainly striving to recover his position, his health gave way and he died in San Francisco about twenty-five or thirty years ago. While he was in flourishing circumstances he settled a large sum of money on his wife. This was never touched in his subsequent business engagements, and at his death the widow was left very well provided for. Skae performed many generous acts when in the

hey-day of his prosperity. Unlike many poor men who have become suddenly and abnormally rich, he never went back on his old friends, and more than one hapless Canadian seeking his fortune in distant California has good reason to remember his open-handed generosity.

Dr. Irwin, at the expiration of two weeks, returned to Oshawa, and after spending a day with him, I came back to Toronto. The stage on which I returned left Oshawa quite early in the morning, and I found to my delight on getting on board that we had a negro minstrel troupe for fellow-passengers. The troupe had been giving entertainments at the small towns between Toronto and Kingston, and were returning to Toronto. Among them were one Fisher, an itinerant telegraph operator, with an unconquerable love for the burnt cork business. He was a capital singer, and played the guitar with the skill of a troubadour. All the way between Oshawa and Toronto we had a perfect feast of fun and flow of song. The banjo, guitar, tambourine and fiddle were all manipulated by artists, and "Brudder Bones" was simply inimitable. Such a revel and riot of wit and humor, jokes and conundrums had never before been heard anywhere on the old stage route. The histrionic art may have made great advances during the past sixty-four years—though there are those who will not admit this is the case, except in the matter of scenic embellishments, elaborate stage settings, and ingenious mechanical appliances—but it is more than doubtful whether the negro minstrels of to-day are as able or amusing, or capable of portraying negro life as truthfully and pleasingly as did "Brudder Bones" and his colored colleagues half a century ago. Negro minstrels are too highfalutin and operatic nowadays; there is too much tinsel, too much blaring brass band and street show, too much swallow-tail coat, satin pants, silk vest, immaculate shirt front and ball-room get-up generally, and too little real honest and natural delineation of negro life as it was before and after "de wah."

All the negro melodies sung in those days were given with infinite taste and skill. The tunes of some of these we seldom hear now, but most of them were exceedingly pretty and catchy. We had "Buffalo Gals ain't You Comin' Out To-night," "Jim Crack Corn I Don't Care," "Stop Dat Knockin' at My Door," "Lucy Long," "Old Uncle Ned," "Nellie Bly," "O Dearest May," "Way Down Upon de Suwanee Ribber," "They Stole My Child Away," "Swashay Hands Across, Sally Go Down de Middle" and many other old-time ditties. Before reaching Toronto, "Christy's Minstrels'" song book had well nigh been exhausted.

Mark Twain, who had travelled all over America and Europe in the best-managed and best-equipped *rail* ways, gives it as his opinion that railway travelling, compared with the old style of stage coaching, is flat, stale and unprofitable. He says:

"It is hard to make railroading pleasant in any country. It is too tedious. Stage coaching is infinitely more delightful. Once I covered the plains, and deserts, and mountains of the West in a stage coach from the Missouri to California, and since then all my pleasure trips must be measured to that rare holiday frolic. Two thousand miles of ceaseless rush, and rattle, and clatter by night and by day, and never a weary moment, never a lapse of interest. In cool mornings before the sun was fairly up, it was worth a life time of city toiling and moiling to perch in the foretop with the driver and see the six mustangs scamper under the sharp snapping of a whip that never touched them; to see blue distances of a world that knew no lords but us; to cleave the wind with uncovered head and feel the sluggish pulses rousing to the spirit of a speed that pretended to the resistless rush of a typhoon."

Thus eloquently and enthusiastically does Mr. Clemens discourse on his ride across the continent in a stage coach, and he had no negro minstrel troupe along. Had a troupe been present, one of the old-fashioned sort, I should just like to hear what "Mark" would have to say then.

The telegraph company in those days dead-headed for the theatre, and every peripatetic show, good, bad and indifferent, that came along. All that we youngsters had to do was to present to the door-keeper of the theatre one of the Montreal Telegraph Company's envelopes, or a piece of copper wire, or produce simple evidence of any description that we belonged to the telegraph fraternity, and we were admitted, not only without question, but with marked civility, to any part of the house.

(To be Continued.)

Developing Men.

When persons in executive positions reach the limit of their usefulness, says *Telephony*, others must take their places. If the new executives are not properly trained, there is often confusion for a period and sometimes irreparable loss. An instance of this kind comes to mind where a newly appointed manager, from outside the local organization, made a decision which cost the company several thousand dollars. The manager's action was taken despite the advice to the contrary of a properly trained local man who was familiar with all the conditions involved.

A fundamental rule for developing men is to give them responsibility. Of course it is useless to give responsibility to a man who has not character and ability. The making of an error is a critical time in the development of a man. At such a time, he may either be spoiled, or he may be fortified against any such mistake in the future. No subordinate should be criticized publicly or harshly.

PROTECTING LONDON TELEGRAPH OFFICE.—The *Post-Office Electrical Engineers' Journal*, of London, England, prints in its October number two views of the exterior of the central telegraph office in war time. The lower part of the building is protected by wire nets, evidently to deflect bombs, etc., and the sidewalks are patrolled by armed soldiers. England ought to be thankful that it has an underground wire system that cannot be disturbed by destructive missiles.

"Why I Am What I Am."

The Philadelphia *North American* prints an article from a prominent railroad man under the title "Why I Am What I Am," which is a good sermon on the reward of duty well performed.

Not only did this man have to fight his way up from a telegraph operator to his present high state in railroading, but he even had to fight to be a telegrapher. He has never had an opportunity to do anything else but keep ahead of the procession. His life story is at once an inspiration and a comfort, being the narrative of a self-made man. A certain genius for organization has lifted him over the heads of his former associates and placed him in a position to speak wisely and well. This is how it happened and why it happened.

"In trying to get things together and to make things run smoothly," he said, "I suppose I attracted the attention of the men who had my advancement in their power. I don't know what else could have inspired them to move me up in the scale past the fellows who were working every bit as hard as I. Of course, there was no wasted time with me. I had wanted to get into railroading for so long that when I got my chance I wasn't going to let any possible slip throw me out of it.

"As a boy I got my eyes trained on the telegraph operator's key pretty early. I liked the looks of it. But there was no chance to break in. I had no time nor money, working as I was, to purchase an instrument or to hire any one to teach me the code. I used to hang around the office in the evenings and talk to the men and try to learn from watching them. All the seats were full and every instrument had its man, so all I could get was in observing, and that wasn't much. Finally, the head man fixed up an instrument in the back part of the room and told me to practice there. There was another lad situated as I was, in another part of the city, and between us we got a wire, over which we could experiment on each other.

"Every night we were at our posts, just as though wrecks would occur if we failed sending and receiving. The ability to send and read were hard to acquire in that situation, but the men took an interest in me, and stopped once in a while to show me the correct way.

"Gradually I mastered it, until I could handle the work without any difficulty; but still there was no opening for me as I could see. I had not come under any promise and I felt as far away from my desired position as I ever had felt.

"Feeling this way, I was nearly knocked over one night when the station agent called me over and told me that an operator out in a neighboring station had quit and that I could have his position. I went. I didn't dicker any about salary. I was too overjoyed to be in a responsible position. That was a proud moment when I began operating my wire from my own office. It was a small place, with no great volume of business, but I did everything that came along, no matter how small it was, just as carefully as though the fate of the road depended upon it. Gradually I got on to the duties of the station agent, and in time I was given his position. More business now devolved upon me, but I mastered each thing as it came along. I had a pride in my little station and kept hoping that the men higher up would notice it and give me a more responsible position in time.

"In time they did, for I was called into the main office and instrusted with some little business. The city was quite large, and, having much traffic, there was much opportunity for good work. This I tried to give and spent my whole energy in seeing that every detail was carried out as nearly perfect as possible.

"When I left my work at the key I carried the same principles of scrupulous exactness into the station and ticket work. You know, a telegrapher, of all people, must never make a slip. He must have his mind on his work and must avoid carelessness or mind-wanderings as though his life depended upon it. More so than if his life depended upon it, for the lives of others actually do depend upon it.

"Events so materialized that I became passenger agent of the road in my city. This was the result of the way I had handled the station affairs in the little things, and, at the same time, had managed bigger movements, which had resulted in the benefit of the road. I had not thought about much else and had given my affairs so close attention that it had been noticed.

"This new position had been more than I had bargained for when I had embarked upon my railroad career. I had never dared to look so high, but, as I had neared the position little by little, I had realized that I could handle it.

"Though our road had been prosperous locally, the whole system had been in a bad way, and another and larger company absorbed it. It was a hard blow to me, because I saw the end of my work. Just before the new road assumed charge the management sent for me and hired me to take charge of the whole city as general passenger agent for the combined roads. Needless to say, I did not refuse.

"With the renewed confidence which this gave me I set about building up the condition of affairs under my charge to the top notch. I watched other systems and scrutinized every detail of their management to see if they could, by any chance, have any advantage over us. I perfected every scheme that I thought might add to the attractiveness of our road. I studied the train service and pondered over the direction of traffic in order to facilitate it. There are a thousand and one things that cannot be set down which a general passenger agent has to watch.

"My early training, as it had prepared me for the humbler calling of station agent, stood me in good stead now. I knew how to carry each thing through. There were men about me and under me who had had better training than I for my work. They had been out on the road in the maintenance of way and other departments, learning first-hand knowledge, while I was plugging away at my instrument, but I had learned to work and to remember what I saw. I could plan and use the things I

knew in those plans. Living with my work and refusing to let other things distract me from it had given me the ability to manage.

"When I had been in this situation for several years a road which had its main offices in Philadelphia offered me charge of a department over the whole system. I could never think of any certain reason why they should have come to my city and have selected me for this responsible position, choosing me over the heads of some of the men who had handled larger cities and systems. But I suppose it is that way with nine-tenths of the men in this world who get promoted. They go along doing their duty, and some one, looking for a man, will notice his reliability and exactness of execution and hire him.

"If I had been selected, say, five or six years earlier I might not have been able to handle a whole system, but, coming, as I did, with experience, I had no trouble. I have noticed that it has always been this way in every kind of industry I have ever seen. If a man does his work well and has the proper training and courage he will get along.

"I never believed a position was too big for me to handle, once I had prepared myself. If a question in railroading came up I gave it thought and investigation before I decided. I went into details and explored it thoroughly before making a choice.

"Being an obedient telegrapher, I learned to do what I was told and that compliance with orders and the pleasing of superiors was the duty of a worker. All this helped me as I came to be at the other end of the line, when I got to giving orders myself. It gave me an appreciation of the work and of the care which must follow each act to its completion."

How to Get Rich.

This question, "How to Get Rich," is probably as ancient as any other that a human being has ever asked or can ever ask. It is the custom of all rich men to tell others, at some time in their lives, after they have succeeded in getting rich and have the time to tell others how to do it. All of the secrets so freely given, after riches have come, resemble one another in that honesty, persistence and a clear head are the most important requisites in one's character. Another important quality to practice is self-control.

The feverish desire on the part of many of the masses who would rather be rich than work has been the basis of the business of sharpers, who, in the past, advertised widely that they would divulge the secret of "How to Get Rich," for a small sum of money. There were many "suckers," of course, and the usual answer was, "Work like the devil and don't spend a cent." The advice, while apparently dearly paid for, was true, and no one could reasonably claim that he was swindled, because he received advice that was worth something. No doubt, these simple directions have led many to think seriously and probably a large number really got rich by following the advice.

Russell Sage practiced economy to the limit. He never paid more than $15 or $16 for a suit of business clothes and the wearing of cuffs was an extravagance that he did not indulge in. He was a multi-millionaire and his advice to those who would get rich was: "Be honest, industrious and economical."

Hetty Green, who was reputed to be the richest woman in America, advised women to go into real estate, buy "snaps" and after improving the property to sell at a nice advance. This advice was supplemented by the admonition for every woman to learn to mind her own business, which probably proved to be the most difficult part of the recipe to carry out.

Charles Broadway Rouss, the well-known blind merchant of New York, prescribed the following formula: "Industry, integrity, economy and promptness; learning when to buy, where to buy and how to buy; buying and selling for cash and quick sales and small profit."

Collis Huntington said: "Don't talk too much during business hours; don't let your competitors know what your next move is; eight hours' sleep every day and twelve hours' work; do a little more than you agree to do; meet bills as they fall due; put by a dollar out of every five you earn."

Henry Clews, the banker, advises to "buy cheap and sell dear," and Mr. Andrew Carnegie's recommendation is "push, squareness, clearheadedness, economy and rigid adherence to the rule of not overworking."

Valuable Book on the Telephone.

"Electricity and Magnetism in Telephone Maintenance." By G. W. Cummings. This book is one of the best on the telephone that we can recommend to the student. Mr. Cummings, the author, being the instructor of inspectors for the Chicago Telephone Company, is well qualified to teach others, and, being an excellent writer, has succeeded very well in describing in an interesting way, and in a clear manner, the facts that would ordinarily tax the ingenuity of most writers on technical subjects. The book contains a vast amount of information and covers the principles and practice of telephony in an excellent manner. It includes chapters on electrical pressure, resistance, current, magnetism, electromagnetic induction, capacity and batteries. From this it will be seen that it covers a wide range of applied electricity. It also gives rules for measurements and is well illustrated. The price of this work is $1.50, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

THE PACIFIC-PANAMA EXPOSITION.—The palace of liberal arts at the Panama-Pacific International Exposition, to be held in San Francisco, Cal., next year, will contain exhibits from all over the world, illustrating human endeavor in all the sciences and arts. One of the groups of exhibits will show electrical methods of communication.

Miscellaneous.

MORE GENERALS THAN SOLDIERS.—A curious error was made in a recent war despatch and the news was widely printed. The item as received stated that the Germans had captured 40,000 generals and four soldiers. As originally written, it read four generals and 40,000 soldiers.

VALUE OF AN IDEA.—The late Richard W. Sears, a former telegrapher, and the founder of the mail-order supply house of Sears-Roebuck, of Chicago, got his idea of establishing a mail-order business through selling a dozen watches to his companions on the wire. Mr. Sears was reputed to be worth $25,000,000 at the time of his death.

"PEACE AND PLENTY."—The business men of St. Paul, Minn., have organized the "Peace and Plenty" League, and propose to raise a fund of at least $1,000,000 to carry on the movement and push its influence to the remotest parts of the globe. Mr. C. A. Crane, manager of the St. Paul Western Union office, was chosen temporary chairman. He is taking an active part in the movement.

EARLY HISTORY OF THE ELECTRO-MAGNETIC TELEGRAPH is the title of a pamphlet arranged by Mr. J. Cummings Vail from letters and journals of his father, Alfred Vail. It is the story of Mr. Alfred Vail's connection with the electro-magnetic telegraph and throws considerable additional light on the subject. It contains illustrations of the principals concerned in the invention of the telegraph, and of the early apparatus. One of the illustrations shows the original machine on which was received at Baltimore the message "What Hath God Wrought?" sent from Washington, May 24, 1844. The price of the pamphlet is 50 cents. Copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

DISC TELEGRAPH RECORDS.—Diamond medal telegraph records are just the thing for telegraph students to obtain practice from. These are double records, that is, they have records on each side, and can be used on any make of talking machine. There are eight discs in the set, sixteen lessons in all, and the lessons lead the student on by easy stages. There are also records of the finest specimens of Morse sending, prepared by the best operators. Single records, 75 cents; double records, $1.00. Send for pamphlet. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

AMERICAN TELEGRAPH PRACTICE.—"American Telegraph Practice," by Donald McNicol, is the latest work on the subject of telegraphy in all its branches. Every application is described in a clear and comprehensive manner, and it is a book that every telegraph student should have at hand for reference. The telephone and its relation to the telegraph is also covered to a liberal extent. The twenty-five chapters cover batteries, generators, storage batteries and rectifiers, power-board wiring, circuits and conductors, single Morse circuits, lightning arresters, switchboards, measuring instruments, speed of signaling, repeaters, duplex and quadruplex telegraphy, multiplex circuits, the phantoplex, high-speed automatic telegraphy, simultaneous telegraphy and telephony over the same wires, etc. The price of this book, which has 497 pages and 418 illustrations, is $4.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Easy Lessons in Technical Telegraphy.

The demands of the present time require that every operator should have at least an elementary knowledge of the technical side of the telegraph, and he who does not keep up with the march of progress will fall behind and will not attain his desire to rise in his profession. Those who study and prepare themselves for better positions will receive their reward in due time.

"Easy Lessons in Technical Telegraphy" is an excellent book of 197 pages, written in plain, every-day language and covering the entire field of telegraphy. It describes the principles involved in telegraphy in such plain terms that no one who is sincere in his efforts to learn will find any difficulty in understanding. It is well illustrated with diagrams of circuits, etc., which are a great aid to the student in his work. The price of this useful volume is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. Stephen E. Barton, for many years in the insurance business at Boston, and an old-time and military telegrapher, in renewing his subscription for another year, has this interesting statement to make: "I thank you for renewing my subscription to the AGE, and I want you to continue doing so until the end of time, knowing that as long as I am able and capable of drawing my check I shall do it with the greatest of pleasure. While I have been about forty years out of the telegraph service, and while my house is filled with magazines and papers, and all sorts of reading-matter, and while I think that I am the busiest man on earth with the detail of my business, I cannot remember that I have ever failed to read the AGE from beginning to end with as deep an interest as I peruse any reading-matter. Occasionally I find mention of some dear friend of my time or a communication from some bright friend, like Walter P. Phillips, and these little incidents amply repay me for reading your publication through. The men whom I knew in the service are growing very few, and, for that reason, their memory is all the more precious. I congratulate you on the able and interesting magazine which you have always published, and I know that all telegraph and telephone men are proud of it. I wish you continued success."

Mr. P. Kearney, of Crown King, Ariz., the well-known old-time member of the profession, who was prominently identified with the service a half century ago, in renewing his subscription, writes: "The Gold Standard Lid is still on in good shape."

THE RAILROAD.

MR. G. A. CELLAR, superintendent of telegraph, Pennsylvania Lines West, Pittsburgh, Pa., was a recent New York business visitor.

MR. AMBROSE S. MILLER, wire chief, Philadelphia and Reading Railroad, Reading, Pa., was a recent New York visitor.

LACKAWANNA WIRELESS OUTFIT STOLEN.—A complete wireless outfit was stolen recently from one of the coaches of the Lackawanna Railroad at Hoboken, N. J. Mr. L. B. Foley, superintendent of telegraphs and telephones, states that the plot was evidently laid with great care, as the telephone call for a wagon to remove the outfit was made through the company's private exchange.

TELEGRAPH AND TELEPHONE ON THE SANTA FE.—It was recently reported that the Atchison, Topeka and Santa Fe Railway Company had reinstalled telegraph service on its line between Salina and Newton, Kan., because the business could not be handled by telephone. Mr. L. M. Jones, superintendent of telegraph of that road, Topeka, Kan., explains the matter as follows: "Salina is on a short branch line. The dispatching of trains, the handling of railway messages and joint commercial way messages was originally handled on one telegraph wire. We recently decided to put in telephone train dispatching on the branch and strung one wire, using the wire already in position for one side of the metallic circuit. In order to give the division office, which is located about 100 miles distant, a telegraph wire, we simplexed the dispatchers' telephone circuit, thus giving Salina a direct telegraph wire to the division office. This wire is used for the handling of railway messages. You will readily see that this was simply an additional facility and should not in any way be connected with the use of the telephone dispatchers' circuit. There was one report published to the effect that we had gone back to the telegraph for dispatching trains. This I endeavored to have corrected."

Meeting of Eastern Division of Association of Railway Telegraph Superintendents.

Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., has, as chairman of the Eastern Division of the Association of Railway Telegraph Superintendents, announced that the next regular meeting of the division will be held in the rooms of the Young Men's Christian Association, Pennsylvania Station, New York, on November 11. The subject of "Inductive Interferences from Automatic Telegraph Systems on Railway Telephone Circuits" will be brought up before the meeting in the form of a paper, and it is likely that it will evoke much discussion. These interferences are becoming more and more pronounced as automatic telegraph systems are being extended, and unless something is done to neutralize or minimize them the situation from the railroads' standpoint will become serious. The meeting will be called to order at 10 a. m., and it is hoped that the attendance will be large.

SELECTOR RESISTANCES.—Those identified with the railroad telegraph and telephone service, desiring copies of the pamphlet entitled "Determination of Selector Resistances," prepared by Mr. W. E. Harkness, of the Hall Switch and Signal Company, New York, can procure the same by addressing Mr. Harkness.

Renewing Old Friendships.

Mr. George E. Lawton, assistant manager of the Denver, Col., office of the Western Union Telegraph Company, who is known throughout the country as "Old Farmer" Lawton, recently contributed to this publication a short article referring to the late John Sherman, senator from Ohio, having at one time lived at Pueblo, where he conducted some important business in behalf of the government. This was in the seventies. The article was read by Mr. G. E. Fletcher, now in the hotel business at Pilger, Neb. Mr. Fletcher is an old-time Colorado telegrapher and a subscriber to this publication. He wrote to the "Old Farmer" as follows:

"Referring to your item in TELEGRAPH AND TELEPHONE AGE of the September 16 issue: I was manager of the Pueblo office from September, 1875, to March, 1876, and was then transferred to Central City. I cannot recall the name of the gentleman who relieved me at Pueblo and have a sort of a feeling that you were the party. The person who relieved me was working for the Denver and Rio Grande in South Pueblo, but shortly afterward resigned and went to Silver City, N. M. He in return was relieved, if I remember correctly, by a Mr. Drake. I remember of meeting Mr. Drake in Denver afterward and might have met you. I was, at that time, a young, green saphead, eighteen years old. The office at Pueblo was in the old Pueblo *Chieftain* building. I worked in Denver from August, 1876, to September, 1878, and was the only night man there. I took report for the *Rocky Mountain News* and the *Denver Tribune*, and it was a snap compared to what is required now. I remember that old Santa Fe wire as being down for a month at a time. They used soldiers from Fort Union as repairmen. Would be glad to hear from you. I have been out of the business for a number of years, but still like to talk shop, and that item of yours was very interesting to me, and reminded me of the old days."

An interesting point in connection with this matter is the fact that TELEGRAPH AND TELEPHONE AGE acts as a bond of union between telegraphers, past and present, and serves to bring together old friends who, during the march of time, have become separated and quite forgotten.

Mr. W. L. Jones, general manager Postal Telegraph-Cable Company of Texas, Dallas, Tex., writes: "Enclosed find remittance covering my seventeenth year's subscription to the AGE. That your educational work is effective is shown by the fact that the best posted men in our service are those who read the AGE."

MUNICIPAL ELECTRICIANS.

Grounding Fire Alarm and Signal Boxes.

In his paper on "Safe Grounding for Fire and Police Signal Boxes," read at the Atlantic City convention of the International Association of Municipal Electricians, Mr. A. C. Farrand, city electrician of Ventnor City, N. J., called special attention to the dangers of lightning on overgrounded fire boxes and circuits.

During heavy lightning storms in large cities several buildings in different parts of the city are, he said, often set on fire simultaneously, or nearly so, and if the fire alarm circuits are over-grounded, lightning will blow the central office fuses, leaving them open just at the time the services of the circuits and apparatus are most needed. Thus the grounded shells of fire boxes, to protect the lives of the few persons that may come in contact with them while their circuits are crossed with high-potential wires, may cause the loss of many lives in factories, hotels, theatres, moving-picture shows, and other places of amusement during a lightning storm, by putting the whole system out of commission, and depriving these fires of the attention of the firemen.

Almost every fireman or police officer of the present day is afraid to handle either fire or police boxes in stormy weather, because so many of them have been knocked down, or out, from crossed circuits.

"Instead of the proposed grounding of the entire signal-box shell," he said, "I strongly recommend as a substitute the simple grounding of the specific portions of the movable apparatus which the operator is required to touch in sending a signal, and insulating those portions of the casings or containing shells which either the operator or any passer-by may touch."

Educating the Public in Sending Fire Alarms.

The paper of Mr. Robert J. Gaskill, of Fort Wayne, Ind., on the subject of educating the public in the use of fire alarm boxes, read at the convention of the International Association of Municipal Electricians at Atlantic City, last September, has attracted a good deal of attention. It is a subject that every city and town is vitally interested in and should receive the earnest consideration of municipal authorities and citizens alike.

As has been pointed out, it is not easy to get the average citizen to realize the importance of knowing how to proceed to send a fire alarm, as simple as the operation is. The fire insurance companies should take the matter up and co-operate with the fire departments in an endeavor to educate citizens in the performance of this manifest duty. To the general ignorance on this subject no doubt can be traced great financial loss through fires which could have been brought under control at the start had the alarms been sent in more promptly.

The educational feature of the question can, no doubt, be easily met in every instance when a co-operative plan is once settled upon and carried out vigorously.

In regard to this matter Mr. J. B. Yeakle, superintendent of telegraph, Baltimore, Md., writes:

"It is a fact that the most ludicrous conditions present themselves in connection with efforts on the part of intelligent people in giving an alarm. The instructions are simple and prominently displayed on the inner and outside doors, but they are sometimes unnoticed and, possibly, in the excitement, one part is observed and the other (the most important) is overlooked.

"Under a well-conducted system of testing it is easy to determine if a box has been pulled after inspection. The examination being completed, the box is wound and the ordinary test of sending in alarm is made. The operator and linemen exchange signals on the Morse key and the box is closed. If a box is pulled the position of the governing wheel is changed a definite number of teeth forward and unless we find a difference in the position of this wheel we know the test signal indicates the last movement of the box. It is possible that the box may be shunted out on account of failure of a certain device to act, but if this rod performs its function the door cannot be closed. I have altered this feature in our boxes so that the door will not go into the rabbit without special care to replace a small pawl that falls below the rabbit when the door is opened.

"Telephones give us some amusement as well as anxiety at times. Notably when an excited female will get a connection with the office and tell the operator there is a fire here (or in the neighborhood) and speedily hang up while she goes to watch the conflagration. Sometimes we locate the call through the intelligence of a telephone operator and in time get the necessary information while the blaze is going on, making additional expense for the insurance people and adding to the work originally cut out for the department."

Join the Old-Time Telegraphers' Association.

All old-time telegraphers, whether in or out of the service, should be members of the Old Time Telegraphers and Historical Association. There is much pleasure and satisfaction in recalling the past occasionally, and recounting telegraphic deeds, and this sentiment is fostered by membership in this association. It is the duty of old-timers, moreover, to preserve and perpetuate the memories of olden times, and that is a function of the association.

Following is the by-law on "Qualification for Membership":

"Any person in good standing, who, prior to twenty-five years before the date of making application, was employed in the telegraph service, and thereafter for five years, shall, upon payment of $2.00 (an initiation fee of $1.00 and $1.00 dues) be eligible to membership."

It is earnestly hoped that all those who are eligible to membership will write for application blanks, and thus become affiliated with one of the most excellent associations in the United States.

Blanks can be obtained upon application through Mr. J. B. Taltavall, Committee on Membership, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

The San Francisco Telegraph Tournament.

The dates for the telegraph tournament at the Panama-Pacific Exposition in San Francisco next year have been set for May 27, 28 and 29.

The membership of the executive committee so far selected is as follows: A. A. Gilson, with E. F. Hutton and Company, chairman; E. Cox, chief operator, Postal Telegraph-Cable Company, secretary; B. Pogue, chief operator, Pacific Telephone and Telegraph Company; Robert E. Geistlich, chief operator, Associated Press; J. C. Arthur, merchant; W. F. Lynch, chief operator, United Press; Guy R. Fisher, correspondent, International News Service; H. B. Segur, representing Southern Pacific; J. I. Hilliard, chief operator, E. F. Hutton and Company, bankers and brokers, treasurer.

The eastern members of the advisory board are: Thomas A. Edison, Orange, N. J.; C. C. Adams, second vice-president, Postal Telegraph-Cable Company, New York; Melville E. Stone, general manager, Associated Press, New York; David Homer Bates, secretary-treasurer, Society of the United States Military Telegraph Corps; Walter P. Phillips, New York and Bridgeport, Conn.; John B. Taltavall, publisher, TELEGRAPH AND TELEPHONE AGE, New York; J. Frank Howell, member consolidated stock exchange, New York; Jno. J. Ghegan, president. J. H. Bunnell and Company, New York; J. C. Johnson, superintendent telegraph, Pennsylvania Railroad, Philadelphia, Pa.; Andrew S. Weir, Cassatt and Company, bankers, Philadelphia, Pa.; F. W. Griffin, American Telephone and Telegraph Company, Philadelphia, Pa.; Patrick B. Delany, telegraph and electrical engineer, Nantucket, Mass., and C. E. Bagley, superintendent, Postal Telegraph-Cable Company, Philadelphia, Pa. The following are also members of the advisory board: J. G. Blake, general superintendent; V. V. Stevenson, division electrical engineer, and W. Hearn, superintendent, Postal Telegraph-Cable Company, San Francisco, Cal., and A. H. Gimman, general superintendent, Pacific Coast Division, Marconi Wireless Telegraph Company of America, San Francisco.

Entertainment and Reception of the New York Telegraphers' Aid Society.

Mr. R. J. Marrin, chairman of the entertainment committee of the New York Telegraphers' Aid Society, announces that this year's entertainment and reception will be held on Tuesday evening, November 17, at Terrace Garden, Fifty-eighth street, near Third avenue, New York. The members of the various committees are making every effort to maintain the record of past performances and it is needless to say they will succeed as usual. Prominent officials of both of the telegraph companies have promised to attend the entertainment, which will be given by high-class professional vaudeville artists. The proceeds of these yearly gatherings in behalf of the relief fund are devoted to the relief of distressed members of the craft, who for any reason are debarred from membership in the society. It should receive the earnest support of all telegraph people, as the object is a most charitable one. Tickets may be procured at the Serial Building Loan and Savings Institution offices, 16 Dey street, or 24 Walker street. All remittances should be made to C. A. Kilfoyle, financial secretary, P. O. Box 711, New York City.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 575 and 576 to meet the claims arising from the deaths of J. B. Nolan, at Denver, Col.; P. V. DeGraw, at Washington, D. C.; A. H. Watson, at Fishkill-on-Hudson, N. Y.; G. K. Wood, at Pillsford, N. Y.; F. O'Ryan, at New York; L. G. Culver, at Bath, N. Y.; J. Ferguson, at Spartanburg, S. C.; J. W. Larish, at New York; J. McNerny, at Dunkirk, N. Y.; T. A. Dailey, at Benwood, Va.

New York Telegraphers' Aid Society.

The quarterly statement of the New York Telegraphers' Aid Society for the quarter ended September 6 is as follows:

Balance on hand June 6		$26,129.76
Receipts		1,361.02
Total		$27,490.78
Disbursements:		
Death benefits	$ 200.00	
Sick benefits	1,139.71	
Expenses	172.20	1,511.91
Balance on hand September 6		25,978.87
Total		$27,490.78

RELIEF FUND.

Balance on hand June 6	$6,452.03
Receipts	100.07
Total	$6,552.10
Disbursements	$ 142.00
Balance on hand September 6	6,410.10
Total	$6,552.10

HARD LUCK FOR MR. HAYES.—When Mr. J. W. Hayes returned to Los Angeles, Cal., on October 19, after a journey of over 15,000 miles over this country and Canada, in the interest of his magazine, *The American Telegrapher,* he was greeted with the announcement that every article of value that he possessed had been destroyed by fire. Much interesting matter for the magazine, his books, furniture, household treasures, winter clothing for the family, in fact, everything had gone up in smoke. Disconcerted, but not dismayed, Mr. Hayes will get out his magazine, but it will be ten days late.

New Edition of Jones' Diagrams.

The new edition of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers," will be a much larger volume than the earlier edition of the work. It is brought up to date, and will contain descriptions of the latest devices and systems. It will contain fifty-six chapters covering and treating that number of important subjects. It will be ready for delivery in December, and the demand for it is already great, as evidenced by the number of orders received. The price will be $2.00 per copy. Address, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

OBITUARY.

EDWARD COLEMAN, aged sixty-four years, an operator of Dallas, Tex., died in Galveston, Tex., October 3.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

Herbert McNichol has been engaged as special operator on the battleship "Morena" during her trial trip.

Messrs. Madden, Collins, Kurtz and Murray went to Princeton October 24, to assist Manager Dean in the handling of the large amount of press caused by the Princeton-Dartmouth game. Everything went off like clockwork.

Our new office recently opened at Shenandoah, under the management of Mr. Thos. B. Riley, is proving a valuable feeder to our already extensive service.

Philadelphia hopes to be represented among the winners at the San Francisco tournament in 1915.

The opening of the foot-ball season saw some changes in the Franklin field squad. E. M. Price is now in charge, assisted by H. Riskie, M. R. Hansberry and W. G. Kurtz, all fast, snappy operators.

Our local American District Telegraph burglar alarm system is again proving its efficiency. During the past two months it has been the means of preventing at least four robberies in the downtown and wealthy residential section. W. M. Fitzgerald is in charge of this department, assisted by Wm. Miley, days, and A. F. Reed, nights.

Manager J. H. Wilson has been an indefatigable worker in effecting arrangements for our new main office quarters, which we hope to occupy early in 1915.

A number of our operators enjoy the distinction of having been involved in no errors during the past six months. Messrs. McKeever, Gifford, Lieberman, Furlong, Price and Murray head the list for all-around accuracy, speed and regularity, while Miss Viola M. Hetzel made the best record among the girls. Misses Falcon and Ott lead the printer operators.

The chief operator has been urging on the force the importance of perfect Morse sending as a valuable ally in the war upon errors. Nothing is so trying on the nerves as to have to copy a poor sender. It is to be hoped that the time will soon come when bad sending will be a thing of the past.

ST. LOUIS WESTERN UNION.

On Monday, September 28, the commercial employes of the second district presented to District Commercial Superintendent Mr. W. R. Chapman, a handsome watch and fob as a token of the respect and esteem in which he is held. Mr. Chapman has been transferred to St. Paul, Minn.

The employes of the operating department and District Commercial Superintendent Cronkhite's office have formed the "Western Union Operators' Bowling League," consisting of four teams. The officers of the league are: O. R. Carson, president; J. S. Dunbar, vice-president; F. C. Helms, secretary; Chas. Garrard, treasurer. The league consists of the following teams: Cablegrams—Captain, Arthur Mitchell; F. C. Helms, E. L. Frey, Ed. Bloss, E. H. Kennedy, S. A. Wooden. Night Letters—Captain, O. R. Carson; J. S. Dunbar, D. R. Flotron, W. H. Frohoff, J. O. Farney, J. B. Overman. Day Letters—Captain, J. H. Bokien; Ralph Dyer, Arthur Gatou, Chas. Garrard, Arthur Chapman, H. E. Leonard. Specials—Captain, Fred Meinholtz; C. A. Pace, John Bollato, Harley Thacker, F. G. Stubblefield. The standing of the teams to date is as follows: Cablegrams, won 9, lost 6; Day Letters, won 8, lost 7; Specials, won 7, lost 7; Night Letters, won 6, lost 9.

Mr. C. W. Frey, of the office of the general superintendent of traffic, New York, spent a week in St. Louis recently.

Telegraph and Telephone Age

No. 22. NEW YORK, NOVEMBER 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

New Standardization Rules.

The new standardization rules of the American Institute of Electrical Engineers will take effect December 1 of this year. They are very complete and cover every point met with in present-day practice. From them have been selected the following definitions relating to the telegraph and the telephone.

A direct current is a unidirectional current. As ordinarily used, the term designates a practically non-pulsating current.

A pulsating current is a current which pulsates regularly in magnitude. As ordinarily employed, the term refers to unidirectional current.

A continuous current is a practically non-pulsating direct current.

An alternating current is a current which alternates regularly in direction.

An oscillating current is a periodic current whose frequency is determined by the constants of the circuit or circuits.

Cycle. One complete set of positive and negative values of an alternating current.

A generator is a machine which transforms mechanical power into electrical power.

A motor transforms electrical power into mechanical power.

A booster is a generator inserted in series in a circuit to change its voltage. It may be driven by an electric motor (in which case it is termed a motor-booster) or otherwise.

A motor-generator is a transforming device consisting of a motor mechanically coupled to one or more generators.

A dynamotor is a transforming device combining both motor and generator action in one magnetic field, either with two armatures, or with one armature having two separate windings and independent commutators.

A double-current generator supplies both direct and alternating currents from the same armature-winding.

A converter is a machine employing mechanical rotation in changing electrical energy from one form into another. A converter may belong to either of several types, as follows:

A direct-current converter converts from a direct current to a direct current, usually with a change of voltage. Such a machine may be either a motor-generator or a dynamotor.

A synchronous converter (also called a rotary converter) converts from an alternating to a direct current, or vice versa. It is a synchronous machine with a single closed-coil armature.

An ammeter is a measuring instrument, indicating in amperes.

A voltmeter is a measuring instrument, indicating in volts.

A wattmeter is an instrument for measuring electrical power, indicating in watts.

Recording ammeters, voltmeters, wattmeters, etc., are instruments which record graphically upon a time-chart the values of the quantities they measure.

A watt-hour meter is an instrument for registering watt-hours. This term is to be preferred to the term "integrating wattmeter."

A line-drop voltmeter compensator is a device in connection with a voltmeter, which causes the latter to indicate the voltage at some distant point of the circuit.

A wire is a slender rod or filament of drawn metal.

A conductor is a wire or combination of wires not insulated from one another, suitable for carrying a single electric current.

A stranded conductor is a conductor composed of a group of wires or any combination of groups of wires.

A cable is (1) a stranded conductor (single-conductor cable); or (2) a combination of conductors insulated from one another (multiple-conductor cable).

A strand is one of the wires or groups of wires of any stranded conductor.

A stranded wire is a group of small wires, used as a single wire.

A cord is a small cable, very flexible and substantially insulated to withstand wear.

A concentric strand is a strand composed of a central core surrounded by one or more layers of helically laid wires or groups of wires.

A concentric-lay cable is a single-conductor cable composed of a central core surrounded by one or more layers of helically laid wires.

A ground-return circuit is a circuit consisting of one or more metallic conductors in parallel, with the circuit completed through the earth.

A metallic circuit is a circuit of which the earth forms no part.

A two-wire circuit is a metallic circuit formed by two paralleling conductors insulated from each other.

A superposed circuit is an additional circuit obtained from a circuit normally required for another service and in such a manner that the two services can be given simultaneously without mutual interference.

A phantom circuit is a superposed circuit, each side of which consists of the two conductors of a two-wire circuit in parallel.

A side circuit is a two-wire circuit forming one side of a phantom circuit.

A non-phantomed circuit is a two-wire circuit, which is not arranged for use as the side of a phantom circuit.

A simplexed circuit is a two-wire telephone circuit, arranged for the superposition of a single ground-return signalling circuit operating over the wires in parallel.

A composited circuit is a two-wire telephone circuit, arranged for the superposition on each of its component metallic conductors, of a single independent ground-return signalling circuit.

A quadded (or phantomed) cable is a cable adapted for the use of phantom circuits.

A loaded line is one in which the normal inductance of the circuit has been altered for the purpose of increasing its transmission efficiency for one or more frequencies.

A microphone is a contact device designed to have its electrical resistance directly and materially altered by slight differences in mechanical pressure.

A relay is a device by means of which contacts in one circuit are operated under the control of electrical energy in the same or other circuits.

A retardation coil is a reactor (reactance coil) used in a circuit for the purpose of selectively reacting on currents which vary at different rates. Note: In telephone and telegraph usage the terms "impedance coil," "inductance coil," "choke coil" and "reactance coil," are sometimes used in place of the term "retardation coil."

A telephone receiver is an electrically operated device designed to produce sound waves or vibrations which correspond in form to the electro-magnetic waves or vibrations actuating it.

A repeating coil is a term used in telephone practice meaning the same as transformer and ordinarily a transformer of unity ratio.

Recent Telegraph and Telephone Patents.

ISSUED OCTOBER 20.

1,114,007. Electrical Signaling System. To E. E. Kleinschmidt, New York, N. Y.

1,114,048. Calling Device. To H. O. Rugh, Sandwich, Ill.

1,114,049. Signaling System. To H. O. Rugh, Sandwich, Ill.

1,114,174. Controlling Apparatus for Telephone Switching System. To E. C. Molina, East Orange, N. J.

1,114,379. Party-Line Exchange. To N. E. Norstrom, Chicago, Ill.

1,114,408. Correcting Disturbances on Telephone and Other Like Wires. To J. B. Speed, New York, N. Y.

1,114,409. Apparatus for Correcting Disturbances on Telephone and Other Like Wires. To J. B. Speed, New York, N. Y.

1,114,578. Stock Quotation Indicator. To W. Bumstead, Boston, Mass.

1,114,626. Series-Multiple Switch and Condenser for Wireless-Telegraph Systems. To T. B. Miller, Seattle, Wash.

ISSUED OCTOBER 27.

1,114,725. Means for Determining Time Intervals in Telephone Systems. To W. G. Blauvelt, New York.

1,114,840. Wireless Telegraphy. To W. C. Woodland, Warren, Ohio.

1,114,842. Attachment for Telephone Stands. To L. E. Wright, Fairgrange, Ill.

1,114,902. Telephone Receiving Instrument. To T. B. Miller, Seattle, Wash.

1,114,904. Printer for Printing-Telegraph Systems. To D. Murray, London, England.

1,114,905. Printing Telegraph System. To D. Murray, London, England.

1,114,939. Selective Signal System. To W. R. Tomlin, Fort Collins, Col.

1,114,982. Working Submarine Cables. To J. Gott, Brighton, England.

1,115,053. Telephone Receiver. To W. H. Cotton, Chicago, Ill.

1,115,174. Coherer Discharge Indicator. To E. E. F. Creighton, Schenectady, N. Y.

1,115,324. Telephone Release-Insurance Means. To T. G. Martin, Chicago, Ill.

PERSONAL.

DR. KARL FRANK, the New York representative of Siemens and Halske, of Berlin, Germany, has returned to the city from Berlin, where he has been several months on a business trip.

MISS I. L. KNIGHT, formerly operator for the Western Union Telegraph Company at Sioux City, Iowa, was married in Detroit, Mich., on October 7, to Mr. A. E. Connine, of the Michigan Central Railway Company. Mr. and Mrs. Connine will reside in Detroit. Mrs. Connine was, for several years, manager of the Postal Telegraph-Cable office at South Haven, Mich., before entering the Western Union service, and has many friends in the telegraph profession.

MR. CHARLES R. UNDERHILL, chief electrical engineer the Acme Wire Company, New Haven, Conn., lectured on the subject of "Electromagnets" before the American Institute of Electrical Engineers, Purdue University branch, on October 27.

and before the Ohio State University branch on October 30. This year, Mr. Underhill has many new slides showing oscillograph tests of electro-magnets, with plungers or armatures both stationary and in motion.

TELEGRAPH AND TELEPHONE PEOPLE IN FLORIDA.—The exodus to Florida of northern telegraph and telephone people has already begun. That State is the home of many old-time telegraphers who have retired from active service. Among those who have recently gone there for the winter, or who contemplate leaving for Florida points within a short time, are Mrs. Francis W. Jones, of Spring Valley, N. Y., who goes to West Palm Beach; Mr. J. B. Norris, of Chattanooga, Tenn., and J. C. Vail, of New York.

MR. JOHN F. O'RYAN, major-general of the National Guard of the State of New York, and a prominent New York attorney, who was recently appointed legal advisor for the Standard Oil Company, began has business career as an office boy for Mr. George H. Fearons, general attorney of the Western Union Telegraph Company. Young O'Ryan, in looking for a position, naturally was referred to Mr. M. W. Rayens, then at the head of the messenger department of the company. Mr. Rayens secured him the place as office boy in Mr. Fearon's office. It is needless to add that Mr. O'Ryan has made good in every trust reposed in him. He was, for many years, a member of the Magnetic Club, of New York, and is well known to the telegraph fraternity.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. C. ADAMS, vice-president, spent two days in Philadelphia recently on company business.

VISITORS.—Among recent executive office visitors were Mr. James Kent, manager Canadian Pacific Railway's Telegraph, Montreal; Mr. C. E. Diehl, manager, Harrisburg, Pa.

MANAGERS have been appointed as follows: G. A. Clemens, Elgin, Ill.; R. B. Clark, Lawrence, Mass.; W. F. Coleman, Davenport, Ia.

NEW OFFICE.—This company will open a new office in Springfield, Mo., about December 1.

RAPID WORK.—Ralph Thompson, an operator at 253 Broadway, and Homer Brown, at Pittsburgh, Pa., have established a record for rapid and accurate work between the two cities. They exchanged 161,586 messages in 2,673 hours (seventeen months), this being an average of sixty messages per hour.

MESSAGE CARRIERS.—The Lamson "Kick-Back" carriers, installed in the main operating department at 253 Broadway, are giving excellent service. They distribute messages between the different sections of the operating room very rapidly. The carriers immediately return to the starting point automatically. They save a great deal of time, and more of them will shortly be installed.

NO MORE LEASED BROKER WIRES.—This company has decided to discontinue its leases of wires to brokers. The required thirty days' notice to that effect has been given.

MRS. MARY T. WHALEN, mother of Mr. J. J. Whalen, manager of the main operating department at 253 Broadway, New York, died October 27.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

PRESIDENT NEWCOMB CARLTON states that this company will not discontinue the leasing of its wires. "As a matter of fact," he says, "we are looking for new business at the present time."

OFFICIALS ON LONG TRIP.—Messrs. Newcomb Carlton, president; L. McKisick, assistant to the president; J. C. Willever, commercial general manager; G. M. Yorke, general superintendent of plant; W. N. Fashbaugh, general superintendent of traffic, and E. Y. Gallaher, comptroller, left New York on November 14 on a business trip to Omaha, Neb.; Denver, Col.; Salt Lake City, Utah; Seattle, Wash.; Portland, Ore.; San Francisco and Los Angeles, Cal., and El Paso, Tex. The party will be absent three weeks. Mr. W. C. Merly will accompany it as secretary.

MR. W. H. BAKER, secretary, attended the meeting of the Telephone Pioneers of America in Richmond, Va., October 29 and 30. He is a member of the organization.

MR. F. E. D'HUMY, of the engineering staff, New York, recently inspected the offices at Denver, Col.; Omaha, Neb.; Kansas City, Mo., and Chicago. The company has moved into new quarters in Denver.

MR. E. R. RIDDLE, division traffic engineer, Dallas, Tex., was married on October 12 to Miss Lulu E. Tilson, of Marshall, N. C.

MR. W. H. JONES, of the engineering staff of this company in New York, was one of the few who passed from 145 Broadway to 195 Broadway. He is still in the service and did not go to the 24 Walker street quarters because the engineering headquarters are at 16 Dey street. Virtually, however, he is one of the "old guard."

MR. J. W. CAREY, formerly time service solicitor, New York, has been appointed manager at Oswego, N. Y.

MR. WM. BENNETT has been appointed manager at La Jolla, Cal., a new independent office.

MISS N. KEILEY, manager at Greenport, L. I., has resigned to accept a position as operator for the government at Brooklyn Navy Yard.

THE TELEPHONE AND TELEGRAPH SOCIETY of Atlanta has elected Kendall Weisiger, of the Southern Bell Telephone Company, president, and J. P. Edwards, division traffic superintendent, Western Union Telegraph Company, vice-president.

G. O. GREGG, for the past twenty years southern wire chief in Philadelphia, died in that city recently.

J. C. Borden, an operator for the Western Union Telegraph Company in New Orleans, La., for the past thirty years, was stricken with apoplexy recently while at his desk and died soon after. He was, at one time, manager for the American Union Telegraph Company at Mobile, Ala.

American District Telegraph Company.—The supervision of the American District Telegraph Company of New York has been transferred from the Western Union Telegraph Company to the New York Telephone Company, and officers have been elected as follows: President, H. F. Stevens; secretary, W. J. Farquhar; treasurer, H. G. McCully; general manager, D. Skelton. The company's headquarters will remain in the Western Union building at 16 Dey street.

The Western Union Society of Connecticut, which was recently organized at Bridgeport, Conn., has issued its constitution and by-laws in pamphlet form. The object of the society is to study matters pertaining to the telegraph business and for the mutual improvement of its members with the purpose of promoting the interests of the Western Union Telegraph Company. Mr. J. W. McMahon, manager of the Bridgeport office, is president of the society.

Mr. Herbert Brown, whose appointment as commercial superintendent of the Chicago district of this company, was announced in our issue dated October 1, is a native of England, having been born in London, on November 23, 1870. He entered the telegraph service in this country in Boston in 1883, and has occupied positions as operator, division chief and solicitor, his latest appointment being to the position of commercial superintendent for the Chicago district, as announced.

T. A. Darling, Manager, El Paso, Tex.

Mr. Thomas A. Darling, whose appointment as manager for the Western Union Telegraph Company at El Paso, Tex., was announced in our October 16 issue, was born at Whistler, Ala., April 8, 1872, and entered the telegraph service at Mobile, Ala., January 1, 1892, as messenger, afterwards becoming an operator. In 1894 he went to New Orleans, La., for the Postal Telegraph-Cable Company, and remained with it until 1901, when he was appointed manager for the Postal Telegraph-Cable Company of Texas at Beaumont, Tex. He was located at this point during the great oil boom. He held the managership until 1912, when he became manager for the Western Union at Fort Worth, Tex., and, in October of this year, he was appointed to his present position.

J. P. Edwards, Division Traffic Superintendent of New York City.

Mr. James P. Edwards, whose recent appointment to the newly created position of division traffic superintendent of the New York City division was announced in our November 1 issue, was born in Saluda County, S. C., July 31, 1868. During his school days he learned telegraphy on a private line and became a good operator at the age of fifteen years. He worked as relief operator during school vacation on the Richmond and Danville Railroad. After his school days he took an apprentice course in the shops of the National Electric Manufacturing Company at Eau Claire, Wis., and engaged in electric light, power and construction work for a few years. In 1893 he returned to the telegraph and entered the service of the Postal Telegraph-Cable Company at Augusta, Ga. A few years later he went with the Western Union at New York and was afterward transferred to the Southern Division, becoming in January, 1913, division traffic superintendent at Atlanta, Ga. Mr. Edwards is first vice-president of the Telephone and Telegraph Society of Atlanta and is a member of the American Institute of Electrical Engineers.

J. P. EDWARDS, DIVISION TRAFFIC SUPERINTENDENT, NEW YORK

Mr. E. D. Slingerland, Bureau of Posts, Dumaguete, Oriental Negros, Negros, Philippine Islands, a well-known operator, formerly employed on the Pacific Coast, in renewing his subscription for another year, informs us that "Telegraph and Telephone Age is the only thing that makes life bearable in the Philippine Islands."

Mr. J. B. Norcross, chief clerk to Mr. C. B. Horton, superintendent, Western Union Telegraph Company, Omaha, Neb., in remitting to cover his subscription for another year, writes: "I thank you for your thoughtfulness in renewing my subscription and will look forward to another year of pleasant reading."

A Short Will.—The will of the late R. W. Sears, of Sears-Roebuck, Chicago, and a former telegrapher, was 122 words in length. It disposed of property valued at $17,500,000.

THE CABLE.

MR. ROBERT BAIN, lately relieving superintendent of the Pacific Cable Board at Suva, has resumed his permanent post of assistant superintendent, and is now stationed at Bamfield, B. C., the Canadian terminal of the Pacific Cable. Mr. Bain has had considerable experience in the service of the Pacific Cable Board, having been superintendent at almost every station as well as at the terminal points.

MR. D. H. CAMERON, of North Sydney, N. S., has invented an automatic telegraph system, which is stated to be simple and requires minimum attention in its operation.

H. E. ROBSON, aged fifty-nine years, a member of the original Direct United States Cable staff, and, for a number of years, until 1899, superintendent of the Western Union Telegraph Company at London, England, died at Bayonne, N. J., on October 30. He returned to New York from London in 1899. Latterly he was employed in the cable code department of the Postal Telegraph-Cable Company in New York.

NO CODE ADDRESSES TO RUSSIA.—The Russian Government has declined to admit code cable addresses. Cablegrams to Russia must be addressed in plain language.

BRITISH PACIFIC CABLE SERVICE RESTORED.—Cable service to Australia, via the British Pacific cable, has been restored, the damage to the Fanning Island station and apparatus by the Germans having been repaired.

CODE CABLEGRAMS.—The British Administration officially confirms that on and after November 1 cablegrams in ABC code, fifth edition; Lieber's code; Scott's code, tenth edition, and Western Union code will be permitted to and from Great Britain and Ireland.

GERMAN CRUISER "EMDEN."—The German cruiser "Emden," which caused so much damage to British shipping in the Pacific, was run ashore recently and destroyed by fire, after a battle with the Australian cruiser "Sydney." The "Emden" was in the act of cutting a cable and destroying wireless property when discovered by the "Sydney."

CABLE OPERATORS IN THE WAR.—Georges Cohen, a former employe of the Commercial Cable Company at Havre, who became a French military aviator, was killed in the battle on the Marne while reconnoitering. Georges Lecul, an operator of the Commercial Cable Company at Havre, who is serving in the French army as a dragoon, narrowly escaped being killed during a battle on the Marne. A German shell burst into the chest of his horse, killing it outright. The strength of the explosion threw Lecul ten yards, stunning him. He recovered his senses after a few minutes and rejoined his regiment in safety.

PROTECTING A CABLE LANDING.—The following is a quotation taken from a report on the measures taken by the British Government to guard the cable office and cable landing of the Commercial Cable Company at Waterville, Ireland: "The office building is completely enclosed by a barbed wire fence, patrolled within by a sentry. At the office door is stationed a second sentry, to whom must be shown a pass by all persons entering or leaving. The basement windows, *i. e.*, battery and testing rooms, are blocked up with sand bags. Preparations are now being made to close up the windows on the operating room floor with a bullet-proof protection of galvanized iron and timber, after which we shall be working completely in artificial light. The cable landing is protected by barbed wire entanglements and guarded; a guard is also maintained at the engine house. The latter place is presently to be bullet-proofed, and the water tower by the office similarly protected; the building of blockhouses is also intended."

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to November 12 as follows:

Between Madgascar and La Reunion, and between La Reunion and Maurice, June 23; Cap St. Jacques and Doson, July 17; Azores and Emden (two cables), August 5; Bundaberg and New Caledonia, August 19; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Paramaribo and Cayenne, September 27; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Itacoatiara and Manaos, October 14; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6.

CANADIAN NOTES.

MR. FRANK D. BOOMER, manager of the Quebec, Que., office of the Great North Western Telegraph Company of Canada, has been appointed manager of the Ottawa, Ont., office. He is succeeded at Quebec by Mr. R. V. Aubin, formerly night chief operator at Ottawa.

J. M. BARCLAY, aged seventy years, for over fifty years in the service of the Montreal and Great North Western Telegraph companies, part of the time as chief operator, died in Quebec, October 28. He was highly respected by his employers, associates and the public through his obliging and courteous manners and strict attention to his duties.

THE DUKE OF CONNAUGHT, president of the Canadian Patriotic Fund, has expressed to the officers and employes of the Canadian Pacific Railway's telegraph his admiration for and appreciation of their contribution of one day's pay for the care and relief of families and dependents of Canadians and allies who have gone to the front. The contributions aggregated nearly $145,000.

CANADIAN POLES FOR ENGLAND.—The British post-office authorities are considering the question of placing trial orders in Canada for telegraph poles.

Canadian Messenger's Long Bicycle Trip.

Two Canadian Pacific telegraph messengers, L. Lemieux, aged 18, and A. Buschel, aged 15,

who had previously made bicycle trips from Montreal to Ottawa and return, and to Plattsburg, N. Y., and return, on their wheels, decided to undertake the trip this year to Chicago and return. They left Montreal on August 12, with a letter from the superintendent at Montreal to the agents at the offices on their route.

After passing through Cornwall, Prescott, Brockville and Belleville, and when nearing Toronto, on their way to Chicago, Buschel dropped out owing to a break in his bicycle. L. Lemieux continued, and after passing through Windsor and Detroit, he reached Chicago on September 2, at 1 p. m. After spending a couple of days sightseeing in that city, he started on his return trip via Toledo, Cleveland, Erie, Buffalo, Rochester, Syracuse, Utica, Albany.

Among the many mementoes of his trip is a letter signed by the agents and officials of the Canadian Pacific and Postal Telegraph-Cable Companies at the places which he visited. The expenses of his trip was, to a great extent, paid by his selling postcards of himself in uniform. He reached Montreal on September 23, having made the round trip in forty-two days.

Commercial Telegraph Service on Grand Trunk Pacific Lines.

Mr. H. Hulatt, commercial and traffic superintendent, Grand Trunk Pacific Telegraph Company, Winnipeg, Man., has just returned to his office, from an extensive trip of inspection covering lines west of Winnipeg. Among other important points he visited Edmonton, Calgary, Prince George, Vancouver and Prince Rupert.

While at Prince Rupert, Mr. Hulatt completed all details in connection with the inauguration of commercial telegraph service over the Grand Trunk Pacific lines, to and from Prince Rupert, B. C., the western terminus of the road. Heretofore such service has only been in operation as far west as Prince George, B. C., a point 467 miles east of Prince Rupert.

The extension of service went into effect on November 12, and a rich agricultural and mineral country, together with numerous thriving towns and smaller communities will be afforded a modern telegraph service.

Mr. Hulatt states that while business conditions in all branches throughout the west are quiet, business men knowing the wonderful possibilities of the great northwest of Canada are optimistic, and look forward to the future development of the country with every confidence.

Mr. Hulatt announces the following appointments of managers for the Grand Trunk Pacific Telegraph Company: Mr. R. M. MacMillan, city manager, Edmonton, Alta., vice R. M. Hicks transferred; Mr. D. C. Smith, city manager, Calgary, Alta., vice R. M. MacMillan transferred; Mr. A. W. Irwin, agent, Moose Jaw, Sask., vice D. C. Smith, transferred; Mr. R. M. Hicks, city manager, Winnipeg Man., vice S. Hutchinson transferred; Mr. S. Hutchinson city manager, Prince Rupert, B. C., new office.

THE TELEPHONE.

Bamboo Poles.—Mr. J. A. Kick, engineer, Chicago, gave a talk before the Chicago Jovian League on October 5 on his Philippine experiences. He told of the use of bamboo as a support for telephone wires. Such bamboo telephone poles, said Mr. Kick, are climbed with the help of bamboo ladders, but so great is the elasticity of the stalks that by the time a fair-sized lineman has climbed to the top of a pole he is back again nearly to the ground. On the other hand, the native wood poles used in heavier line construction in the Philippines are so hard as to defy the spurs of ordinary linemen's climbers. The Filipino workmen climb these poles with their bare legs, but an American lineman requires the aid of a ladder. Even these extremely hard woods are not, however, proof against the ravages of the ants which infest the tropics. In one instance, a large pole on a main street was found to be but a hollow shell, the interior having been totally eaten away by the voracious insects.

Telephones at the Panama-Pacific Exposition.—The entire system of telephone wires and cables at the Panama-Pacific Exposition at San Francisco next year will be placed in underground conduits composed largely of fibre wood duct. Iron conduit is used where water is near the surface. The conduits also carry the electric light and power wires. The switchboard is a five-section board with fifteen positions and is of standard design. The board is equipped with five-panel multiple and auxiliary answering jacks, 200 for incoming and 160 for outgoing calls. Thirty-two attended public pay stations are installed at convenient points, including one in each exhibit building. There are five to ten booths comprising each station. Individual measured rate service will prevail as regards the charges for the telephones except in the case of restaurants and concessions, where coin collectors will be used. A 400-pair cable connects the system with one of the exchanges of the local company in San Francisco to handle the incoming and outgoing city calls. A special composition cable provides facilities for long-distance service. All stations will handle local or long-distance calls.

Review of Leading Telephone Articles in Contemporary Publications.

Cable Troubles in New Zealand.—Mr. E. Noble describes in *Telephony* some peculiar troubles met with in an underground telephone cable laid in New Zealand. Ingenious experiments with the tone-test method were tried with success. "The results obtained," says Mr. Noble, "were not startling, but left me thinking that any firm with a well-equipped laboratory should be able to turn out a good repeater or amplifier. It would mean carrying one dry cell and repeater in one's pocket while searching for the tone, but I think the benefits would compensate for it.

"If the tone current is left on the faulty wire continuously, it seems to noise up every other subscriber line in the cable and nearly every other line terminating in the exchange as well.

"It does not stop conversation, but annoys the subscribers, so I always left a helper at the buzzer with instructions to put the tone on for a three-minute period at twenty minute intervals.

"It is always helpful if the current is interrupted quickly several times towards the end of each period. While one is listening on the sheath, the breaks can be picked up nicely, thus guarding one against being led astray by any grounded power generators."

TELEPHONE SERVICE IN CONSTANTINOPLE is the title of an interesting and illustrated description in *Telephony* of the telephone system established in the Turkish capital. Less than six months ago there were no telephones in Constantinople, which has a population of a million and a quarter. The city now has 30,000 miles of lines, including submarine cables under the Bosphorus, the Golden Horn and the Gulf of Ismid. The telephone service is much appreciated by the Turks, and it is undoubtedly the forerunner of a commercial awakening. Over 4,000 subscribers have been connected. Three large exchanges have been opened, and eleven smaller exchanges. At present an official service is given in Turkish and French, but Greek also is very widely spoken over the wires and, to a lesser degree, German, English, Italian, Russian and Spanish. There is some one in each exchange who can answer, if so required, in any of these languages. The operating staff is truly cosmopolitan and consists of Mussulmans, Greeks, Armenians, Hebrews, Bulgarians, Maltese, Syrians and Russians. The Mussulman operators (female) are veiled while performing their duties.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, is on the Pacific Coast on a trip of inspection. He will return to his office about December 1.

MR. T. M. STEVENS has been appointed acting superintendent of the Marconi Wireless Telegraph Company of America at Baltimore, Md., vice C. J. Pannill, who has gone with the government radio service. Mr. G. W. Nichols is acting district superintendent at Boston in place of Mr. T. M. Stevens, transferred to Baltimore.

MR. LEE LEMON, superintendent, and Mr. W. B. Van Size, patent attorney, Marconi Wireless Telegraph Company of America, New York, are the subjects of two interesting sketches in the November number of *The Wireless Age*. Both gentlemen are well-known old-time telegraphers and both have great faith in the future of wireless telegraphy.

MR. C. J. PANNILL, superintendent of the Marconi Wireless Telegraph Company of America at Baltimore, Md., has accepted a position with the United States Naval Radio Service as expert radio aid, with headquarters at Radio, Va.

THE MARCONI TELEGRAPH-CABLE COMPANY has been given permission by the Board of Public Utility Commissioners at Trenton, N. J., to construct its lines in Middlesex, Monmouth and Somerset counties.

INVESTIGATING ALLEGED SECRET WIRELESS.—The Federal Government is investigating reports that secret wireless plants are being used from points in the United States for the purpose of sending military information for the benefit of one or more of the European belligerents.

FREDERICK A. PARSONS, New York, an amateur radio operator, pleaded guilty in the United States District Court, November 11, of operating a wireless station without the necessary government license, using a wave length in excess of 200 meters, which interfered with commercial stations, and using unofficial radio call letters. He was fined by the Court and cautioned not to repeat the offense. This is the second case of this kind reported to the district attorney by W. D. Terrell, radio inspector in charge, for a violation of the radio laws.

PORTABLE WIRELESS.—Professor Domenico Argentieri, of Aquila, Italy, who invented a pocket wireless instrument capable of receiving messages from high-power stations at a distance as great as 1,250 miles, has proved the utility of his invention. He gave a demonstration of the capabilities of his instrument before a large gathering of prominent men and scientists at the British Embassy in Rome on November 4. He picked up messages transmitted from London and Paris and from warships at sea.

INSTITUTE OF RADIO ENGINEERS.—The November meeting of the Institute of Radio Engineers was held Wednesday evening, November 4, at Columbia University, New York. Mr. H. E. Hallborg, engineer of the Marconi Wireless Telegraph Company of America, presented a paper on "Resonance Phenomena in the Low-Frequency Circuit." The design and testing of the alternator-transformer circuit of a quenched-spark transmitter were fully considered, and the construction and performance of this circuit in the Marconi, New Brunswick, transatlantic station described.

LIGHT WIRELESS EQUIPMENT FOR AEROPLANES.—A German wireless set for small aeroplanes or balloons, suitable for directing artillery fire within a range of fifteen miles, is described as weighing about sixty pounds, including a battery of dry cells or accumulators, a hammer-break induction coil, a Morse-key transmitter, and a detector and telephone. To deaden the noise of the engine the telephone receiver is enclosed in a padded helmet. A larger equipment is provided for the Zeppelin air-ships. This has a total weight of about 275 pounds, and includes a 500-watt alternating-current generator, weighing 120 pounds, and driven by the main air-ship motor. The effective range is from fifty to 100 miles.

Mr. Edison Visits Scenes of his Boyhood Days.

During his recent visit to Detroit Mr. Thomas A. Edison made a trip to Port Huron, Mich., over the old route on the Grand Trunk Railway on which he travelled when he was a train news "butcher" over fifty years ago. At Port Huron Mr. Edison shook hands with Edmund Harrington, proprietor of the Harrington hotel, who worked as a telegraph operator with Mr. Edison in the days shortly after the "news butchering." It was "Hello, Ed," and "Hello, Tom," and the two were soon going over old times together.

Port Huron had heard that the inventor was to come, and when he reached the hotel there was a crowd on hand. If the city officials had known in time, there would have been a parade for the home-coming, but the unofficial welcome was too hearty to leave anything else to wish for.

To several business men who met him, Mr. Edison said: "You go ahead and get up a real good 'home-coming' and I will come back to Port Huron gladly and spend a day or two. I am a busy man, but I would like to look over all the old scenes once more, if the Lord will permit." Mr. Edison was assured that a home-coming for his especial benefit would be arranged.

As the faces of old-time friends passed in review, Mr. Edison called many by their first name. One of the most striking greetings was that accorded to Judge William T. Mitchell, who is ninety-eight years of age and still engaged in the practice of law. Mr. Edison sold papers to Judge Mitchell when he was a boy, and as he grasped the hand of the old man and took him by the shoulder, he said: "Judge Mitchell, I remember you when I was a boy. I sold you papers and you were then a gray-haired man. You are a remarkable man. Here I am, also an old man, but you are just as active. Judge, you've got my goat."

Mr. Edison was well pleased at the venerable jurist's reply: "It's true, Mr. Edison, we are getting old, but you and I still have much to do."

One of the stories of olden days which brought a hearty laugh from Mr. Edison was related to him by Julius McMartin, his boyhood chum.

Mr. Edison lived across the road from McMartin and taught the latter how to send and receive telegrams. Both boys had instruments in their homes and carried on a telegraphic conversation daily. One day a school teacher came to board at the McMartin home. Young Edison and McMartin exchanged confidences over the wire on the personal beauty of the school teacher.

The next morning they awoke to find their apparatus wrecked. The cause of the wreck was not known until McMartin learned that the school teacher was also a telegraph operator and had taken exception to the comments of young Edison and McMartin on her personal charms. After laughing heartily at the incident Tuesday, Mr. Edison remarked: "Yes, we were bad boys then."

While in Detroit Mr. Edison met Mr. George M. Eitemiller, the well-known old-time telegraphic star, and the two talked over old times. Mr. Eitemiller was the guest of Mr. Edison at luncheon.

American Electromagnetic Telegraph.

On page 600 of our November 1 issue was printed a short reference to a pamphlet arranged by Mr. J. Cummings Vail from letters and journals of his father, Alfred Vail, giving the story of the latter's connection with the electromagnetic telegraph. In a recent letter touching upon the subject, Mr. Edward L. Morse, of Stockbridge, Mass., son of Prof. Morse, the inventor of the telegraph, writes: "If you will turn to page 15 of that brochure you will find the following words in a letter from Alfred Vail to S. Vail and Son, dated February 7, 1838:

"'The machine did not exhibit its working so successfully as at New York, for this reason: Prof. Morse had invented a new plan of an alphabet and has thrown aside the dictionary.'

"This is the first time that this particular letter has been brought to my attention, and to the best of my knowledge, it is the first time it has ever been made public. This is rather a pity, for it would have settled conclusively the curious and bitterly contested claim that Vail invented the dot and dash alphabet. In this letter Vail states explicitly that Morse invented—not 'originated' or 'adopted'—a new plan of an alphabet,' with no hint whatever that Vail had anything to do with it. Surely this is conclusive, and I trust that you will bring it to the attention of your many readers."

Book on the Wave Meter.

"Practical Uses of the Wave Meter in Wireless Telegraphy" is the title of a book by Lieutenant J. O. Mauborgne, U. S. Army. It explains the principles and practical use of the wave meter, and is of value to every wireless operator. It is, moreover, essential under the present statutes. This work is a thorough revision and enlargement of Lieut. Mauborgne's original pamphlet, to meet the needs of commercial operators and technical schools. The book contains seventy-four pages and is illustrated. The price is $1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

ELECTRICAL DICTIONARY.—Every student of electricity should have an electrical dictionary within easy reach to explain the technical terms he meets with in his reading and studies. "Handy Electrical Dictionary," by W. L. Weber, a little book of vest-pocket size, meets all the requirements of the student and practical man. It is a key that unlocks the meaning of technical words, and is a great aid to the making of progress in studies. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price, 25 cents per copy for cloth binding, and 50 cents for leather binding.

Mr. Charles M. Baker, division general superintendent of plant of the Postal Telegraph-Cable Company, Chicago, Ill., in remitting to cover another year's subscription to this journal, writes: "There is no publication that contains the reliable telegraph and telephone information as does the AGE."

Telegraph and Telephone Age

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ADDRESS ALL COMMUNICATIONS TO

J. B. TALTAVALL, - - - - - *Publisher*

253 BROADWAY, NEW YORK.

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Telephone: 6657 Barclay

CHANGES OF ADDRESS.—In ordering a change of address the old as well as the new address must be given.

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Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, NOVEMBER 16, 1914.

Relation of Employer and Employe.

It is a self-evident truth that all concerns employing help need the good will of that help in order to successfully carry on business, and it also follows that to obtain and preserve the loyalty of employes due consideration to their interests is essential. To carry on any business there must necessarily be two parties, namely, employer and employe, and unless an understanding exists between the two the business cannot be conducted harmoniously.

One of the most galling experiences of employes is the overbearing and unreasonable conduct sometimes displayed toward them by their superiors in position. Many men who have been selected from the ranks to occupy such positions often lose their mental balance by the distinction placed upon them and become dictatorial, tyrannical and oppressive to those under them. In such circumstances it is difficult for a self-respecting workman to give the best that is in him however hard he may try to overcome the effects of petty annoyances. It should therefore be the aim of every company in selecting individuals to fill positions of trust and authority to consider their fitness to handle men as well as their technical ability.

In the practical application of scientific principles and system to business of every kind there is danger of the pendulum swinging too far and tending to make machines of the workmen. System is all right in its place, and is highly desirable, but it cannot take the place of human brains. If it is practiced too intensively it is more relentless than the individual who, clothed with a little brief authority, makes himself generally disliked by his overbearing conduct toward those under him.

The companies as well as the individuals in authority should at all times consider the workmen's interests. The employes are in one sense partners with their employers and both engage in a work for mutual benefit. There is a medium line of action between both interests that should be adhered to. If it is overstepped by either it is to the disadvantage or injury of the other.

The great majority of operators are honorable, intelligent, industrious, faithful to their employers and ambitious to get along in the world. They deserve and are entitled to the respectful consideration of the companies and their agents, and it is highly important that every means be adopted to promote and maintain the good will and loyalty of all employes.

Cable Codes.

Complaints are frequently made to managers of the larger telegraph offices that the telegraph and cable companies should provide for the convenience of their customers copies of cable codes in all main telegraph offices for the coding and de-coding of cablegrams and other communications in code. No doubt the companies would be glad to accommodate their customers in this regard were the number of codes limited to one or two, but when it is remembered that there are many hundred codes on the market, the matter assumes an entirely different aspect. Under these circumstances it is beyond the range of possibility for the companies to accede to the suggestion. They would have to maintain large libraries of codes in the principal offices, managed by bureaus of experts, all for the accommodation of a few customers. It would be physically and financially impossible for any company to undertake such a task.

The use of codes is a matter of prearrangement entirely and those who send communications in this way generally provide themselves with the key to unlock the cipher.

Life Insurance.

There seems to be considerable misapprehension in the minds of many telegraph and telephone employes regarding the relative advantages of insurance in the old fraternal organization and the newer pension, sick benefit and life insurance schemes of the telegraph and telephone companies. It would appear on the surface that the two ideas were conflicting, but in reality they are not; they are complementary and harmonious in their operation. The difference between the two organizations is clearly pointed out by Mr. W. H. Baker, president of the

Telegraph and Telephone Life Insurance Association, in a recent circular letter to the members of the association. "While the insurance [pension, sick benefit and life] offered by the companies," he says, "is liberal, and the entire plan most praiseworthy, the benefits to be derived are dependent upon length of and continuous employment in the service.

"Changes from one telegraph company to another are not infrequent, neither is it unusual for operators and other employes to transfer their labor to other fields of employment, perhaps more attractive, outside of the telegraph and telephone service; in which case the benefits of the pension, sick benefit, insurance plan are lost to them. In the meantime their families are without such protection and they may, by age or physical disability, be unable to obtain life insurance."

In considering the relative advantages of the two plans all telegraph and telephone employes should remember that the life insurance accruing to them under the companies' plan depends upon their continuous employment, while membership in the old fraternal association is unrestricted as to length or continuity of service. A definite amount of money is paid to the heirs whether the insured was a member of the organization ten days or ten years, but in the case of the companies' plan there are several limiting requirements that may vitiate any benefits that have accrued.

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 73) What are the essential facts upon which the operation of the electric generator (sometimes, but erroneously, called the dynamo) and the induction coil depend?

How may an e.m.f. be set up in a wire by a magnetic field?

What is the value of such an e.m.f.?

Study carefully illustration Fig. 23 and the accompanying explanation, as it is very important to understand how alternating currents are created in a generator.

(Page 74) When the magnetic field is uniform what is the value of the e.m.f.? At what portion of the revolution of the armature is the maximum potential developed?

What is a sine curve.

(Page 75) What is the character of the current generated in the armature coils of an electric generator?

How may the alternating current be changed to direct current?

How are the brushes of the machine set so as to reverse the currents generated in the coils?

Is this direct current continuous, that is, is its potential of the same value at all points of the revolution of the armature?

Study Fig. 24 in connection with this matter.

(Page 76) If two coils are mounted on the armature shaft and properly connected, what kind of a current will result?

Will the fluctuations in this arrangement be as marked as in the case of one coil?

What will the effect be on the current of increasing the number of coils?

Why is one of the segments of a telephone ringing generator sometimes permanently grounded?

What is the polarity system of telephone ringing, and how does it operate?

(Page 77) How can the e.m.f. of a generator armature be increased? Name the three methods for accomplishing this result.

Which is the most practical method of increasing the e.m.f.?

What is the effect of doubling the number of poles of the generator?

(Page 78) What is the common frequency of alternating current lighting?

Is it practical to drive an armature at a speed of sixty revolutions per second?

How can high frequency be obtained from moderate rotative speed?

Why is direct-current transmission not practicable on a large scale?

What is the polyphase method of power transmission?

(Page 80) What are the advantageous features of a three-phase motor?

(To be Continued.)

Early Use of Selenium in Telephony.

In 1878 Mr. Geo. C. Maynard, curator, division of technology, National Museum, Washington, D. C., received a letter from the late W. D. Sargent, of the New York Telephone Company, in which Mr. Sargent suggested the possibility of using selenium in visualizing articulate speech from the telephone.

The letter is dated Philadelphia, January 31, 1878, and reads as follows:

"I have an idea that a telephone that would 'speak right out' might be made by introducing a bar or bars of selenium in an electric circuit (including a battery), and creating an undulating current by throwing a beam of light on and off the selenium bar, the beam of light to be thrown, or reflected, from a mirror mounted on a diaphragm, which would respond to vibrations corresponding to the voice or any other sound.

"I should like to know what steps are necessary and what expense would be required to file a caveat that would protect me until I can procure apparatus to develop the idea in a practical manner.

"It seems to me the idea is novel and worth working out; at any rate, as it has been worrying me for a week past, I want to work it out for my own peace of mind. The 'telephone tarantula' has bitten me."

It has been asserted that Mr. Sargent was the first man to suggest the use of selenium in the way he explains.

Annual Meeting of Telephone Pioneers of America.

The fourth annual meeting of the Telephone Pioneers of America was held at the Jefferson Hotel, Richmond, Va., October 29, nearly 500 members and guests being present. The entertainment features were most delightful and the enjoyment was greatly enhanced by the perfect weather conditions.

In the absence of president Theo. N. Vail, who is resting at Old Point Comfort, the sessions were presided over by vice-president T. D. Lockwood.

At the morning session mayor George Ainslie, of Richmond, was introduced by Mr. J. W. Crews, of the Chesapeake and Potomac Telephone Company. The mayor's welcome to the members was most hearty. He said he was always glad to meet representative organizations when they came to Richmond, but this was the first instance that he had enjoyed the privilege of welcoming people who rejoiced in being veterans in any particular business. He congratulated the members on being in the city for pleasure. "I am glad of that," he said, "for it does one good to forget business once in a while and to meet with and greet old friends and to let business take care of itself for a few days."

Mayor Ainslie highly complimented the telephone service in Richmond and the men who conducted it, and said that he had never met a body of men connected with a public service corporation that were as loyal, intelligent and fair as were the Richmond telephone men. He closed his address by wishing the visitors' stay in Richmond might be so pleasant that they would want to come again.

Vice-president Lockwood made a graceful reply to the mayor's address of welcome, and a rising vote of thanks was tendered to Mr. Ainslie.

Mr. R. H. Starrett, acting secretary, read the report of secretary Henry W. Pope, who was unable to be present on account of illness. Mr. Pope reported that for the nine months ending September 30, fifty-three members had been added, thirteen had died and two had resigned, leaving a net gain of thirty-eight, the total membership being 1,221. He gave the names of those who had passed away.

Mr. Pope referred to the question of the advisability of changing the annual dues and recommended that action on the matter be postponed indefinitely. He also suggested that consideration be given to the advisability of establishing a life membership at a reasonable fee, to obviate any possible necessity for an increase of dues in the future. These matters were referred to the executive committee.

A committee was named to express to Mr. Pope the sympathy of the members and their regret at his inability to be present at the meeting.

The following officers were then elected: President, Theo. N. Vail; vice-presidents, T. D. Lockwood, A. S. Hibbard, T. B. Doolittle and G. E. McFarland; secretary, H. W. Pope; treasurer, G. D. Milne. Executive committee: C. G. DuBois, E. F. Sherwood, J. Robb, C. E. Scribner and J. T. Moran.

At the afternoon session Mr. J. S. McCulloh, commercial general superintendent, New York Telephone Company, described what was probably the first telephone train dispatching system. It was used during the construction of the New York, West Shore and Buffalo Railroad, between Athens and St. Johnsville, N. Y., in 1882. He was followed by Mr. N. T. Guernsey, general counsel, American Telephone and Telegraph Company, New York, who read a lengthy and highly interesting paper entitled, "The Relations of the American Telephone and Telegraph Company to the Telephone Business."

He said in part: "The relations of the American Telephone and Telegraph Company to the telephone business grow out of, and are very largely defined by, its relations to its associated companies. The American Telephone and Telegraph Company is not a holding company. The Bell System is not an aggregation of independent, unrelated parts. It is a single system whose parts are interdependent, each part requisite to the highest efficiency of every other part, and of the system as a whole. The American Telephone and Telegraph Company is essentially an operating company, not because through one of its departments it operates long distance lines, nor in the sense of directing the details of operation which are delegated to the associated companies because they can be more effectively handled by them, but in the sense that it determines and carries out the broad lines of operation necessary to the efficient co-ordination of all of these parts as a single, harmonious system. Technically, this relationship arises out of contract. Actually, it has been a development along the lines which experience has shown to be essential to the realization by the public of the benefits of efficient, economical and widely extended telephone service."

Mr. Guernsey then described at length the development of the telephone art on the basis of the fifth claim of the original Bell patent.

"The undertaking which confronted the telephone pioneers when Mr. Vail became manager in 1878 was enormous," he said. "What they undertook to do was to transform the immense undeveloped potentialities of the telephone into a theretofore unknown, concrete, commercially practical public service. They had the fundamental idea—they, but no one else, clearly foresaw its possibilities—but that was practically all they had. There was no telephone art, and only the merest beginning in apparatus; and because they were in a radically new field, they were without the assistance of either experience or tradition.

"These circumstances, and not any man or collection of men, determined what must be the relations of the American Telephone and Telegraph Company and its predecessors to the telephone business, if the great discovery of Dr. Bell was to be utilized and if the public was to derive from it the potential benefits which it offered. At first, there were no questions of refinement or development. It was necessary to begin with nothing and create the telephonic art, apparatus and equipment. The telephone pioneers did not even know what they needed. They only knew that there were certain great ends to be accomplished; that certain great possibilities must be made realities.

"Naturally," he continued, "the scope of the services performed by the American Telephone and Telegraph Company has broadened to keep pace with the necessities of the business, but this development has been along, not away from, the broad requirements which made the central organization necessary at the outset. The relationship is not inaptly described by a phrase coined by Mr. Carty, in which he refers to the central organization as 'The General Staff.' The service covers the widest range, extending from advice upon the broadest lines of policy to specific attention to the most minute details of operation."

Mr. Guernsey then described in detail the organization of the American Telephone and Telegraph Company, and dwelt especially upon the work of the engineering department.

"What the engineering department has done," he said, "has been to create and develop the science and art of telephone construction and operation. The experimental and research department which was created at the outset is now directed by a staff of more than five hundred and fifty engineers and scientists, who, as to this particular work, in knowledge, experience, ability and special fitness, have brought together for the Bell System more than the aggregate of what is available outside of it."

The relations of the Western Electric Company were also gone into.

Mr. Guernsey summarized his address as follows:

"(1) The Bell organization is not an artificial organization. It is the normal, natural result of the conditions surrounding the invention and development of the telephone—inevitable, if the public is to have the best and most comprehensive service at the minimum expense.

"(2) This organization has afforded the associated companies service and assistance which have been of vital influence in developing and building up the telephone service in the United States.

"(3) The results attained through this organization have demonstrated that it is essentially and fundamentally right. The inevitable result of the consistent application for over thirty years of theories of organization that were out of accord with sound economics or the public interest, would have been complete failure; the result could not have been a telephone system showing the highest development and giving to the public the cheapest, best, most efficient and comprehensive telephone service in the world.

"(4) No substitute for the single system and central control, which are the dominating characteristics of the Bell organization, could have attained, at the same cost, or at any cost, results of equal benefit to the public, whether measured by the character of the service, its cost, its efficiency, or its universality.

"It is natural," said Mr. Guernsey, in conclusion, "that the first generation of telephone pioneers, looking back upon the marvelous achievements of less than forty years, should feel that what can be accomplished has been accomplished; should feel that there is little to add, except in the way of refinements, to a telephone service that is approaching in scope the limits of the imagination of its founders, and that in efficiency and accuracy is the model of the world. But this is a delusion to which each generation in its wisdom has been subject. It is a mistake. There always remains more to be done than has been done; the possibilities of the future are greater than the accomplishments of the past."

Mr. A. S. Hibbard followed Mr. Guernsey with a short paper entitled "The Blue Bell."

"It was my good fortune in the fall of 1886," said Mr. Hibbard, "to be called to New York by Mr. Vail and Mr. Edward J. Hall to take charge of the operating and maintenance of the long distance telephone service, and of the development of its business. This long distance work was at that time the sole function of the American Telephone and Telegraph Company, of which Mr. Hall was general manager, and I was appointed general superintendent.

"Toll service over grounded lines, and to a large extent exchange service of the same character, had about reached their limitations, and were increasingly interfered with by electric light and power circuits which were then being introduced. The American Telephone and Telegraph Company had been formed to construct and operate long-distance lines of metallic circuits and copper wires and to develop the operating requirements for an extended and more dependable service, and also to create what was essentially a new business, that is, a telephone service for distances exceeding approximately fifty miles, carried on at commensurate rates.

"It need not be repeated here how old methods were, to a large extent, discarded or revolutionized, requiring not only the construction of stronger and better lines of copper wire, but the development of switchboards and other apparatus of various kinds by means of which the required service could be rendered. This preliminary long-distance work was carried on for a number of years, and brought to it the devoted services of many men well-known to you all. It was soon shown that the long-distance toll lines stood up and gave service when other telephone and telegraph lines were prostrated. It will be recalled, as an example of this, in the great blizzard of March, 1888, which spread generally over the eastern part of the country, the long-distance lines furnished almost the only means of communciation and were, in fact, the only means by which, for several days, the city of New York could be reached, except by cable from Europe. The dependability of long-distance service soon put it in a class by itself, and brought to it customers to whom it meant something more than telephone service as previously rendered, indeed, its use by the public had, by the year 1889, grown to such an extent that it was thought necessary to indicate long-distance telephoning by some special sign or token, by means of which it could be known.

"The question of a suitable emblem was carefully considered and a number of suggestions were made of more or less conventional designs and wording of various kinds. Impressed by the desirability of having a thoroughly distinctive sign,

which, at the same time, might be related to the telephone, it so happened that I sketched one day upon a memorandum sheet of paper, a bell, of the design now in use, having upon it the words 'Long Distance Telephone,' and indicated that this should be a blue bell with white letters, and that it should be used as a sign of long-distance telephone service. Submitting this to Mr. Hall, the suggestion was approved at once, and a larger sketch was quickly made in the drafting department, with the proper coloring, and this sketch was approved as the standard blue bell sign in December, 1880.

"The intention and the hope in adopting this emblem was that we might associate the name of Alexander Graham Bell with what should stand for the very best development of the telephone, his wonderful invention, and that the blue bell, in standing for the Bell Telephone System and its service, might be worthy of this association with his name. It need scarcely be said that the results have surpassed the original expectations. The long-distance standards of service were soon spread over greater areas and included local conditions, which very soon were so changed and improved as to almost universally give results equal to the best. In these circumstances, only a few years later the word 'local' was added to the blue bell and connected with the previous wording 'long distance.' The blue bell thus became an extended herald of the service and gradually made its appearance throughout the entire country. Not only here, but in many foreign countries, the blue bell stands for the telephone. With the extension and great growth of the service came also the great increase in the numbers of those who serve, and it is good to know that, in these United States, the blue bell has come to mean more than a sign to the public.

"To-day the blue bell," said Mr. Hibbard in conclusion, "is the banner under which nearly two hundred thousand willing and devoted workers are endeavoring to serve the country in the development and perfection of the most wonderful and useful means of communication the world has ever known. 'Here and there, everywhere rings the big blue bell.'"

The meeting then adjourned.

ENTERTAINMENT AND NOTES.

On the evening of October 29 a banquet was tendered the members by the American Telephone and Telegraph Company at the Jefferson Hotel There were over 400 persons present, and after the dinner short addresses were made by Messrs. U. N. Bethell, president New York Telephone Company, New York; J. W. Crews, Chesapeake and Potomac Telephone Company, Richmond, Va.; A. S. Hibbard, Chicago; L. Hume, vice-president, Southern Bell Telephone and Telegraph Company, Nashville, Tenn.; B. E. Sunny, president Chicago Telephone Company, Chicago, and J. T. Moran, vice-president, general manager and general attorney, Southern New England Telephone Company, New Haven, Conn. Mr. T. D. Lockwood acted as toastmaster. During the dinner there was music and singing. The song "It's a Long, Long Way to Tipperary" instantly caught the fancy of the audience and was sung time and time again, and wherever the Pioneers met in groups there was an outburst of "Tipperary."

On October 30 the party boarded the steamer "Smithfield" at 8:30 a. m. and made the trip down the James River to Old Point Comfort, where they arrived at 7 p. m. The day was a beautiful one and the ride was greatly enjoyed. Luncheon was served on the boat, and a stop of one hour was made at Jamestown, where a group photograph was taken and visits made to the various points of historical interest. On landing at Old Point dinner was served at the Chamberlin Hotel. President Theo. N. Vail here met and greeted the Pioneers. The party at 8 p. m. took the night boat for Washington, and the moonlight ride up Chesapeake Bay and the Potomac River was a rare treat and greatly enjoyed by all. Washington was reached at 7 a. m. Saturday, October 31, and the day was spent in sightseeing.

The return trip to New York was made on Sunday, November 1, by special train over the Pennsylvania Railroad.

The banquet at the Jefferson in Richmond, the boat ride down the James River to Old Point Comfort and the night boat trip from Old Point to Washington were tendered by the American Telephone and Telegraph Company, including the luncheon on the day boat and the dinner at the Chamberlin Hotel, at Old Point Comfort.

The ladies of the party were entertained at the Country Club at Richmond on the afternoon of October 29.

Mr. J. W. Crews, of the Chesapeake and Potomac Telephone Company, Richmond, was chairman of the local entertainment committee, and was untiring in his efforts to please everyone present. Mr. H. C. Brown, of the same company, rendered excellent service in making announcements of the programme and worked hard and faithfully to keep things running smoothly.

On the ride down the James River the party was entertained by excellent music and plantation songs rendered by a colored troupe.

Much credit is due to Mr. R. H. Starrett, acting secretary, for the efficient manner in which he filled the arduous duties devolving upon him in the capacity of secretary.

New Book.

"Experimental Wireless Stations" is the title of a new book recently issued. Mr. Philip E. Edelman is the author, and he gives instructions for the building of wireless apparatus. The book covers the design, construction and operation of stations, with particular reference to the requirements of the new wireless law. Every phase of wireless is fully treated, including wireless telephony and quenched arc systems. The book contains nineteen chapters and covers the subject very thoroughly. It is well and judiciously illustrated. The price is $1.50 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(Continued from page 507, November 1)

Mr. W. Weller, of Cobourg, Ont., was the opulent and corpulent owner of the line of stage coaches which ran between Toronto and Montreal, and between Toronto and London. He became interested financially in the old Grand Trunk Telegraph Company, the name of which was subsequently changed to the International Telegraph Company. This telegraphic enterprise was started in the early fifties, in opposition to the Montreal Telegraph Company. Its lines were wretchedly built and badly managed, and after a brief and precarious existence, the concern fell into the hands of the Montreal Telegraph Company. In this unfortunate venture was the bulk of Mr. Weller's fortune dissipated.

In the ante-railway days, when there were no telegraphic facilities north or northwest of Toronto, and but one single and solitary telegraph wire between Toronto and Montreal, and between Toronto and Buffalo, the operators or others of the office employes, when the line became interrupted, were frequently called upon to go out and make the necessary repairs. Each office had a section allotted to it to keep in order, and this section, or "beat," extended, save in exceptional cases, half way to the next station on either side. That ubiquitous and highly important individual, the regular telegraph-line repairer, was as yet in embryo. Climbers or iron spurs had not been invented, and operators, when engaged in repairing the line, who were unable to shin up a pole, were obliged to exercise their ingenuity in improvising a ladder out of any available material to be found in the neighborhood of the break, or to use other means to assist them in fastening the spliced wire as high up the pole as possible. The rule was imperative that in splicing the line the utmost care must be observed in order to make a complete and solid connection. Diligent practice was therefore required to become competent in deftly turning out a telegraph "joint" that would pass muster, and all operators were expected to perfect themselves in this intricate wire-twisting operation.

Jim Poustie, the first regular line repairer employed in Canada, with an assistant, made a tour of inspection over this lone line in the spring and again in the fall of each year, and put it in thorough repair. It was an event of rare interest to the small, but wide-awake, telegraphic community at Toronto when Jim came along with his repairing establishment, which consisted of a long, light wagon, with an extension ladder strapped alongside; and, stowed snugly away in the wagon, picks, shovels, axes, crowbars, top-pins, insulators, braces, spare wire, etc., all of which implements and "fixings" were required to complete the outfit. The wagon was drawn by a smart French-Canadian pony, and, on some occasions, to save the expense of housing this animal at a livery stable, when Jim's caravan arrived the pony was given accommodation in the small woodshed in the yard in rear of the office. Jim no doubt used to wonder why his tough little pony was not quite so sprightly as he ought to be after a night's repose in this shed. He would have been able to account for the stiffness of limb and generally bedraggled appearance of his fleet-footed little equine had he seen us juveniles, after office hours, put him through a course of energetic exercises, bare back, east and west on Wellington street and along the bay front, taking care not to go too near Roach's Hotel, down by the market, where Jim put up, and where, owing to the conspicuous position he occupied in connection with the wonderful electric telegraph, he was looked upon as one of the greatest men in the country. Everyone about the place, from the landlord to the hostler, went stumbling over each other in their eagerness to pay him homage, and when Jim condescended to accept their attentions, they felt that a great honor had been conferred upon them.

As already stated, operators and other employes of the telegraph company were expected to repair the line when it became interrupted, and I have a lively recollection of an expedition of this sort in which I participated in 1852. The line was down between Toronto and Hamilton, and there being no intermediate office between these places, Toronto was expected to cover half the distance in search of the fault, and Hamilton the other half. Toronto's "beat" ended at Trafalgar. Pat Langdon, a messenger boy, but a good-sized lad of fifteen or sixteen years of age, and myself, were delegated to go out and discover the difficulty. As Pat was the older, he had charge of the horse and rig. We started from Toronto early in the morning, having got our horse from Mitchell's livery stable. The Mitchells sized up the party who were to act as repairers on this occasion, and thinking, no doubt, that any kind of a horse was good enough for youngsters, palmed off on us a thick-legged, lazy old brute, with which we had a terrible day's experience. The telegraph line followed the Dundas road out by the Peacock, Lambton, Islington, etc.

Although we started early in the morning, it was dinner time ere we reached Cooksville—sixteen miles. The horse required constant watching, to prevent it from leaving the road to lean up against the fences for a rest. If there was nothing of the trolley, there was a good deal of the trollop about this old nag. After dinner, and a short rest at Cooksville, we set out for Trafalgar, and, on arrival at that place, managed to get down the long, steep, winding hill without mishap; but, on attempting to return, the now thoroughly used-up horse insisted upon coming to a sudden stop every few yards, when the buggy would, of course, run back, dragging the horse after it. We were in a pretty predicament, and it looked every minute as if the telegraphic equipage, with its worthy but worried juvenile occupants, would be hurled to destruction over the huge embankment, and the world called upon to mourn the untimely demise of two celebrated electricians. This surely would have been a calamity. But had the bones of Mitchell's backsliding old reprobate, erroneously yclept a horse,

been left to bleach on the bleak and barren hills of Trafalgar, he would have merely got his deserts. It was at last decided that Pat should walk alongside the old "crow-bait" and lead it up the hill, while I ran behind with a good-sized stick of timber. Every time a stop was made I promptly clapped my block of wood behind the wheels to prevent the buggy from running backwards. Pat and I remembered that history tells of another great man, England's naval hero, who died for his country in Trafalgar Bay a century ago. Was history about to repeat itself, and this time did the fates require two instead of one victim? These harrowing thoughts caused us much uneasiness, but just then Nelson's brief but famous exordium to his men, "This day England expects every man to do his duty," came into our minds, and again we thought of "Toronto, home and beauty." This lent renewed vigor to our almost exhausted energies, as we plodded our weary way to the top of the hill, using the block as often as necessary to prevent a catastrophe. I am afraid that the outrageous conduct of this horse was the cause of some very unparliamentary remarks right on the Queen's highway on that day. We had an awfully tough time getting home. I finally went to sleep in the bottom of the buggy, while Pat continued to reason with and to coax the old thing along; but we didn't reach the city until long past midnight. We found the line working through all right next morning, the Hamilton people having discovered and remedied the trouble on their section.

James Mink, a fine-looking and well-to-do colored man, kept a livery stable, in which he had a superior class of horses, and from whom the company frequently hired a rig, when necessary, for repairing purposes. Mr. Mink had a daughter who was black, very black, but a pleasant-faced, buxom young woman. She dressed in a quiet, genteel manner, and had a decidedly lady-like appearance on the streets. It would do no violence to perfect taste to say that she was "good form," and as she majestically sailed along the fashionable thoroughfares, her style and figure and general get-up excited favorable comment. Her pedal extremities were not fashioned after the humpy, expansive plantation pattern, but were trim and shapely. It is said of Annie Laurie that "Like dew on the gowan lying was the fa' of her fairy feet." Miss Mink was not quite in Annie Lauries' class as to feet, but her voice—a characteristic of many of her race—was musically "low and sweet," and quite a match for that of Maxwelton's feminine celebrity. There was nothing spirituelle or flimsy about Miss Mink. She was natural, substantial and solid, fond of show, and ambitious. As she gracefully skipped along the streets she cut quite a dash, and

"Her feet beneath her petticoat,
Like little mice, ran in and out,
As if they feared the light."

Thinking it would improve her social status, her father stated openly that he would give a large sum of money to any well-behaved and otherwise suitable white man who would marry her. By and bye an attractive and speculative young man, who meant business, came along from the other side and laid siege to the heart of Miss Mink, and to her father's purse. The young lady was not long in capitulating, and the marriage took place without delay. The newly married couple took an extended trip into the States, gradually going south, and when the enterprising but unprincipled villain arrived in South Carolina, he cruelly sold his young, simple and confiding colored wife into slavery. Of course, this happened a great many years before the immortal Lincoln issued his proclamation, declaring the slaves in the States to be freemen. Miss Mink—if I may still so call her—being young, well educated and good looking, brought a large sum of money. Her father was betimes apprised of the dastardly trick that had been played upon himself and his daughter, and took immediate steps to repurchase her and bring her back to Toronto. Poor old Mr. Mink had to pay dearly for the coveted but doubtful honor of having a white man for a son-in-law. The adventurer made well out of the speculation, for he not only got the dower that went with his wife, but the sum he realized on her sale.

In 1850-51 the number of telegraphic despatches received for local delivery did not exceed a dozen or two per day. One messenger delivered them all with ease and had what the boys nowadays would call a soft snap. We had a messenger boy about this time who was very fond of shooting, and he invariably brought his gun down with him in the morning, leaving it in a secure place in the battery-room, and when he had messages for people living any distance off, he took his gun along and was sure of a shot at some description of game. Like most youngsters, a gun had great attraction for me, and I was glad of any excuse to get out with this mighty hunter, and do a little still hunting in the city and suburbs. Having a message for the old Parliament buildings on Front street one afternoon, we were lucky enough to shoot a brace of plover right on the grounds around the Parliament buildings. At that time a fair-sized creek—long since filled in—ran through the eastern part of the Parliament grounds. None of the immense, gnarled, knotted, ancient-looking trees which later adorned the grounds had been planted, and the ground around the buildings was an open and unimproved common, destitute of trees and other horticultural embellishments. One of the principal caretakers, a very austere man, was near by when the plover were killed, but instead of finding fault with our gunning operations within the sacred precincts of government grounds, he praised our skill as marksmen and helped to gather the game. Black squirrels were very plentiful about Toronto at that time, and our messenger-sportsman often returned to the office with two or three in his bag. It would look not a little odd to see a messenger boy leisurely trudging along the streets to-day with a gun in his hand, cocked and ready for action, and his powder horn—this was before the day of the breech loader—shot bag, and other hunting accoutrements fastened across his breast. There were no tickers in those days, nor Chicago markets (Chicago at that

time was scarcely as large a place as Toronto), nor New York stocks. A bulletin service had not been dreamed of, nor were there any evening papers with vigilant and exacting news editors to razzle-dazzle and frighten the souls of dilatory messenger boys. Possibly the said news editors think that it is they who now require a gun. I fear it would be bad for the blundering messenger did the news editor have his blunderbus handy when a "rush" piece of news was placed before him which a rival paper had already received and bulletined.

The telegraph was, as yet, something very new, and, indeed, to most people it was a vast and inscrutable mystery The occupation was, however, considered decidedly tony and professional, and Mr. Dwight was greatly importuned by a class of people seeking employment who would never think of entering the business nowadays. We, consequently, had some queer characters employed at different times in the Toronto office. Among others was Captain Lionel Fitzgerald, an Irish gentleman who sold out his commission in an English cavalry regiment and came to Canada to seek his fortune. Nothing gave the captain greater pleasure than a run out on the line to make repairs, and he was frequently required to go on these expeditions. This valiant ex-member of the Horse Guards disdained riding in a buggy, and to maintain the dignity of his erstwhile profession, he invariably went on horseback, and the firiest steed the Mitchells or Mink had in their stables suited him best. It was a ludicrous sight to see the captain in a semi-military cap, brown velvet coat, riding pants, and bespurred boots, a coil of iron wire wound around his shoulders, and the nippers, clamps and copper wire in his saddle bags, start off on one of these excursions from in front of the office. Everybody in the neighborhood came to their doors or looked out of their windows to see the restless and war-like charger, with the curiously accoutered cavalier, move off, or, rather, bolt off. All being ready, the stableman gave the racer its head, the captain gave it the spurs, and off went this small, but extremely comical cavaclade, tearing through the streets of the city and out into the country at a rate that would have astonished Tam O'Shanter and his mare "Maggie." The captain, though peculiar in many respects, was well bred, and had the instincts of a gentleman. It dawned upon him ere long that his habits and training had not quite fitted him for the telegraph business, and he left the service. Being naturally of a roving disposition, he found his way in the early fifties into the region around Lake Superior while that country was yet in a very wild state, returning to this part of Canada, some years later, with a large assortment of Lake Superior agates and other rare and pretty stones, which then abounded in that section. With these he set out for the old country, believing that in his geological possessions he had secured a large fortune.

Another young English swell to whom Mr. Dwight gave employment in 1850-51 was a Mr. Saunders. I forget his initials, but so numerous were these that they invoked a large draft on the alphabet. He was a scholarly fellow and an excellent penman. He was also a good amateur actor and fond of spouting Shakespeare. Our ideas of office decorum were sometimes rudely shocked by his suddenly assuming a tragic attitude and exclaiming with great fervor, "A horse! a horse! my kingdom for a horse!" Pat and I, while on our memorable trip to Trafalgar, occasionally, in our despair, addressed ourselves in the same strain to the imaginary influential inhabitants of the Dundas road, but it brought us neither comfort nor relief, though we were willing to throw in our jack-knives along with our kingdoms in the swap. Saunders frequently appeared on the boards of the Royal Lyceum, where he "declaimed" with considerable native ability and taste.

(To be Continued.)

Electrical Instruments and Testing.

We are frequently asked about the methods employed for testing telegraph lines for crosses, insulation, grounds, etc., and we invariably recommend Schneider and Hargrave's book, entitled, "Electrical Instruments and Testing." As its name implies, this book describes the instruments used in making tests and the tests themselves, and is up to date. It is well illustrated, and has very little mathematics—just enough to exemplify the work.

This is a book every progressive operator should possess, and, no doubt, it has been a stepping stone to advancement in many instances.

It is written in a very clear style by practical men for practical men. Mr. Jesse Hargrave, who wrote the chapters on testing, is a well-known telegraph engineer, and what he says on this subject is worth much to those whose duty it is to test wires, and to those who hope to occupy such positions in the future.

The price of this book is $1.15 per copy, which is a remarkably low price for so much information. Copies may be purchased of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is now ready for delivery. It is up to date and meets every need in the various branches of the telegraph service. An operator using the old code is placed at a decided disadvantage in working with a man using the new code; he therefore should be one of the progressive ones. To say that the old code is good enough does not make it so, and anyone saying and believing such a thing stands in his own light. Although the book has been greatly enlarged the price remains the same—$1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. H. F. Taff, manager Western Union Telegraph Company, Washington, D. C., in remitting to cover his subscription, writes: "Every issue is brimful of interesting and profitable reading."

The World's Series.

BY M. J. DUGGAN, DISPATCHER, WESTERN UNION TELEGRAPH COMPANY, CHICAGO, ILL.

The country in general, and the Western Union service in particular, will be very much interested in Mr. T. M. Ragen's article in your issue of November 1, regarding the handling of the descriptive service of the world series baseball contest. However, the story is not half told, and I am sure you will be kind enough to permit me to supply an accurate account of the part left untouched by Mr. Ragen.

The service radiating west, north, northwest, south and southwest, from Chicago during the games was perhaps the most elaborate and most perfect, as well as the most rapid, ever attempted or ever given by a news-gathering bureau. Stretching out of Chicago, linked together at various places throughout the West, twisting and turning over vistas of plain, desert and mountain, repeatered into each other at logical points for reserve purposes, were arranged seven circuits, aggregating approximately 20,000 miles of wire. These circuits were connected at Chicago "blind" to the direct ball park Commercial News Department circuits, so that before the sound of the crash of bat and ball had died away in the New England ball park, audiences located at important and unimportant towns from the Gulf of Mexico to Puget Sound and from the Everglades to Mount Shasta knew that some one had "singled to centre."

One of these remarkable circuits followed the Burlington railroad to Omaha, Neb., the Rock Island to Denver, Col., the Rio Grande to Salt Lake City, Utah (with a leg to Butte and Helena, Mont., and Spokane, Wash.), the Oregon Short Line to Boise, Idaho, and Huntington, Ore., the Oregon Railway and Navigation to Portland, Ore., and the Northern Pacific to Seattle. This circuit was legged at Helena back to Miles City, Dickinson, Fargo, St. Paul and another leg from St. Paul to Duluth, thence to Winnipeg. At Portland, in addition to the leg to Seattle and Tacoma, it was repeatered south to Ashland and San Francisco, and at San Francisco south to Los Angeles, where it ended. Probably eighteen operators were copying from this one circuit which contained approximately 8,200 miles of wire.

Another circuit followed the same route as far as Salt Lake City, then turned over the San Pedro, across Death Valley, humming its music of strikes and hits, connecting at Los Angeles with the Southern Pacific wires into San Francisco. At Los Angeles a leg was connected to this circuit, extending back to El Paso and Dallas, Tex., for reserve. At San Francisco this circuit was repeatered into the first circuit named, doubling back on itself for reserve. This circuit was 6,200 miles long.

Another circuit left Chicago over the Chicago, Milwaukee and St. Paul road to Milwaukee, thence to St. Paul, Minneapolis, Duluth and Winnipeg. At St. Paul it was repeatered into the second named circuit to Dickinson and Helena. At Helena it was repeatered to Salt Lake on the southbound side of the second named circuit, and was scheduled, in case of interruption, to be turned to Spokane on the westbound side of the Portland leg for Spokane and Portland's reserve.

Another circuit took in St. Louis, Kansas City and Sioux City, and was scheduled, in case of interruption, to be turned to Omaha where it would automatically connect with circuit No. 1 and bridge over any break on the first named circuit.

Other but shorter circuits extended to other towns west, north and south, taking in Indianapolis, New Orleans, Cincinnati, etc.

The remarkable feature about the service beyond Chicago was that every single element of it was handled absolutely true to schedule, without a single failure, misunderstanding or delay. Previous to the games, the dispatching bureau at Chicago, which planned the layout and directed its execution, had advised each office throughout the vast overland system which wires and circuits would be used, the time to start the set-ups, etc., and when that time arrived, everything fell into place automatically.

The Chicago plant forces rendered invaluable aid in carrying out the dispatching bureau's plans and were responsible in a great measure for the wonderful success of the undertaking. Those prominently identified with the project at Chicago, besides the dispatching bureau, were: Wire chief W. F. Webber, quadruplex chiefs R. G. Matthews and F. H. Jones, assistant wire chiefs Willhoite, Kennedy, Kinder, McKnight, Miller and in fact the entire board and quadruplex room forces of the office as well as the forces at all other offices through which these circuits passed. Mr. Jones rendered particularly brilliant service at critical times in making rapid and well-directed moves during failures.

Truly it was vast, great, wonderful, almost beyond comprehension, yet simple, because everyone did the right thing in exactly the right place at exactly the right time; in other words, everyone "co-operated."

Easy Lessons in Technical Telegraphy.

The demands of the present time require that every operator should have at least an elementary knowledge of the technical side of the telegraph, and he who does not keep up with the march of progress will fall behind and will not attain his desire to rise in his profession. Those who study and prepare themselves for better positions will receive their reward in due time.

"Easy Lessons in Technical Telegraphy" is an excellent book of 197 pages, written in plain, everyday language and covering the entire field of telegraphy. It describes the principles involved in telegraphy in such plain terms that no one who is sincere in his efforts to learn will find any difficulty in understanding. It is well illustrated with diagrams of circuits, etc., which are a great aid to the student in his work. The price of this useful volume is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Worthless Patents.

In our November 1 issue we referred editorially to the subject of patents, pointing out the generally recognized weak features of the United States patent system. This article has attracted much attention from those who are interested in patents, and who have passed through the discouraging experiences there pointed out.

Mr. S. M. Kintner, one of the receivers of the National Electric Signaling Company of Pittsburgh, Pa., and a well-known educator and inventor in wireless telegraph apparatus, in a letter points out the inconsistencies of the American patent system, and the disheartening difficulties inventors meet with in their endeavors to protect their patent rights. It shows that everything is against the inventor, and while the law and the courts do not specifically protect the infringer, the practical application of the law in such cases does favor him as against the inventor, who is really the one the laws and the courts should protect. Even the Government itself is guilty of such practices as Mr. Kintner points out.

"If your invention is one for which the Government, in any of its departments, has use," says Mr. Kintner, "you will be confronted with another phase of the question, which is heart-breaking, to say the least. This point can best be illustrated by stating our experience with our wireless patents.

"One patent, a detector patent, was sustained in the courts after an exceedingly expensive and tedious proceeding, and all manufacturers were finally enjoined from making or selling these devices to anyone. Some of the Government departments then proceeded to make the detectors themselves, refusing to buy from the owners of the patented invention. This detector was the best one in use for five or six years, after which time it was supplanted by others, but its owners never realized anything on it, for they did not have the 'exclusive right' guaranteed to it by the United States Constitution. The owners were denied by one branch of the Government the very right that had been contracted for in accordance with the Constitution by another. There was no recourse in the courts at that time and the owners of these valuable rights were compelled to sit by and see themselves robbed by their own Government. There is now, however, a statute which permits inventors to recover 'a reasonable recompense for the use of their inventions by the Government' by bringing a suit in the Court of Claims. A poor inventor should stop and think, however, several times before starting such proceedings, as the Government will appeal to the Supreme Court of the United States in the event of a decision against it in the Court of Claims, and the recovery would need to be a very substantial one to exceed the expense of its collection in such extended proceedings. It should be remembered that that does not prevent the guilty governmental department from continuing its infringement or from making it necessary for you to sue again to secure 'reasonable compensation' for the further use of your invention.

"Any fair minded person would think that this was about the limit of what a Government department would undertake, but the following experience will indicate that it is not, and I hesitate to think of what their limit really is.

"This experience also related to a patent which had been held by the courts to be valid; in this instance the appeal court had sustained the patent. A suit was being started against another defendant and the court was asked to enjoin them from infringement of the patent. At the request of the new defendant to the Navy Department an assistant attorney-general appeared and asked the court to except the defendant in its injunction in so far as it affected it in dealings with the United States Government. The injunction was accordingly issued with such exception and the United States Government, the principal user of the invention, was permitted to continue its practice of buying stolen goods. Naturally, stolen property can be sold more cheaply than other property of the same kind, and the Government officials continued to buy it and doubtless were commended for the efficient manner in which they had purchased their supplies.

"A sad feature of our present practices in Government operations in the purchasing of supplies is this: An appropriation is made for the purchase of certain apparatus and the official purchases from the lowest bidder, no matter whether such bidder has a title to the thing supplied or not. If later the Court of Claims should allow to the rightful owner damage or recompense or whatever you call it, for such purchase, such damage or payment does not come from the appropriation of the department, and as a result they have no special interest in it. The payment such as is made comes from a special deficiency appropriation of congress. This is a lamentable state of affairs which tends to encourage such acts.

"In my opinion an inventor of a device for which the United States Government is the principal or sole customer, had better forget it and save himself all the annoyance and expense that is sure to follow any other proceeding, at least under present practices. The individual inventor, or even single corporation, is too small a unit to interest Congress or the administration sufficiently to cause a serious investigation of this matter. There are not enough votes at stake. It will not be possible to secure consideration of this until enough people make it their business to demand action from their representatives in Congress.

"It is difficult to interest others in one's own troubles, but I believe there are enough people who have had similar experiences to mine, who, if acting in unison, could make their grievances known effectively, and I have seriously contemplated an attempt to organize an Association of Government Contractors for the purpose of correcting such manifest wrongs as those outlined by me."

Mr. E. A. Patterson, Western Union Telegraph Company, Saginaw, Mich., in renewing his subscription, writes: "Keep the AGE coming. It is a good thing and I derive a lot of valuable information from it."

EDISON BSCO PRIMARY BATTERY

Type 403 Cell
400 Ampere Hours' Capacity

IS your talking circuit battery entirely satisfactory? If not, has it occurred to you that a remarkable improvement in transmission can be effected by the use of a battery capable of maintaining a uniform voltage in the hardest service?

The increasing use of Edison Primary Cells in the telephone field evidently indicates that a dependable battery, with a guaranteed capacity, is now demanded by telephone managers, particularly in the more important branches of service.

The Edison-Bsco cell has been developed to a remarkably high degree of efficiency and at normal discharge rates, maintains a practically constant voltage, the drop being less than one-tenth of a volt, from beginning to end of life, on average transmitter circuit.

The internal resistance is extremely low and does not vary in different cells of the same type, because the plates are correctly spaced and permanently assembled before leaving the works.

These features, together with the fact that Edison Primary Batteries are not subject to polarization, explain why Edison Primary Cells are necessary to bring the transmission out distinctly on busy and important lines.

Type 202 Cells in Steel Tray

Catalog and curves on request.

The Cheapest Form of Battery Energy.

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THE RAILROAD.

MR. CHARLES SELDEN, superintendent of telegraph and general inspector of transportation, Baltimore and Ohio Railroad Company, Baltimore, Md., is resting at Los Angeles, Cal. He is accompanied by his family and will be absent four or five months.

TO CENSOR RAILROAD MESSAGES.—The Lehigh Valley Railroad Company has appointed a censor to pass upon telegrams intended for transmission over the company's wires. A carbon copy of every telegram will be submitted to the censor, who will determine whether the message contains any unnecessary words and whether it could as well be sent by mail. The censor will be located in the office of the superintendent of telegraph. Mr. J. F. Caskey, South Bethlehem, Pa., is superintendent of telegraph.

WIRELESS TELEPHONY BETWEEN TRAINS.—At the recent convention of the Association of Railway Electrical Engineers in Chicago, Dr. F. H. Millener, of the Union Pacific Railroad, Omaha, Neb., described his experiments in wireless telephone communication with moving trains from fixed stations. It is his plan to use as "extended aerials" the telegraph wires along the right-of-way, insulating them thoroughly and providing condenser shunts for the high-frequency currents around the telegraph keys. The transmitting equipment adopted employs a bank of arcs to produce the high-frequency current. The inventor asserted that a baggage car can be equipped with transmitting equipment for less than $200. Perikon detectors have been used in the receivers experimented with. Dr. Millener stated that the system has been successfully tried on a section of siding.

Meeting of the Eastern Division, Association of Railway Telegraph Superintendents.

The regular meeting of the Eastern Division of the Association of Railway Telegraph Superintendents was held in the Young Men's Christian Association Auditorium, Pennsylvania Railroad Station, New York, November 11. There was a large attendance, including several Western members of the association.

The meeting was presided over by Chairman W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C.

Mr. Newcomb Carlton, president of the Western Union Telegraph Company, who was present at the opening, made a few general remarks on the relations of the Western Union Telegraph Company and the railway telegraph service. "Our problems, to you," he said, "are very old; to me they are new. I realize that the Western Union has to overcome some difficulties before surrounding you with a telegraph atmosphere competitive with the railroad atmosphere in which you constantly live. How to come nearer to the superintendents of telegraph and establish relations necessary for close co-operation has been much in my mind, but it is our aim to create a spirit among you that will give to us the same enthusiasm and the same fidelity which you discharge to the railroad companies. We want a co-operative movement which will secure for the Western Union a more efficient railroad telegraph service."

Mr. Carlton closed his remarks with the suggestion that the superintendents come to him direct with proposals looking to a broadening of the telegraph company's point of view in meeting the problems of the superintendents of telegraph.

At the conclusion of his remarks, Mr. Carlton met the superintendents individually and chatted with them a few minutes.

Mr. R. J. Meigs, valuation engineer of the Western Union Telegraph Company, made a few remarks on the valuation of wire plant by the Interstate Commerce Commission and the co-operation of telegraph and railway companies in connection therewith. The subject was briefly discussed by Messrs. E. P. Griffith and W. C. Walstrum.

Mr. S. L. Van Akin, jr., assistant superintendent of telegraph, New York Central and Hudson River Railroad, Syracuse, N. Y., read an interesting paper on "Inductive Disturbances." He related the experiences on the lines of his company and how the problems had been handled. The various cases of interference were separately discussed. These included induction from a 22,000-volt transmission line on the Phoenix Branch, the Rochester-Sodus trolley line, the Rome-Little Falls trolley line, the 11,000 alternating-current third-rail supply system between One Hundred and Thirty-eighth street, New York, and Yonkers and the Western Union ticker service. He gave a history of each case.

In the discussion, Mr. P. J. Howe, of the Western Union engineering staff, stated that the frank telling of one's own personal experiences is often much more interesting and helpful to others than hours of theorizing.

Power induction is not a new thing, he said; the high voltage transmission line is, however, a product of more recent years. Every year it reaches to new localities, and every year the telegraph company finds more of its lines unsuitable for its highest grade circuits by reason of disturbances from new power lines along its routes. In the case of railway companies the matter appears even more important in some respects.

A new phase of the question, he continued, is now being brought about by the tendency of railroads to adopt signal systems operated by alternating currents. In general, there should be no interference from these signal systems if they are designed with due reference to the conditions that cause induction.

Messrs. N. E. Smith, J. F. Caskey, E. P. Griffith, E. C. Keenan, W. C. Walstrum, R. E. Chetwood and others made brief remarks on the subject and related their experiences.

The question of the misuse of wires in sending telegrams that could be shortened or sent by mail came up before the meeting and was discussed by several of the members. Mr. S. L. Van Akin, jr., did not think that any operator should be given the authority to determine what messages should be sent by telegraph and what should go by mail. Mr. J. F. Caskey thought it was safe to trust the telegraph

managers to decide such matters, provided they had the authority of the president or some other superior official to do so.

There was also a short and general discussion of the subject of high-tension crossings.

At the afternoon session Mr. L. B. Foley, of the Lackawanna Railroad, referred briefly to the use of wireless on his road. While the entire equipment for the Buffalo service was not yet complete, they had sent messages 400 miles. He predicted that the wireless telephone would revolutionize railway practice.

At this point of the proceedings Mr. Belvidere Brooks, vice-president of the Western Union Telegraph Company, entered and was presented to the members.

Interest in the subject of wireless was shown by the many questions that were put to Mr. Foley.

On invitation of Chairman Potter the representatives of the associate members were called upon for remarks on their products, and the following responded: Mr. E. V. Adams, for the Western Electric Company; Mr. H. W. Lucia, for the General Railway Signal Company, Rochester, N. Y.; J. H. Finley, Automatic Electric Company, Chicago; W. E. Harkness, Hall Switch and Signal Company, New York; H. Homer, American Telephone and Telegraph Company, New York; J. O. Carr, Morkrum Company, Chicago; D. Sarnoff, Marconi Wireless Telegraph Company of America, New York; E. E. Hudson, Thomas A. Edison, Inc., Orange, N. J.; H. M. Horton, Radio Telephone and Telegraph Company, New York.

Votes of thanks were tendered to the Pennsylvania Railroad Y. M. C. A. branch for the use of the hall, to the authors of the papers and to TELEGRAPH AND TELEPHONE AGE for the announcements of the meeting.

Mr. A. B. Taylor, of the New York Central and Hudson River Railroad, New York, described the experiments made on his road with various loud-speaking telephones.

The meeting then, at 3:45 p. m., adjourned and the members in a body visited the new operating quarters of the Western Union Telegraph Company at 24 Walker street.

Those present were:

Angelica, N. Y.—C. L. Lathrop.
Baltimore, Md.—B. F. Thompson.
Chicago, Ill.—E. V. Adams, P. W. Drew, J. H. Finley, C. H. Hubbell, V. T. Kissinger, E. C. Keenan.
Cleveland, Ohio.—F. F. Riefel.
Detroit, Mich.—J. J. Ross.
Garwood, N. J.—C. S. Rhoads, jr.
Indianapolis, Ind.—C. S. Rhoads.
Jersey City, N. J.—E. P. Griffith.
New Haven, Conn.—H. A. Shepard, N. E. Smith.
New York.—C. G. Baird, J. H. Bell, N. Carlton, J. O. Carr, R. E. Chetwood, L. B. Foley, W. E. Harkness, J. B. Harlow, H. Homer, H. M. Horton, P. J. Howe, R. J. Hunter, A. Lockwood, R. J. Meigs, G. A. Nelson, D. Sarnoff, R. F. Spamer, J. L. Spence, T. R. Taltavall, A. B. Taylor, L. S. Wells, F. White.
Norfolk Va.—W. S. Williams.
Orange, N. J.—E. E. Hudson.
Pittsburgh, Pa.—L. A. Lee, A. S. Roush.
Richmond, Va.—C. W. Bradley.
Roanoke, Va.—W. C. Walstrum.
Rochester, N. Y.—H. W. Lucia.
South Bethlehem, Pa.—J. F. Caskey.
Syracuse, N. Y.—S. L. Van Akin, jr.
Wilmington, Del.—W. Wilson.
Washington, D. C.—J. A. Jones, W. H. Potter.

Several of the superintendents were accompanied by their wives.

Meeting of New York Central Telegraph Superintendents.

The regular quarterly meeting of the joint superintendents of telegraph of the New York Central Lines was held in the office of Superintendent A. B. Taylor, New York, November 10. Those present, besides Mr. Taylor, were: E. C. Keenan, Chicago; F. F. Riefel, Cleveland, Ohio; J. J. Ross, Detroit, Mich.; C. S. Rhoads, Indianapolis, Ind.; S. L. Van Akin, jr., Syracuse, N. Y.; L. A. Lee, Pittsburgh, Pa.; W. L. Connelly, Gibson, Ind.

In the afternoon a trip was made to Harmon to inspect the electrification system of the New York Central.

All of these superintendents remained over in New York to attend the meeting of the Eastern Division of the Association of Railway Telegraph Superintendents on November 11.

Reducing Volume of Railway Service Messages.

The Grand Trunk Pacific Railway has recently inaugurated a campaign to reduce the volume of railway service messages transmitted over that company's wires. The following by H. Hulatt, commercial and traffic superintendent telegraphs, appeared in Bulletin No. 32, issued October 1, published by the Grand Trunk Pacific Passenger Traffic Department:

"The word brevity has a short, crisp sound, and so has a telegram that is brief and to the point.

"Every telegram sent 'RS' over company's wires, although no actual charge made for same, costs the company money; more for a long message, less for a short message. Short messages increase the capacity of circuits, and it is desirable to remember that every telegraph circuit has a limit to its capacity.

"'Brevity' is said to be the soul of wit, but it also has a much more important significance, i. e., it indicates a business-like method of conducting the company's affairs.

"When dictating or writing a telegram, it should be the aim of all concerned to use the least possible number of words consistent with an intelligent understanding of such message by the addressee; in fact, compile 'RS' telegrams in the same way as though you had to personally pay tolls on same out of your own pocket.

"Telegraph service should only be used for really urgent and important matters. A perusal of messages sent over the wires indicates very clearly that a large number of messages would have served the company's purposes equally as well if sent as 'traingrams.'"

MUNICIPAL ELECTRICIANS.

NEW YORK'S FIRE-ALARM SYSTEM.—Mayor Mitchell of New York has given out correspondence showing the illegal diversion and waste of a large part of appropriations of $1,609,276, which have been made in the last ten years to instal an adequate fire-alarm telegraph plant in the city. The appropriations were induced by expert reports showing that large areas of the city might, at any time, be subject to serious conflagration, owing to lack of an efficient alarm system. It appears from the correspondence that no substantial progress has been made toward removing this danger and that a large sum has been spent for maintenance of the old system and for other improper purposes. In 1906 the city secured the services of Messrs. J. J. Carty and Kempster B. Miller, engineers, to prepare an adequate plan for the protection of property interests against fire. Upon the basis of their report appropriations were made to develop the system laid out by them, but of the money to maintain and patch up the old system much went for salaries and other purposes.

OBITUARY.

FRANK WINGET, aged forty-nine years, Western Union operator for the Chicago *Daily News,* died in Chicago recently.

JAMES B. TATE, aged forty-three years, a Western Union operator at Washington, D. C., died on October 30 from injuries received by being struck by a trolley car at Hyattsville, Md.

W. B. LASSCELL, age ninety years, a forty-niner of the telegraph, who has lived in retirement for many years, died at his home in Mount Vernon, N. Y., on November 5. He was an old personal friend of Prof. Morse and was well known to the older members of the telegraph. He remained in the telegraph service until 1852, and was very proud of his early telegraph connection. He had been in the sewing machine business for the past fifty years.

J. A. HENNEBERRY, aged fifty-nine years, a well-known old-time telegrapher, and for several years chief clerk in the district attorney's office, under district attorney Jerome, of New York, died at Stamford, Conn., November 5. Mr. Henneberry was a member of the Philadelphia and New York Western Union offices for many years. While with the latter interests he represented this publication and his numerous contributions to our columns were favorably received. Mr. Henneberry severed his relations with the telegraph service fifteen years ago since which time he has been more or less identified with politics, and the New York City government.

JOHANNES DE LA MOTTE, aged seventy-six years, a well-known old-time telegrapher of New York, died in Brooklyn, N. Y., October 30. After funeral services on November 1 the remains were taken to Fresh Pond and cremated, according to his directions. He was a native of Germany, and before coming to the United States he was connected with the German Government telegraph and railway mail service. He retired in 1902. His first entrance in the telegraph service in America was at Castle Garden, where he managed an office for the Atlantic and Pacific Telegraph Company, and afterwards took charge of several city branch offices. When the American Telegraph Company started in business at 135 Broadway he assumed charge of the delivery department there. The consolidation of this company with the Western Union opened up a place for him in the treasurer's office of the American District Telegraph Company, which was under Western Union control. Deceased was a brother of "Count" William E. L. de la Motte, who had charge of the Sandy Hook office for many years, but is now retired.

THE MARTIN H. GLYNN TELEGRAPHERS' CLUB of New York issued a circular appealing for support for the Governor at the recent election, in which a pleasant incident, of interest to telegraphers, was referred to. Mr. Charles E. Shaughness, repeater chief for the Western Union at 24 Walker street, New York, was at one time deputy postmaster of Columbia County, N. Y. During that time he gave Mr. Glynn his first start in life by employing him as clerk. Governor Glynn referred to the fact at a banquet of the Columbia County Association in New York last February, and gave Mr. Shaughness full credit for giving him his first start in his political career. Mr. Shaughness says: "Of course I am proud to call the Governor my friend, as I regard his career from poor boy to governor in twenty-five years as one that puts to shame the pessimists who say there is no chance for a young man to-day. This is food for reflection if the young fellows would only see it."

INDUSTRIAL.

TELEPHONE BULLETIN IN SPANISH.—The Western Electric Company has issued for the Central and South American trade, in Spanish, a bulletin describing and illustrating its telephone switchboards for small exchanges.

"AN ELECTRICAL XMAS."—The Western Electric Company has issued a booklet, entitled. "An Electrical Xmas." It contains suggestions as to practical electrical Christmas gifts and illustrates many useful appliances of this character. It is to be supplied to central stations and electrical dealers to assist them in the sale of practical gifts.

MR. SAMUEL WEIN, New York, who is well known to our readers through his contributions on cable relays, selenium cells, and other kindred subjects, is now manufacturing selenium cells for commercial and experimental purposes. He has made a special study of selenium and its applications, and makes a high-grade article. His place is at 25 East 115th street, New York. He advertises his product on another page of this issue.

Mr. W. H. Mann, manager, Western Union Telegraph Company, Phœnix, Ariz., in remitting to cover a renewal of his subscription for another year, writes: "It goes without saying that the AGE would have been greatly missed had its coming been discontinued."

The San Francisco Telegraph Tournament.

The Panama-Pacific International Telegraphers' Tournament, which is to hold a telegraph contest May 27, 28 and 29, 1915, at San Francisco, is exciting a great deal of interest and favorable comment in all sections of America. In many localities expert operators with good records are being urged to put forth their best efforts from this time on, both at sending and receiving, in order to participate in this San Francisco event.

It is said that the money prizes will be so liberal as to make each contest attractive to telegraph people residing at the remotest points. In fact, it has been hinted that it is possible that the first prize may reach the sum of one thousand dollars in cash. Of course this depends upon the liberality of the contributors. The wide-spread interests manifested in this event by everyone is remarkable. The telephone company has promised to designate one of its officials as a member of the advisory board so that the telephone interests may be properly represented in this international affair.

The newspapers throughout the entire United States have already devoted considerable space to this proposed tournament. This alone has aroused a national interest in the affair that could not have been secured in any other way. All of the committees identified with the project are busy formulating plans and preparing their printed matter for a national publicity campaign.

Announcement of the full programme cannot be made at this time, for the committee is unable to determine as yet just how far it will be able to go in the matter of prizes.

Owing to the great distance between San Francisco and the large telegraph centres, it is planned to hold elimination contests in all cities possessing sufficient telegraph talent to warrant it, and only the winners of these elimination contests will compete in the finals at San Francisco. This will make the tournament a contest between the real champions.

From present indications the tournament will be the most successful ever held.

ENTERTAINMENT OF NEW YORK TELEGRAPHERS AID SOCIETY.—The annual entertainment and reception of the New York Telegraphers' Aid Society will be held at the Lexington Avenue Opera House and Terrace Garden, Fifty-eighth street and Third avenue, New York, Tuesday evening, November 17. There will be high-class vaudeville, followed by dancing. Tickets may be procured at the Serial Building Loan and Savings Institution offices, 16 Dey street, or 24 Walker street. All remittances should be made to C. A. Kilfoyle, financial secretary, P. O. Box 711, New York City.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

Among recent visitors were Mr. C. C. Adams, vice-president, and J. R. Dennis, New York.

Mr. M. R. Hansberry was married to Miss Anna DeHart, of Germantown, on October 14.

Mr. W. V. Madden, chief clerk to Superintendent C. E. Bagley, has resigned to become city agent of the American Express Company at Mahanoy City, Pa. The training and experience received in the telegraph service will fit Mr. Madden to shoulder the responsibility of his new position. He carries with him the best wishes of his telegraph associates. He was presented with a gold watch and chain by his friends.

Mr. John J. Hardy, who succeeds Mr. Madden as chief clerk to Superintendent Bagley, began with this company in 1902 as messenger and by persistent study and careful attention to details advanced, step by step, from one position to another. He brings to his new position a well-trained and experienced mind.

George L. Kohlbrenner, who has been advanced from the bookkeeping department to be district auditing clerk, succeeding Mr. Hardy, also began service with this company as messenger.

Telegraph and Telephone Age

No. 23. NEW YORK, DECEMBER 1, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Odds and Ends.

CONDENSER DISCHARGE AND HERTZIAN WAVES.

It has been experimentally demonstrated that if a condenser is charged and then discharged by means of a spark through a conductor having inductance, the discharge, provided the resistance of the circuit is small, will be oscillatory. The circuit instead of being traversed by a current in one direction which rises quickly to a maximum and then dies down more slowly as would be the case if considerable resistance were present in the circuit, will have established in it a current which rises to a maximum, descends to zero, attains a maximum in the reverse direction and repeats the operation till the energy has been completely dissipated in the light and heat of the spark and in heating the conductor. The amplitude of each swing is less than the one preceding it, and bears a constant ratio to it.

INDUCTION ON STRAIGHT WIRES.

A current passing through a straight wire will induce currents in another wire running parallel, when the current is varied in strength. The strength of the induced current depends upon the rate of variation of the primary current, the distance apart of the wires, the lengths they run together and the insulating substances or dielectric between them. The induction through dry air is less than when any other substance intervenes between the wires. What is called the inductive capacity of air being unity, that of resin equals 1.7, glass 1.9, paraffin 1.98, india-rubber 2.8, and gutta-percha 4.2. It is important to consider these values in connection with cables for telephone wires, and, if otherwise possible, to choose a substance which has the least inductive capacity, and so keep down the inducing action between the wires.

ELECTRO-MAGNETIC INERTIA.

The magnetic property of iron wires has a harmful influence on currents rapidly varying in strength which pass through them. Such are the currents which pass through the telephone wires in conveying speech. A part of the energy of such currents is wasted in magnetizing the material of the wire. The weakening is said to be due to the electro-magnetic inertia of the wire.

PRIMITIVE WIRELESS TELEGRAPHY IN AFRICA.

Primitive natives in darkest South Africa maintain a system of wireless telegraphy that is as efficient as the highly developed method of the present day. Nothing more pretentious than the bark drum is their sending instrument and their highly attuned ears are the receiver. From village to village by a series of drum beats, resembling somewhat our own Morse code, the natives convey the news of battle, the warning of approaching enemies or epidemic and other subjects of importance to jungle denizens. Kaffir drum telegraphy is operated almost exclusively in the stillness of the night, when the tap on the tightly drawn skin is heard distinctly for many miles. Sometimes fires are used, but this system is as far behind drum telegraphy as the Morse system is superior to the semaphore.

OPERATING CURRENTS.

The following table shows the normal and minimum current necessary to operate single line relays and sounders of standard resistances:

RELAYS.

Resistance in ohms.	Current in Milliamperes. Normal.	Minimum.
20 (pony)	130	15
35	65	10
150	40	6
300	25	4

SOUNDERS.

Resistance in ohms.	Current in Milliamperes. Normal.	Minimum.
4	250	180
50	110	60
150 (main line)	60	30

CHLORIDE ACCUMULATORS.

The two plate chloride accumulator consists of cells having only two plates, one positive and one negative, which are permanently joined together forming a couple. The plates of a couple are placed in adjacent cells. Separators are not required. The group type consists of cells with the

plates of the same polarity permanently joined together forming positive and negative groups. A positive and a negative group are placed in the same cell with separators. An "element" consists of one positive and one negative group, complete with separators for one cell. A "positive group" is the positive half of the element. The plates are of a brown color and connected together by a lead strap. A "negative group" is the negative half of the element, and always has one more plate than the positive group in the same element. The plates are of a gray color and also connected together by a lead strap. A "couple" is one positive and one negative plate of the two plate type connected together. A "positive terminal" is similar to a "couple" except in place of the negative plate, there is an extended lead strap on which connection can be made by means of bolt connectors. A "negative terminal" is the same as a "positive terminal" except there is a negative plate in place of a "positive."

SELF-STARTING AND SELF-STOPPING INK-WRITING REGISTER.

This instrument has two electromagnets mounted on supporting pillars at one end of an iron base. Magnets attract two armatures mounted with concentric sleeves on the same shaft. The armatures operate independently of each other, and have individual air gap adjusting screws. Two horizontal forked pens are carried by the concentric sleeves at one end of the shaft and have attached to their under side two retractile springs for adjustment purposes. An ink wheel and inking pad are located in the order named above the forks of the pens. The separation between the pens and the ink wheel being just sufficient to allow a ribbon of paper to pass when the pens are in their top-most position. A sharp-toothed wheel operating in conjunction with an idler wheel serves to draw the paper ribbon between the pens and the inking wheel. The paper ribbon or tape is carried by a reel, the supporting arms of which extend outward from the top of the brass case in the directions of the electromagnets. When an electromagnet is energized the armature presses on a steel rod projecting through the end of the brass case and causes a retaining pin inside the case to trip and engage a threaded rod mounted parallel to the base. When the retaining pin trips it allows a helical spring to set a train of gear wheels in motion thereby causing the sharp-toothed wheel and ink wheel to revolve. The spring will be free to act until the retaining pin, carried along by the revolving threaded rod, returns to its original position and is met by a stop carried by the rod. Each succeeding impulse received by the electromagnet causes the retaining pin to release and reengage the threaded rod.

Recent Telegraph and Telephone Patents.

ISSUED NOVEMBER 3.

1,115,530. Radiodynamic Directive-Control System. To J. H. Hammond, Jr., Gloucester, Mass.

1,115,739. Automatic Telephone Exchange System. To F. N. Reeves, Newark, N. J.

1,115,868. Antiseptic Telephone Mouthpiece. To I. S. Rosenblatt, San Francisco, Cal.

1,115,969. Telephone System. To F. R. Parker, Buffalo, N. Y.

1,115,977. Selective Signalling System. To H. O. Rugh, Sandwich, Ill.

1,116,111. Station for the Transmission and Reception of Electromagnetic-Wave Energy. R. Pfund, New York.

1,116,183. Receiver for Wireless Telegraphy. To E. Weintraub, Schenectady, N. Y.

1,116,309. Duplex Wireless Telegraphy. To G. Marconi, London, Eng.

ISSUED NOVEMBER 10.

1,116,402. Conductor-Wire-Reeling Mechanism for Telephones. To C. W. Ferguson, Bower, W. Va.

1,116,447. Electrical System. To C. D. Lanning, Boston, Mass.

1,116,538, 1,116,539, 1,116,540 and 1,116,541. Telephone-Exchange System. To M. L. Johnson, Chicago, Ill.

1,116,542. Telephony. To M. L. Johnson, Chicago, Ill.

1,116,588. Receiver for Wireless Communication. To W. Harrison, Brooklyn, N. Y.

1,116,591. Telegraph Repeating System. To A. T. Jester, Houston, Tex.

1,116,657. Printing Telegraph. To C. J. Wiley, Yorktown, N. Y.

1,116,667. Telephone Cutout. To J. Anderson, Jr., Omaha, Neb.

Stock Exchange Business.

The New York Stock Exchange which was closed on July 30 is still closed. On August 12 the special committee appointed to handle the affairs of the Stock Exchange ruled that stocks could be bought and sold through the clearing house of the Stock Exchange at prices not less than the last prices of July 30. Trading through the Exchange clearing house has been done under this restriction. The minimum prices for telegraph and cable stocks now permitted are as follows:

American Tel. & Tel.	114
Mackay Companies	59¾
Western Union Telegraph	52⅜

The "outside" security market is again in operation. Among the quotations is Marconi Company of America 2¼.

PERSONAL.

MR. J. T. THEBAULT, supervisor of signals and telephones, Panama Railroad Company, Isthmus of Panama, is in New York on a business trip.

MR. W. H. SAWYER, of Providence, R. I., an old time telegrapher who retired from active business pursuits several years ago, has gone to Pasadena, Cal., for the winter months.

MR. PATRICK B. DELANY, electrical engineer and inventor, who is located at Nantucket, Mass., during the summer months, has returned to New York and will reside at South Orange, N. J., during the winter.

MRS. CRAW, wife of Mr. Alex. Craw, of Chicago, an old time telegrapher now general claim agent for the Baltimore and Ohio Railroad Company, west of Pittsburg, died on November 13. Interment took place at Jersey City, N. J., her old home. Mrs. Craw was well known to many members of the Old Time Telegraphers' and Historical Association, being an occasional attendant at the annual reunions of that organization.

MR. J. P. BRADT, an old-time telegrapher, has returned to the service of the Columbia Graphophone Company, New York, and henceforth will fill an important position in the executive offices, which occupy the twentieth floor of the Woolworth Building. Mr. Bradt, who was formerly the manager of the old United Press in Baltimore, entered the service of the Columbia Company seventeen years ago. He was manager at Baltimore up to 1903, when he went to Berlin. His success in Germany was so pronounced that in 1906 he was made manager in London. Returning to America in 1908 he was made general manager for Canada, with headquarters in Toronto. As a telegrapher, press association manager and newspaper writer he won a name years ago.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. CHARLES P. BRUCH, vice-president of this company, has been elected a vice-president of the Ohio Society of New York.

MR. E. KIMMEY, district superintendent New York, has returned from a trip of inspection through northern New York.

MR. CHARLES M. BAKER, general superintendent of plant, Chicago, Ill., was a recent New York visitor.

MR. W. M. BERRY has been appointed manager at Fowler, Col., vice Miss A. Donahue, transferred to Laramie, Wyo.

THE MACKAY TELEGRAPH AND CABLE COMPANY has moved into new quarters in Denison, Tex. Mr. H. E. Gordon is manager.

WHEELING OFFICE.—This company's office at Wheeling, W. Va., is receiving extensive alterations which will be a great improvement. Both the exterior and the interior are undergoing changes.

WIRE TAMPERER SHOT.—This company's lines having been tampered with several times in Cleveland, Ohio, during the past few weeks, detectives were placed on watch. On the night of November 18 a man was discovered on a pole and, in resisting arrest, the detectives shot him. He was injured and taken to the hospital. The police say that the man caught tampering with the wires has a bad record and is supposed to have been hired to damage the company's property.

RIGHT TO REMOVE TELEGRAPH OFFICE.—Justice Clark A. Smith, of the Kansas Supreme Court, has issued a writ of mandamus against the Kansas Postal Telegraph Company on the application of A. E. Helm, attorney for the state public utilities commission, on the ground that the company had violated the public utilities law by dismantling a telegraph office at Syracuse. The idea is to discover if this corporation, which does business in Kansas as "The Kansas Postal Telegraph Cable Company," may remove a telegraph office without consulting the public utilities commission.

RIGHT TO LAY CONDUITS IN CITY STREETS.—Telegraph companies possess a right to the use of streets for the laying of conduits without restriction from the city or state, is the opinion of the city solicitor of Philadelphia. The opinion is the result of the desire of the Postal Telegraph-Cable Company to dig up South Penn Square for a trench to carry its wires in conduits between Juniper street and the Finance Building, near Fifteenth, the new central office of the Postal Company in Philadelphia. The right referred to is granted by the "Post Road Act" of Congress in 1866, and the Postal Service Act of 1884.

WESTERN DIVISION CHANGES.—The following district changes in the Western Division are announced: The position of division superintendent, now held by Mr. S. H. Mudge will be abolished as of December 1. The first district, now presided over by Mr. E. S. Williams, and the fourth district under the supervision of Mr. A. L. Lafferty (with the exception of Sturgis, Mich.), and that part of southern Illinois now in the third district under the supervision of Mr. J. F. Looney, will be consolidated, forming what will be known as the first district, to be presided over by Mr. S. H. Mudge, superintendent, with headquarters at Chicago. In addition, Mr. Mudge will have supervision over the lines from the eastern Chicago city limits to Michigan City, Ind., including Hammond, Indiana Harbor and Michigan City offices. The second district lines and offices will remain as at present, under the supervision of Mr. F. W. Sprong, superintendent, Cleveland, Ohio. The third district will be comprised of the lines and offices in the state of Indiana, plus Sturgis, Mich., excepting Hammond, Indiana Harbor and Michigan City, Ind., offices and the lines from Chicago eastern corporate limits to Michigan City. The fourth district (heretofore known as the seventh district) will be comprised of only the offices and lines within the states of Colorado and Wyoming, and will be under the supervision of Mr. W. C. Black, Denver, Colo., who, in addition, will assume the management of the Denver office. Offices and lines in New Mexico, Utah and Texas, now in the seventh district, will be taken over by the Pacific Division. The fifth district will have added to it the lines and offices between Kansas City and St. Louis, including St. Louis and East St. Louis offices, and continue under the supervision of Mr. A. B. Richards, Kansas City, Mo. The sixth district will remain as at present, under the supervision of Mr. C. A. Comstock, Chicago, Ill.

Are You Ready to Fill a Higher Position?

Following is a copy of a letter recently addressed to all employes of the operating department of the Postal Telegraph-Cable Company, Philadelphia, Pa., by Mr. E. W. Miller, chief operator:

"Do you ever ask yourself whether you know more about your business than you knew a year ago? If the company should need you to-morrow for a higher technical position or for a higher commercial position that requires some technical knowledge—and most commercial positions to-day do require this—would you be prepared?

"You are not really living unless you take pleasure in your daily occupation. You cannot take pleasure in your occupation unless you try to know as much as you can about it. To know what has been accomplished and to keep up with what is now being accomplished must be your aim.

"Someone asks, 'How can I learn the technical side when I never get a chance?' The answer is simple: You can know all about ancient and mediæval history without having lived in ancient or mediæval times, by carefully studying a small text-book of history. The newspapers inform you of current events. So it is with your occupation. All that has been accomplished by those who preceded you is recorded in text-books. Fifteen minutes a day spent in the faithful study of any one of these books will yield surprising results in two weeks' time. Regular reading of a trade journal will keep you informed of what your contemporaries are accomplishing, and stimulate to greater accomplishments on your part.

"The more you put into anything, the more you get out of it. With the knowledge gained by systematic study you will be enabled to put more intelligent effort into your work and consequently get greater reward and pleasure out of it. The time to begin is right now. Are you ready?"

Western Union Telegraph Company.

EXECUTIVE OFFICES.

PRESIDENT NEWCOMB CARLTON and his party spent Thanksgiving day in San Francisco.

MR. J. MCROBIE, general manager, American District Telegraph Company, New York, has resigned.

CONFERENCE AT OMAHA.—The officials of this company who started on a three weeks' trip of inspection through the Western and Pacific Coast States, as noted in our issue dated November 16, held a conference in Omaha, Neb., November 16, with managers and superintendents from the principal offices between St. Paul and St. Louis and Chicago and Denver. There were also present managers from twenty-three of the larger offices in Nebraska and Kansas. In addition to the officials already named—headed by president Newcomb Carlton—the following railway telegraph superintendents were present at the conference: E. J. Little, Great Northern Railway, St. Paul; M. H. Clapp, Northern Pacific Railway, St. Paul; E. A. Chenery, Missouri Pacific Railway, St. Louis; L. M. Jones, Atchison, Topeka & Santa Fe Railway, Topeka; Fred T. Wilbur, Illinois Central Railway, Chicago; P. F. Frenzer, Union Pacific, Omaha; W. P. McFarlane, assistant superintendent of telegraph, Chicago and Northwestern Railway, Omaha; H. A. Vaughan, assistant superintendent of telegraph, Chicago, Burlington and Quincy Railway, Lincoln. Other Western Union officials present were: W. J. Lloyd, general manager, Denver; W. C. Titley, division plant superintendent, Denver; B. L. Brooks, division traffic superintendent, Denver; C. O. Blandin, division special agent, Denver; C. B. Horton, district commercial superintendent, W. W. Umsted, district commercial manager, W. Salisbury, district plant superintendent, and J. P. Barnhart, district traffic superintendent, Omaha.

The following managers were also present: T. O. Hurst, Lawrence, Kan.; C. M. Fariss, Leavenworth, Kan.; W. C. Carswell, Topeka, Kan.; H. L. Bradbury, Coffeyville, Kan.; O. P. Jarrett, Independence, Kan.; B. Pearl, Salina, Kan.; J. E. Romer, Emporia, Kan.; E. J. Sullivan, Wichita, Kan.; C. H. Frary, Hutchinson, Kan.; E. J. Townley, Grand Island, Neb.; W. C. Fountaine, Fremont, Neb.; J. R. Hyland, Omaha, Neb.; P. P. Hughes, Atchison, Kan.; G. M. Horton, Lincoln, Neb.; M. J. Hyland, district commercial agent, Wichita, Kan.

A luncheon was given to the visiting officials at the Commercial Club, at which there were forty-eight present.

MR. J. R. TERHUNE, district commercial superintendent, Nashville, Tenn., announces the following changes in his district: Mr. J. B. Cheatham, formerly of general manager H. C. Worthen's staff, at Atlanta, Ga., has been appointed assistant superintendent, with headquarters at Nashville, Tenn. Mr. T. H. Gore, manager at Knoxville, Tenn., has been added to general manager Worthen's staff at Atlanta; Mr. W. C. Fox, manager at Vicksburg, Miss., has been appointed manager at Knoxville, Tenn.; Mr. L. K. McNees, manager at Jackson, Miss., has been transferred to Vicksburg, Miss., and Mr. H. A. Whitsitt, formerly district manager, has been appointed manager at Jackson, Miss.

MISS MARGARET E. SMITH, for the past ten years stenographer to the manager at Buffalo, N. Y., died November 16.

R. C. WATSON, operator at Chicago, Ill., died November 10.

W. V. DUKE, aged sixty-four years, former manager at Evansville, Ind., died on November 17. He was retired on pension last July.

RECEIVER ASKED FOR ECKERT ESTATE.—Mr. James C. Eckert, son of the late Gen. Thomas T. Eckert, president of the Western Union Telegraph Company, on November 20 asked the Supreme Court to appoint a receiver to conserve his father's estate and petitioned the Surrogate's Court to appoint a temporary administrator.

Putting Western Union on Its Feet.

Under the title "Putting Western Union on its Feet and How Vail Did It," *Printers' Ink* publishes an authorized interview by C. W. Hurd with Mr. Newcomb Carlton, president Western Union Telegraph company. The article follows:

Putting a $100,000,000 public utility on its feet after a long, heart-breaking slump looks simple enough on paper—after the fact. All that Theodore N. Vail did to Western Union subsequent to the American Telephone & Telegraph Company securing control in 1910 was to put life and courage into the demoralized force, improve the 25,000 telegraph offices scattered over the country, create several new telegraph and cable services to fill in the force's idle time, reduce the general cost to the public, and educate the latter to these new services and economies through country-wide advertising. Expensive when done on a large scale, but simple enough in theory and looking backward. Only, nobody in the old organization had seen it before, had been aware of the real basic trouble or knew where to begin to overcome it.

What Mr. Vail saw with the eyes of a trained imagination and what the others did not see was the vast untouched market ahead of the company, the tremendous potential development of service by telegraph, the almost infinite if latent demand of the public for rapid communication.

How he located this market and organized the service to satisfy it is a story that has almost as much meaning for the $10,000,000 corporation or even the $50,000 company as it has for the Western Union itself. Every progressive house has a labor or sales force problem, a commodity or price problem, an advertising problem. What Mr. Vail did is open, with minor modifications, to others to apply if they have not already applied it, or to apply it more intensively if they have already made a start. It will not be possible for every concern to lift its gross earnings $5,000,000 and more every year, as Vail did—from $35,000,000 to $41,000,000 and then to $46,000,000 and so on—but there is something in it, without doubt, for every one.

"The renaissance of Western Union," repeated Mr. Carlton, "is the work of Mr. Vail, and the enforced separation of the American Telephone and Telegraph Company from Western Union and the latter's loss of Mr. Vail is one of the most serious blows it ever sustained. Rehabilitation began with Mr. Vail's coming and its continuance is due to the impetus he gave it."

Confronted with a situation just this side of being critical, the result of a long period of unsettled business and labor conditions, of economies and retrenchment, how did Mr. Vail meet it? By further cheeseparing? Not at all. On the contrary, his prescription was revolutionary and direct.

"Mr. Vail started with the men," said Mr. Carlton. "Internal conditions had been unfortunate and the company was not asking or getting the loyalty it needed from the mass of its employes. Mr. Vail began at the beginning. He invited confidence by increasing salaries, not all along the line, because that was not practicable, but here and there. This gave all of the men something to think about and look forward to. It served notice that the choked way to a recognition of loyalty and ability had been reopened.

"And with it he established a pension system and a loan service. 'It ought to be possible for any good man in the company's employ who is in pressing need of money to get it from the company—get a full month's pay in advance, if necessary,' Mr. Vail affirmed. There were some doubters in the directorate, but Mr. Vail had his way and his way was right. We have had the loan service in use for more than four years; it is more or less freely used, and yet our loss is less than three-tenths of one per cent. The effect on the organization *morale* has been excellent.

"Mr. Vail's purpose in introducing these reforms was to get the right spirit back into the men. He saw that it was absolutely impossible to think of asking the co-operation of the force in improving the service until the force felt right about the company. The long-enduring friction and demoralization had to be removed and the compensation of the men made more equitable."

The 1913 report of the company shows that under this policy for the three years ending October 31, 1913, as compared with the preceding three years, wages went up fifty per cent.; and maintenance, improvement, etc., fifty-seven per cent.; while gross revenue increased by forty-five per cent. The increase in wages during the three years amounted to $16,566,000 and was exclusive of construction and of reconstruction wages. That is the estimate which Mr. Vail placed on the great importance of the human equation.

"During the early days of his connection with the company his mind was busy all the time with plans for improving the spirit of the force, as the thing of first importance," continued Mr. Carlton. "He dwelt so much on this in his conversation and was so earnest about it that his friends urged him to go out to the men and see them. He was a telegrapher once, you know, and his friends felt that if he would only see the men his very appearance and unaffected speech would have a splendid effect on them. However strange the fact may be, Mr. Vail is a shy man. Among his friends he is the life of the meeting, full of energy of thought and expression, but the presence of even two or three messenger boys will often cause him to beat a retreat into a far corner. He could not bring himself to make a tour of all the telegraph offices, but he did make a concession. He wrote letters, telling the men the company wished to better conditions and asking them to come directly to him if they had grievances they felt were not being settled. Some of them did come and grievances were settled that way. Eventually, I think, he had the full confidence of every man in our large force."

After this first action in raising wages Mr. Vail set about the improvement of the offices and the conditions there, of the service and character of the personnel Mr. Carlton continued:

"When I speak of his doing these things I mean that he laid down the policy. His way was to

generate the idea and let others work out the details.

"Of course, all this time the construction and reconstruction work of the company, which had been running down for years, was going forward on an enlarging scale, and after the problem of the improvement of the personnel was in process of solution, Mr. Vail began to look about to see how the wire service itself could be improved and what new kinds of service, if any, could be devised. His experience was of great help here. As president of the American Telephone and Telegraph Company, he had had the telephone service analyzed and charted in order to study it more intelligently than he could from the figures alone.

"Accordingly, he had a chart made to show the service of the Western Union, in the Metropolitan district. This showed graphically the hours of heavy traffic and those of comparative idleness; how the 'load' rose abruptly from six o'clock in the morning to a 'peak' between ten and eleven o'clock and then fell away in a decline of about forty-five degrees to four or five o'clock the next morning.

"Mr. Vail studied the chart and asked himself: 'What can be done to occupy the force profitably during the almost unutilized night hours?' Of the 25,000 telegraph offices, 20,000 did not pay their office expenses in gross revenue. As he had pointed out in a report, 'eighty-five per cent of the gross telegraph business of the country is between less than 5,000 towns and cities—that is, four-fifths of the offices of the Western Union and fully one-half of its wire mileage is maintained at a loss in order to give that general and comprehensive telegraph service which the business and social interests of the country require.' One-fifth of the offices were carrying the whole organization and even these running at full efficiency only one hour of the day.

"'What can be done to fill in between the peaks and distribute the load?' was the question. The first step towards a solution was the night letter, a fifty-word message at the previous rate for ten words. Mr. Vail tells how he arrived at this in his annual report for 1910-11."

The night letter came first because it filled the greatest need. By accepting messages during the day to be sent at night when the wires were less busy and delivered in the morning before the day's rush began, the company could afford not only to create a new service to the public at a cheaper rate, but even turn it into a new source of revenue to itself.

The day letter service was inaugurated March 1, 1911.

As a result of the introduction of these two new services, their use and the advertising, they are producing 20,000,000 messages a year and showing an annual gain. As Mr. Vail pointed out, this is virtually all new revenue, without new expenditure, except for advertising, which at the same time exerts no small influence on the old service as well.

"After this, turning his attention to other things, he saw that the Western Union was at a disadvantage without close cable connection and that it ought not to be left swinging alone in the air, as it were," said Mr. Carlton. "There had long been reciprocity between the two systems but no direct physical contact. Mr. Vail arranged for the latter, and the results have proved beneficial to both systems. There followed in due time night and week-end cable-letters, originating out of the same need for swelling the volume of business and equalizing the load. This, too, has resulted satisfactorily. The present cable letter rate for twelve words is seventy-five cents, and for week-end letters of twenty-five words, $1.15."

"Mr. Vail also reduced the cable press rate during certain times of the day and night for the same reasons," said Mr. Carlton, "and again his judgment was vindicated—the falling off in the normal business of the high peak hours was inappreciable, while there began at once a steady development of new business."

There are three ways of getting a telegraph message started: call at an office, ring or telephone for a messenger; or dictate it over the telephone. This suggested the development of closer relations between the telegraph and telephone than had existed. At first it seemed possible to have the public ask simply for "telegram" over the telephone and get "Western Union," but certain obvious objections arising, the plan was changed, and in August, 1913, the company's advertisements read:

"When you lift the receiver of a Bell telephone and call 'Western Union' you are in communication with all the world."

From the first of the year considerable attention has been devoted to the borders.

Just now, when a section of the business world is inclined to hesitate, Western Union is coming out twice a month all over the country with clarion calls for courage:

"Bigger Business is attracted to those who seize opportunity vigorously," is a sample of its method of approach to the proposition to go after business with telegraph salesmen.

The manner in which Western Union has continued to seize opportunity itself and justify Mr. Vail's business-building methods is perhaps best illustrated by the financial report of the company for the nine months ending September 30 last, September being partially estimated, which shows total revenues of $1,494,482 in excess of the same period last year and net income amounting to $3,884,462, an increase of $1,652,402.

"We are now working on a plan to simplify collection and delivery," said Mr. Carlton. "The present method of ringing a bell and summoning a boy is cumbersome and antiquated in this age. The improvement will be in the nature of some such scheme as having the business house drop its message, written on its own letterhead, into a Western Union box, from which collections may be made at known intervals. The message would then be telegraphed to the receiving point, where it would be reduced to writing and posted for the earliest delivery. The plan would, of course, be practical only between far distant points, where it would outfoot the mail. It would be of no use between New York

and Boston. But for the longer distances it has great possibilities. And it only waits upon the invention of the right kind of a collection system, which we are working upon.

THE CABLE.

JAMAICA CABLE CUT.—The Governor of Jamaica reports that the interruption of cable communication early in August was attributed to an earthquake; but it is now known that the cable was cut by hostile cruisers on August 13, which was before the declaration of war.

Germany's Cable Isolation.

The following statement with reference to the cable isolation of the German and the Austro-Hungarian empires has been given out by the German Information Service:

"Germany has five cables ending at the island of Borkum, in the North Sea, one going to Brest, in France; one to Vigo, in the north of Spain; one to Teneriffe, on the Canary Island at the north of Africa, and two by way of the Azores to New York. All five lead through the English Channel, so that it was not difficult for England to cut them. On the other hand, it will be very difficult, even impossible, for Germany to repair them as long as the war lasts.

"Between Germany and England there exist six cable lines, partly German, partly English, which, of course, are not used now. From Germany's west coast, therefore, no communication with the world is possible.

"The telegraphic communication via Holland, Denmark, Norway, and Sweden can only be kept up by cables that end in England and France, where, of course, cablegrams are censored.

"The ways to the south via Austria or Italy are also blocked, as the cables that run from west to east in the Mediterranean belong to an English company, the Eastern Telegraph Company, and end in English territory. The cables starting from Italy, and also from Turkey, go via Malta, Gibraltar, and Lisbon to the Atlantic Ocean. With Africa no communication is possible without using the cables of the Eastern Telegraph Company, and telegraphic land connections with China pass through Russia or British India. Therefore with the exception of the wireless service Germany can telegraph only to Austria-Hungary, Holland, Switzerland, Italy, and the Scandinavian countries. Spain and Portugal are cut off, too."

New Cable Between New York and Colon.

The Mexican Telegraph Company and the Central and South American Telegraph Company in July last contracted with the Telegraph Construction and Maintenance Company of London for the manufacture and laying of a duplicate cable between New York and Colon, Isthmus of Panama, via Guantanamo, Cuba. The length of this cable will be about 2,328 nautical miles, which includes an allowance of twelve per cent for slack. A considerable portion of the cable will have a core of 550-pound copper and 310-pound gutta-percha per mile, which will insure a working speed of over 200 letters per minute.

Two thousand nautical miles have already been completed and it is expected the remainder will be finished and the cable steamer "Colonia" sail from London before the end of this year. The cable will be laid from New York southward to Colon, Isthmus of Panama.

This duplicate New York-Colon cable will provide facilities for a growing South American traffic which has been augmented by the European war and the opening of the Panama Canal.

The Central and South American Telegraph Company expects shortly to extend its cable system from Buenos Aires, Argentina, to Brazil, by laying two cables, one from Buenos Aires to Santos, and one from Buenos Aires to Rio de Janeiro.

In order to provide a quick service for these extensions and maintain the prestige of the "Via Colon" route, it was considered necessary to have a first-class duplicate system between New York and Colon, thus duplicating the "Via Colon" route between New York and Buenos Aires.

At present the average time of transmission between New York and Buenos Aires, with the one cable between New York and Colon, is about twenty-five minutes. It is expected that when the duplicate New York-Colon cable is laid and working, this time will be reduced.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to November 25 as follows:

Between Madagascar and La Reunion, and between La Reunion and Maurice, June 23; Azores and Emden (two cables), August 5; Bundaberg and New Caledonia, August 19; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Paramaribo and Cayenne, September 27; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Itacoatiara and Manaos, October 14; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6.

CANADIAN NOTES.

Inauguration of Commercial Telegraph Service Over Grand Trunk Pacific Telegraph Company's Lines.

Commercial telegraph service was inaugurated by the Grand Trunk Pacific Telegraph Company to and from Prince Rupert, B. C., on November 12. Previously such service had only been in effect as far west as Prince George, B. C., a point 468 miles east of Prince Rupert.

By the extension of this service, such important places as Smithers, Hazelton and Prince Rupert are afforded a cheaper means of telegraphic communication.

On the occasion of the opening, greetings were exchanged between mayor S. M. Newton, of Prince Rupert, and mayor T. R. Deacon, of Winnipeg.

Commercial telegraph service is now in operation over all lines of the Grand Trunk Pacific Railway,

serving, among other important places, Fort William, Ont.; Winnipeg, Man.; Regina, Sask.; Moose Jaw, Sask.; Saskatoon, Sask.; Calgary, Alta.; Edmonton, Alta.; Prince George, B. C., and Prince Rupert, B. C.

The construction of the lines has from the commencement been under the management of Mr. A. B. Smith, manager of telegraphs, Grand Trunk, and Grand Trunk Pacific Railway, Montreal, his chief assistants being Mr. H. Hulatt, commercial and traffic superintendent, Winnipeg, and Mr. W. J. Rooney, superintendent of plant, Winnipeg.

THE TELEPHONE.

MR. C. W. MACKENZIE, of the New York Telephone Company, Buffalo, N. Y., who attended the recent annual meeting at Richmond, Va., of the Telephone Pioneers of America, has written a very interesting journal of the trip of the Buffalo Pioneers to Richmond and back home. Mr. Mackenzie has been in the telephone service thirty-six years.

MR. P. KERR HIGGINS, former general manager of the independent telephone system in Texas, is now located in Excelsior Springs, Mo., where he will spend the winter.

MISSOURI TELEPHONE CONVENTION.—The Missouri Telephone Association will hold its annual convention in Kansas City, December 9 and 10.

TELEPHONE FRANCHISE.—The referendum election in Spokane, Wash., November 3, on the new telephone franchise granted by the city council to the Pacific Telephone and Telegraph Company, resulted in defeat of the franchise.

ALIEN TELEPHONE INSPECTORS IN ENGLAND.—An Austrian employed as a telephone inspector at Wanstead telephone exchange, was charged with failing to register, and was sentenced to three months' imprisonment.

UNIFORM ACCOUNTS FOR TELEPHONE COMPANIES.—The uniform system of accounts for telephone companies, Class C, prescribed by the Interstate Commerce Commission, has been issued in pamphlet form by the Government Printing Office, Washington, D. C.

THE SABINE CITIZENS' TELEPHONE COMPANY has recently been organized to give telephone service in Sabine County, Texas, with headquarters at Hemphill. The new company has taken over two small exchanges formerly operated by another company and in addition will install five Western Electric switchboards at other centers. These central offices will operate over 200 lines as a beginning, in a territory where telephone service has been lacking almost entirely.

TELEPHONE DIRECTORIES.—The New York City telephone directory contains the names of 325,000 subscribers on 952 pages. It will have a circulation of 606,000 copies. These figures show a gain over the 1913 fall issue of 20,000 names, 64 pages and 41,000 copies. In the delivery of these books over 102,000 were disposed of in one day, and in three days 225,000 copies were delivered. The New Jersey telephone directory and local directories for points in the Westchester and Long Island divisions of the telephone company's territory has also just been distributed. The New Jersey book contains 121,500 listings on 436 pages, a gain of 6,500 names and twenty pages over the last fall issue. Its circulation will be nearly 152,000 copies. Approximately 40,000 local directories will be distributed in Long Island towns and about 57,000 in Westchester, so that the combined directory distribution at this time totals 855,000 telephone books.

Telephone Troubles and Their Remedy.

In the practical work of installing and caring for telephones it is important to know just how to remedy the troubles that occur in the operation of telephone apparatus and systems. Mr. W. A. Gibson, in his book, "Manual of Telephone Troubles," covers this phase of telephone work very thoroughly, and every telephone man should have a copy at hand, as it will help him out of many difficulties. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.50. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

LEGAL.

KENTUCKY STATUTE VALID.—The Kentucky Court of Appeals has held constitutional Section 4679a of the Kentucky Statutes which provides that any telegraph company shall upon making a just compensation for the right, construct, maintain and operate telegraph lines upon the right-of-way and structures of any railroad in that state in such manner as not to interfere with the original use or traffic of such railroad. The validity of the act was decided in the case of the Western Union Telegraph Company against the Louisville and Nashville Railroad Company.

NATIONAL FIRE PROTECTION ASSOCIATION.—The biennial meeting of the electrical committee of the National Fire Protection Association will be held in March, 1915, in New York City, the day and place of the meeting to be announced later. As usual, the provisions of the national electrical code, as they now exist, will be considered, together with reports of all sub-committees. Mr. Ralph Sweetland, 141 Milk street, Boston, Mass., is secretary of the committee.

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BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, DECEMBER 1, 1914.

Worthless Patents.

Our editorial article on the subject of patents, printed in the November 1 issue, has aroused considerable interest among those who are familiar with the uncertainties of the patent situation in this country. In our issue dated November 16, Mr. S. M. Kintner, a well-known inventor, took up the matter from the inventor's standpoint and related his experiences, pointing out the injustice to patentees in the practical application of the existing law.

In this issue we print another interesting contribution on the subject from Mr. Harry E. Dunham, a former examiner in the United States patent office and now a patent attorney for the principal electrical manufacturing company in the United States. Mr. Dunham discusses the subject from the attorney's standpoint and points out the defects of the existing law.

Everyone interested should carefully read these three articles in order to get a broad view of the theory and practice of patenting. It will then be easy to understand how the troubles of the inventor come into being.

It is not possible for any legislature body to formulate a law that will cover every case that may arise in human affairs, but this is no reason why existing laws should not be amended to meet present-day necessities as far as possible, and it is to be hoped that the nation's law-makers will some day be brought to a realization of the unjust practices in patent matters and come to the relief of the suffering inventor.

Cable Cutting in War.

When two or more nations go to war one of the very first acts of violence committed is to cut the submarine cables that join the belligerent countries with the outside world. The present European war has been particularly remarkable in this respect on account of the world-wide interests of the countries concerned and the necessity of maintaining submarine cable connections. So far, three important cables have suffered. At the outbreak of the war, the line of communication between the United States and Germany was destroyed and has not yet been repaired. The United States, of course, was not the country aimed at in the crippling of these facilities, but Germany—the cable being German property.

Later the German cruiser "Nurnberg" destroyed the British Pacific Cable station at Fanning Island, in the Pacific Ocean. An interesting account of this work of destruction was printed in our November 1 issue.

The third case of destruction of cable communication was that on November 12, when a force from the German cruiser "Emden" made a raid on the cable station at Direction Island and destroyed the instruments and would have done further damage had they not been interrupted in their work by the appearance of an Australian cruiser and chased away. The "Emden" was finally destroyed as a result of the damage inflicted by the Australian.

An interesting account of this visitation of the Germans and their work is printed in the present issue.

How and by whom the German-American cable was cut has not been made public, but it is certain that the Germans themselves did not do it. In the other two instances the Germans inflicted all the damage they could to English property, but it must be said, to their honor, that they committed no personal injury upon the members of the staff at these stations.

The Outlook.

To the prophetic eye signs are not lacking that the United States are at the threshold of a period of great industrial activity. There are indications in many directions of business revival and a more optimistic state of mind among the people.

It is true that there exists much suffering and want all about us at the present time, but this condition will be abated to a very large extent before long.

The European nations at war are destroying, not producing; and they will be so weakened when the war is ended that it will be a long time before they can resume their wonted industrial activity. In the meantime they will require food stuffs and

manufactured articles, and a greater part of such supplies must necessarily come from the United States, the only producing country of importance that is not involved in the war.

At the present time we are, it is true, suffering great industrial depression, owing to the lack of demand, but as the stores of necessities in the warring countries become exhausted they must be replenished. These countries themselves cannot renew them, so they will have to look to countries that can. Hence, taking it all in all, the immediate future, it seems to us is full of promise. There is no other way to look at it than optimistically.

War Tax on Telegrams and Telephone Messages.

According to the war tax bill passed just before the adjournment of the last Congress all telegraph and telephone companies are required to make, within thirty days after the expiration of each month, a sworn statement to the collector of internal revenue, stating the number of dispatches, messages or conversations originated at each of their offices, exchanges or toll stations and thence transmitted over their lines during the preceding month, for which a charge of fifteen cents or more was imposed, and on each such message or conversation they are required to collect from the person paying for the message or conversation a tax of one cent, in addition to the regular charges for the message or conversation, and to pay over this tax in turn to the collector of internal revenue.

Only one tax is to be collected on a message passing over more than one line.

Company's messages, railroad messages over railroad wires and official Government messages are not taxed.

An Interesting Historical Telegraph Relic for Michigan Museum.

Mr. Frank Kitton, of the engineer's office of the Western Union Telegraph Company, New York, has presented an old telegraph register and relay to the Michigan Historical Society and Museum, at Lansing, Mich. The presentation of these instruments was made through Mr. H. J. Kinnucan, Detroit, Mich., former president of the Old Time Telegraphers and Historical Association.

Following is a copy of an interesting letter from Mr. Kitton to Mr. Kinnucan bearing on the subject:

"As requested in your letter of the eighteenth inst., I have expressed the old style telegraph register and relay to our manager at Lansing, Mich., to be turned over to Mrs. M. B. Ferry, of the Michigan Historical Society and Museum in the capitol at Lansing. I am glad that the Historical Society and Museum of Michigan is to have these instruments, as that seems the most appropriate place for anything of this kind which is of historic interest in connection with the early telegraph lines of Michigan.

"I am sorry that there is so little I can tell Mrs. Ferry from personal knowledge of the line on which the instruments were used. My recollections are those of a small boy who probably did not take very much interest in such matters.

"Mr. James D. Reid states in 'The Telegraph in America,' that the Erie and Michigan Telegraph Company, of which John J. Speed, jr., was president, built a line from Buffalo through Erie, Cleveland, Toledo, Detroit, Ann Arbor, Jackson, Battle Creek, Kalamazoo, South Bend and Chicago to Milwaukee, which was completed and in operation in 1847-8. Mr. Reid does not mention the line to St. Clair, but I have assumed that it was a branch line of the Erie and Michigan Company from Detroit to Port Huron via St. Clair, and probably extending further north on the shore of Lake Huron, and seem to remember that it was called the 'Speed Line.'

"It was on this line that the instruments I am sending Mrs. Ferry were used by my father, Edwin D. Kitton, who was the operator at St. Clair and read the messages from the register tape. The telegraph office was in my father's store and I can remember seeing these instruments in position, but do not remember very much more about it except that the line was abandoned and the poles gradually disappeared when I was a boy.

"After my father retired from business in St. Clair, about 1868, I obtained the register and relay, and now regret that I was not so fortunate as to secure the telegraph key that was used with them. This key was of very curious construction and I have never since seen one that resembled it. It was probably mislaid and lost.

"After the 'Speed Line' was abandoned, St. Clair was without telegraph facilities for some years until the Western Union Telegraph Company built a 'loop-line' from Port Huron to St. Clair some time about 1862-3 and cut St. Clair in on a wire from Buffalo to Detroit, built, I think, in 1861 over the Grank Trunk Railroad via Fort Erie, Port Colborne, Stratford, Fort Gratiot and Ridgeway. The business men of St. Clair subscribed to the cost of constructing the 'loop-line' from Port Huron and were rebated the amount of their subscriptions in tolls on their telegraph business. The Western Union office was also in my father's store.

"A few years later, about 1865-6, the United States Telegraph Company, a competitor of the Western Union, built a line from Detroit through Mt. Clemens, Algonac, Marine City and St. Clair to Port Huron. A year or so later the United States Company was absorbed by the Western Union and the United States line transferred to the Western Union office. The loop line to Port Huron was then taken down.

(Signed) Frank Kitton."

Other members of the telegraph fraternity, past or present, who have any Michigan telegraph history they desire to contribute should communicate with Mrs. M. B. Ferry at Lansing, Mich., or superintendent H. J. Kinnucan at Detroit.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager of the Marconi Wireless Telegraph Company of America, returned from a business trip to the Pacific Coast, on November 23.

MR. C. H. TAYLOR, engineer of the Marconi Wireless Telegraph Company of America, New York, has returned from Hawaii and the Pacific Coast, where he has been on company business for the past four months.

MR. W. D. TERRELL, radio inspector in charge of the second district, states that a large number of licenses of commercial operators will expire on December 13. The attention of operators is invited to paragraphs 152 and 153, page 66 of the Department of Commerce, Radio Communication Laws of the United States, edition July 27, 1914. The two paragraphs mentioned give instructions how to procure license renewals.

COOPER HEWITT WIRELESS SYSTEM.—Dr. Peter Cooper Hewitt, of New York, announces that he has about perfected a variation of the vacuum rectifier which will many times multiply the possibilities of wireless telegraphy and telephony. The same receiver is used for both wireless telegraphy and telephony and the inventor prophesies that when the transmitting apparatus is completed it will be possible to telephone directly to Europe. This he attributes to the capability of the instrument to pick up even the faintest current. Dr. Hewitt is the inventor of the mercury arc vapor lamp, the mercury arc rectifier and many other devices of great utility.

AMATEUR ARRESTED.—Lyman Sayward was arrested by Federal officers in Boston on November 24 for operating a wireless station without a license. According to the Government radio inspectors, Sayward has been annoying British merchant steamers with repeated calls.

NEWS BY WAY OF THE CHURCHES.—Magdalen Islanders will get from the Canadian Government a weekly wireless despatch of 800 words of war and other news, which the clergy will read to their congregations every Sunday morning from December to May. The Magdalen Islands are situated in the Gulf of St. Lawrence.

CAPE RACE WIRELESS STATION.—The Canadian Government's wireless station at Cape Race, N. F., is to be enlarged and improved. All the wireless stations on the Newfoundland and Canadian seaboards were taken by the admiralty at the outbreak of the European war. Since that time the Cape Race station has been operated to full capacity.

YACHT WIRELESS SEIZED AND DISMANTLED.—The wireless equipment of the steam yacht "Winchester," anchored off Stapleton, Staten Island, was dismantled by naval officers on November 26, because sending and receiving wireless messages to and from some vessels outside New York harbor was persisted in. It is thought that the "Winchester" was to act as a supply ship to the English cruisers off the coast.

RADIO COMPANY ENJOINED.—On November 13 Judge Hough of the United States District Court, New York, granted the temporary injunction sued out by the Marconi Wireless Telegraph Company against the De Forest Wireless Telegraph and Telephone Company, the Standard Oil Company and Lee de Forest. The charge was that the defendants had been and were continuing to install on the Standard Oil ships a wireless device which is an infringement of the Fessenden patents owned by the plaintiff.

RUNNING DOWN AN ILLICIT WIRELESS STATION.—A report was current in Jacksonville, Fla., on November 17 that a high-powered German wireless station, manned by three of the Kaiser's officers, had been found in a supposed sawmill in the woods near Tampa. An inspector from the Department of Commerce was ordered to Bayport, forty miles north of Tampa, to learn whether a wireless station discovered there has a license, and whether it is engaged in sending unneutral messages to ships at sea.

WIRELESS PLANT BEING INVESTIGATED.—Ernesto G. and Alessandro Fabbri, of New York and Bar Harbor, are under investigation by United States Secret Service agents in an attempt to learn if they have supplied to German agents information obtained by wireless at the Fabbri estate in Bar Harbor, where a powerful wireless plant is situated. The surveillance over the Fabbri brothers is the result of a complaint to the State Department in Washington by the British Embassy there, alleging that the German Government was obtaining wireless information in this country concerning the movements of English warships and vessels sailing under the English flag, this at a time when all wireless communication between Germany and this country was supposed to be under a strict censorship.

Easy Lessons in Technical Telegraphy.

Every student in telegraphy will find a copy of the "Correspondence School Lessons in Telegraphy" a great help in his studies. It is a telegraph school in itself and is a real practical work; it gives the student a solid foundation to build practice upon. It is elementary but fundamental, and no ambitious telegraph student can afford to be without a copy.

The first chapter deals with the simple mathematics necessary to apply to the facts and problems met with in every-day practice. Then follow chapters on electricity, gravity battery, circuits, ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement, magnetism, electromagnetism, self induction, the induction coil, the relay, the local circuit, the key, Morse circuit, "earth's" switches and switchboards, single circuits in bad weather, line leakage, static induction, testing, testing instruments, repeaters, the duplex, etc.

The book is amply illustrated and the subjects are treated in the text in simple language, so as to make it understandable to the student. Each chapter is followed by a few review questions which are very helpful in keeping the memory fresh as the student progresses.

The price of this excellent work is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Attack on Cable Station by German Cruiser "Emden" Interrupted.

A despatch to a London paper from a cable man at Keeling, Cocos Islands, dated November 12, gives an interesting account of the raid of the German cruiser "Emden" on the cable station at Direction Island and her sudden departure upon the appearance of the Australian cruiser "Sydney."

"One of the islands," the writer states, "is known as Direction Island, and here the Eastern Telegraph Company has a cable station and a staff engaged in relaying messages between Europe and Australia. Otherwise the inhabitants are all Malays, with the exception of the descendants of June Clunies Ross, a British naval officer who came to these islands ninety years ago and founded the line of 'Uncrowned Kings.'

"The war seemed to be very far away. The official bulletins passed through the cable station, but they gave us very little real news, and the only excitement was when it was rumored that the company was sending out rifles in case of a raid on the stations, and orders came that the beach must be patrolled by parties on the lookout for Germans. Then we heard from Singapore that a German cruiser had been dispatched to these islands, and toward the end of August one of the cable staff thought he saw searchlights out over the sea. Then suddenly we were awakened from our calm and were made to feel that we had suddenly become the most important place in the whole world-wide war area.

"At 6 o'clock on Monday morning a four-funneled cruiser arrived at full speed at the entrance to the lagoon. Our suspicions were aroused, for she was flying no flag and her fourth funnel was obviously a dummy made of painted canvas. Therefore we were not altogether surprised at the turn of events. The cruiser at once lowered away an armored launch and two boats, which came ashore and landed on Coral Beach three officers and forty men, all fully armed and having four Maxim guns.

The Germans—for all doubt about the mysterious cruiser was now at end—at once rushed up to the cable station, and, entering the office, turned out the operators, smashed the instruments, and set armed guards over all the buildings. All the knives and firearms found in possession of the cable staff were at once confiscated.

"I should say here that in spite of the excitement on the outside, all the work was carried on in the cable office as usual right up to the moment when the Germans burst in. A general call was sent out just before the wireless apparatus was blown up.

"The whole of the staff was placed under an armed guard while the instruments were being destroyed, but it is only fair to say that the Germans, working in well-disciplined fashion under their officers, were most civil. There was no such brutality as we hear characterizes the German army's behavior toward civilians, and there were no attempts at pillaging.

"While the cable station was being put out of action the crew of the launch grappled for the cables and endeavored to cut them, but, fortunately, without success. The electrical stores were then blown up.

"At 9 a. m. we heard the sound of a siren from the 'Emden,' and this was evidently the signal to the landing party to return to the ship, for they at once dashed for the boats, but the 'Emden' got under way at once and the boats were left behind.

"Looking to the eastward, we could see the reason for this sudden departure, for a warship, which we afterward learned was the Australian cruiser 'Sydney,' was coming up at full speed in pursuit. The 'Emden' did not wait to discuss matters, but firing her first shot at a range of about 3,700 yards, steamed north as hard as she could go.

"At first the firing of the 'Emden' seemed excellent, while that of the 'Sydney' was somewhat erratic. This, as I afterward learned, was due to the fact that the Australian cruiser's range-finder was put out of action by one of the only two shots the Germans got home. However, the British gunners soon overcame any difficulties that this may have caused and settled down to their work, so that before long two of the 'Emden's' funnels had been shot away. She also lost one of her masts quite early in the fight. Both blazing away with their big guns, the two cruisers disappeared below the horizon, the 'Emden' being on fire.

"After the great naval duel passed from our sight and we could turn out attention to the portion of the German crew that had been left behind, we found that these men had put off in their boats, obedient to the signal of the siren, but when their ship steamed off without them they could do nothing else but come ashore again. On relanding they lined upon the shore of the lagoon, evidently determined to fight to the finish if the British cruiser sent a party ashore, but the dueling cruiser had disappeared, and at 6 p. m. the German raiders embarked on the old schooner 'Ayessa' which belongs to Mr. Ross, the 'uncrowned king' of the islands. Seizing a quantity of clothes and stores, they sailed out and have not been seen since.

"Early the next morning, Tuesday, November 10, we saw the 'Sydney' returning, and at 8:45 a. m. she anchored off the island. From various members of the crew I gathered some details of the running fight with the 'Emden.' The 'Sydney,' having an advantage in speed, was able to keep out of range of the 'Emden's' guns and to bombard her with her own heavier metal. The engagement lasted eighty minutes, the 'Emden' finally running ashore on North Keeling Island and becoming an utter wreck."

A despatch from Sydney, Australia, states that the cruiser "Sydney" went to the Cocos Islands in response to the "SOS" signals sent from the cable station on Direction Island. While the wireless signals were being flashed, a rush cable message of similar import was sent to the navy office at Melbourne. This office acted promptly, sending word out in every direction at once.

Worthless Patents.

BY HARRY E. DUNHAM.

I was much interested in reading the editorial in TELEGRAPH AND TELEPHONE AGE, dated November 1, upon "Worthless Patents" because of the fact that it calls attention to some of the imperfections of our patent system.

I agree that, in many cases, patent attorneys are to blame for the condition of affairs referred to, but I also believe that, in many more cases, the attorney is in no way to blame for the issuing of worthless patents, and I do not feel that the patent office itself should be charged with misleading the inventor.

According to Sec. 4886 of the U. S. Revised Statutes "Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof * * * * * may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor." If an applicant can show that he has complied with the requirements of this statute the patent office has no option in the matter but must grant a patent. Unless the applicant can show compliance with the statute, however, the grant of a patent is refused. This being the case, why is it that so many worthless patents are issued? In the first place, the statute requires merely that the invention shall be useful; that is, of possible utility in the field for which it is designed. The applicant in his specification describing the invention makes a *prima facie* showing of its usefulness, which, in the absence of any evidence to the contrary, the patent office must accept as true. Whether it is an entirely new discovery or an improvement it is not necessary, to meet the requirement of the statute, that it should be more useful than other inventions in the same field which may come after, or which have gone before. Hence, even though it may be perfectly apparent to the patent office that the invention upon which the application is filed will not accomplish the desired result as well, or as economically, as other devices in the same field, and that, consequently, the patent, when granted, will probably be worthless, the grant of the patent cannot be refused.

Consequently, the work of the patent office is largely narrowed down to a determination of the question whether the thing for which patent protection is sought is new. It is unquestionably true that more than one patent is sometimes issued for the same thing, and, as a result, only the first patent is valid. The greater part of the blame for this condition, however, should not be placed upon the patent office but upon Congress for its failure to provide a large enough appropriation for the maintenance of the patent office to enable it to make the thorough search to which the inventor is entitled. The work in the patent office at the present time is so congested that, in some cases, the examiners do not have an opportunity to examine an application until more than nine months after it is filed and there are over 23,000 cases awaiting action by the office. Under these conditions it is impossible for the examiners to give to every application filed the time necessary to make an adequate search, and until the examining force is greatly enlarged there will unavoidably be frequent cases of patents granted for old devices.

From my own experience as an examiner and from my general observations of the workings of the patent office I believe that it may truthfully be said that the prevailing spirit in the patent office is not to grant a patent to whoever may apply, but to refuse to grant a patent if any legal excuse can be found for refusal. In fact, the zeal of the examiners in finding reasons for rejection is so great that it is believed by many that much greater wrong is done inventors by the refusal to grant patents for really meritorious inventions than by granting invalid patents.

There are, it is true, many people who believe that once they have been granted a patent they will be protected from interference in the use of the invention and that others will be prevented from using it. Unfortunately for these people, however, our government has never included in the grant the defense of the patent. Those fully conversant with patent matters are aware of the extent of the government grant, and if the inventor has any false notions in this respect his attorney should set him right. If he does not, of course the blame for the inventor's disappointment rests with the attorney. On the other hand, if the inventor acts as his own attorney and fails to acquaint himself beforehand with the extent of the protection afforded by a patent, he alone is to blame for his disappointment when he finds that he has not received all that he expected. Unless an inventor has had considerable experience in patent matters he should no more think of prosecuting his own case than he would of attempting to carry on a suit at law without an attorney.

In most instances in which it appears that two or more patents have been granted for the same device, a careful examination will reveal the fact that entirely different things have been patented in the various cases. Whether or not this is true cannot be determined by merely reading the specifications, but the claims of the patents must be taken into consideration. The case mentioned of the mechanical transmitting key is an excellent illustration of how several patents may be issued for apparently the same thing, which, as a matter of facts, are issued for things which are entirely different. One of the early patents issued in this field has a claim which reads as follows:

> "In a telegraph transmitter, in combination, a vibrator adapted to make and break an electric circuit, a key lever for controlling the operation of said vibrator, and an independent circuit controller carried by said lever."

It will be seen that this claim calls for a combination of three elements, viz., a vibrator, a key lever for controlling the vibrator, and an independent circuit controller carried by the lever. Any telegraph transmitter which comprises the combination

of these three elements to accomplish the same result will be an infringement of this patent. Hence, this patent may be said to be a basic patent on a transmitter of this type. In the mechanical development of transmitters of this class, however, great improvements have been made over the original transmitter disclosed in the patent. Many variations have been made in the specific construction of the different elements and other elements have been added to improve the operation. In order to make these improvements inventive skill has been exercised and those who have made such improvements are entitled to such protection as may be given them without subtracting anything from the original grant. In the particular construction shown in the patent there was a lever movable in one direction only for dot impulses and a supplemental key lever for sending dashes to the line. A second patent was obtained by another inventor, in which the key lever itself was movable in one direction for dots and in the other for dashes. The broad principle involved in the two patents was the same and, as was to be expected, the device constructed according to the second patent was held to be an infringement of the first patent. The first patentee, however, could not make devices like the second patent without infringement.

A situation like this may seem unjust to the second patentee because of the fact that after having obtained his patent he is unable to practice it, and hence it is worthless to him. If, however, his device is, in reality, a useful improvement over the first, it may be to the advantage of the first patentee to either buy the second patent or take a license thereunder, in order that he may use the improvements and place on the market a better instrument than the one which he described in his patent. If the first patentee does not choose to recognize the second in any way, his patent can be of use to him only for that portion of the term which is left after the first has expired. The fact should not be overlooked, however, that the first inventor is entitled to the most protection because he is the one who has disclosed to the public the broad idea. The attorney should not be blamed for such a condition, as he cannot be expected to know of all of the patents which have been issued, and, even in case he does know of the broad patent, there is always the possibility that the owner of the first patent will buy the second one when it has been granted.

Even though an attorney is perfectly conscientious in his dealings with the inventor, he may be misled by the enthusiasm of his client. A patent attorney in general practice must depend largely upon the inventor for his information as to the utility of a device. The inventor always believes that he has produced something for which there is a large field of usefulness and which is better than anything in the same line which has ever before been produced. Although the average attorney will largely discount the inventor's statements, still he may be led to believe that the idea disclosed is really valuable, when, if it could be presented to a jury of disinterested practical men thoroughly versed in the field to which it applies, it would be at once rejected as impractical and worthless. Even though the attorney may advise his client not to file an application because of the fact that the idea, though patentable, is probably worthless, the inventor will, in many cases, consider his opinion of the value of the invention superior to that of his attorney and take out a patent in spite of the unfavorable advice.

It is of course true that among patent attorneys, as in all professions, there are unscrupulous individuals to whom the interest of the client is but a secondary consideration and that a great part of the inventor's troubles are due to the glowing pictures drawn by these people of the great rewards awaiting the man who invents something. It should not be forgotten, however, that no matter how high the ethical standards of the profession may be that for numerous reasons, in addition to those I have attempted to set forth, there will unavoidably be many worthless patents issued. This condition is bound to continue until extensive changes are made in our patent system. Many remedies have been suggested, but, usually, careful consideration of the remedy has shown it to be worse than the disease which it would cure. Because of the importance and magnitude of our patent system progress in the right direction must necessarily be slow. Many able men who have the interest of the inventor and of our patent system at heart are working, however, to improve conditions, and I am optimistic enough to believe that many of those now living will see the day when most of the present evils will be cured.

[NOTE.—Mr. Dunham, the author of the foregoing, was editor of this journal for two years, resigning to become an examiner in the Patent Office at Washington. He served in the latter capacity for two years, and then became a member of the General Electric Company's staff of patent attorneys. —*Editor.*]

Valuable Book on the Telephone.

"Electricity and Magnetism in Telephone Maintenance." By G. W. Cummings. This book is one of the best on the telephone that we can recommend to the student. Mr. Cummings, the author, being the instructor of inspectors for the Chicago Telephone Company, is well qualified to teach others, and, being an excellent writer, has succeeded very well in describing in an interesting way, and in a clear manner, the facts that would ordinarily tax the ingenuity of most writers on technical subjects. The book contains a vast amount of information and covers the principles and practice of telephony in an excellent manner. It includes chapters on electrical pressure, resistance, current, magnetism, electromagnetic induction, capacity and batteries. From this it will be seen that it covers a wide range of applied electricity. It also gives rules for measurements and is well illustrated. The price of this work is $1.50, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Telephone Transmitter.

BY ANDREW PLECHER, FLORINDA, FLA.

Not quite two years ago TELEGRAPH AND TELEPHONE AGE published a number of articles in reference to a new telephone receiver in which an annular induction coil acts on the tongues of a diaphragm, having a fulcrum between an inner solid portion and an outer tongued portion, the tongues being tuned to the average pitch of the voice. The tongues receive the impulses from the core of the annular induction coil and these tongues actuate the solid portion of the diaphragm over the intermediate fulcrum, and the solid portion sets the air into vibration. For extraordinary long distance work this receiver includes a detector exactly as in the wireless art, but co-acting with the diaphragm, eliminating all choking of vibrations and allowing tuning in the full sense of the word.

The receiver needed a corresponding transmitter. From the beginning of the art membranous diaphragms were naturally thought to be the best adapted to receive sound vibrations, but they are non-conductors. Metal slabs, strips, springs were resorted to and partially metal-coated membranes were used, co-acting with springs and metal parts which in turn again destroyed the desirable property of the membrane. In the new transmitter the membranous electrode has the conductive film co-extensive and firmly united with the membrane so that the film makes continuous electric contact with the metal ring and rib by which and upon which it is stretched. Now, since and because the said electrode retains the desirable property of the membrane, namely, the pliable elastic softness and is, besides, conductive, another expanded electrode can be brought into contact which is hard without impairing the great vibratile tendency of the membrane, for, while the hard surface actuated by sound waves, vibrates to and fro, the soft membrane vibrates in rills.

The two expanded surfaces considered as electrical parts act in accordance with the principle of the electrostatic balance, the one surface being springy and yielding is attracted and pulled toward the hard surface in accordance with the charge or voltage on the opposing surfaces. Thus, although the membrance with the conductive film is very slightly separated from the hard surface when the current is broken, yet as soon as the current is made it instantly jumps into contact. Such electrostatic balance action makes the electrodes slightly convex and concave and renders them highly sensitive to sound impulses, the vibrations being of such amplitude as to equal a make-and-break contact. However the contact may be broken the circuit is not broken, since in the break position, owing to the large surfaces, condenser conditions are established so that the apparatus is at the same time a microphone, a condenser and an electrostatic balance. The higher the voltage and the softer and more elastic the membrane the better the electrostatic balance action becomes apparent. It is evident from the large contacting surfaces that a comparatively large current can be handled by the new transmitter, moreover, the new diaphragm with a fulcrum admits a larger contacting surface than the old one and makes the transmitter correspond fully with the receiver.

The new instrument compares favorably with any type of transmitter. The single-point contact type cannot handle the large current nor the entire volume of sound impulses. The multipoint or granular type, not recounting the defects of packing, frying and forming arcs, cannot have large vibrations for the reason that the granules are incapable of vibration as a whole, which is proven by the fact that sucking the diaphragm settles the granules and at once destroys the efficiency. Further, the granular type cannot have condenser conditions since one of the continuously expanded surfaces is wanting, nor can it have electrostatic balance conditions since the granules lack the property of a spring.

The new transmitter, on account of its make-and-break contact, can be connected in multiple with the induction coil. It vibrates in sympathy with receiving impulses and is not merely a microphone but a telephone proper. The receiver, although hung up, responds loudly to the call. It dispenses with bells and is therefore no longer a bell telephone.

Both these instruments promise new things. For instance, they will make a record on the phonograph and thus give us the telephonograph. The circuits can be tuned acoustically, magnetically and electrically, similar to radio apparatus.

Mr. C. T. Currier, now residing at Linden Heights, Ohio, in renewing his subscription to this publication for the thirty-first time, makes these observations as to the value of our journal: "The AGE is always a welcome visitor, and has been coming to me in my wanderings since I first subscribed for it about thirty-one years ago. The information obtained from its columns and from a book ordered as a result of an advertisement also appearing in your paper gave me the confidence to tell Minor M. Davis, the well-known electrical engineer, that he need not hang the expense on the company of sending a man to my office (Postal at Olean, N. Y.) to set up the five quadruplex and two duplex sets to be used as repeaters on two New York and Chicago quadruplex circuits, the fifth quadruplex to be set up on a New York circuit and repeat into one duplex to Buffalo and one to Pittsburgh. I guess Mr. Davis was a little doubtful about trusting the job to me, but he made no objections, and the day the new repeaters were tried out he made me feel very happy by complimenting me for the smooth working of the circuits. That was the first information of value culled from your publication. There have been a great many 'helps' found since that time. It has also told me of the passing away of many old friends and associates, the last one being Joseph W. Larish, who was always glad to help any of the old Baltimore and Ohio employes."

Are you a regular reader of TELEGRAPH AND TELEPHONE AGE?

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(*Continued from page 622, November 16.*)

Upon the organization of the Montreal Telegraph Company in 1847, O. S. Wood, whose reputation as a skilful electrician and able administrator had already reached Canada, was communicated with and invited to become its superintendent. About the same time H. P. Dwight entered the company's service.

I removed from Toronto to Chicago in April, 1853, being then a fair sound operator, and carrying in my pocket a first rate recommendation from Manager Dwight. On arriving in Chicago I applied at the telegraph office for a situation. As good fortune would have it, I was presented to Mr. Cornell. That gentleman was busy with some other matters just then, but he took time to read my testimonials, and giving me the number of his room at the Tremont House, requested me to call there at 3 o'clock that afternoon. I was promptly on hand at the time indicated, and found the old gentleman—he was then only forty-six years of age, but the worries and anxieties of an unusually busy life had deepened the lines in his smoothly shaven face and made him look older—sitting at the window looking over a book. He again read my recommendation papers, and requested me to give him a specimen of my handwriting. I did so, and it seemed to satisfy him. He then commenced a pleasant talk about telegraphic matters, making particular enquiries regarding the business in Canada; how the lines worked; the number of messages sent daily; the length of the circuits, etc., etc. He thought I was a very young man to start out as an operator—I was then fourteen years of age—and, after telling me that operators in the western country were expected to go out and make repairs when the lines were down, quizzed me as to what I would do supposing I were on top of a pole mending the wire and should lose my grip and fall to the ground. This was a poser, but I said something to the effect that if the fall did not entirely disable me, I would make an attempt to resume operations on top of that pole at once. This seemed to please him, and he smiled approval. His further enquiries were as to my ability to spell common, as well as uncommon, words; how fast I could copy by sound; whether I could copy with pen and ink as rapidly as with a pencil, and many other simple, but, perhaps, considering the importance of the engagement, pertinent questions. Of course he did not put my accomplishments as regards spelling to the test, but had he done so I was prepared to give a good account of myself, for I believed, at that time, if I could do anything well, it was to spell all sorts of words in common use correctly. A little incident which took place in Toronto office had a stimulating effect upon me in this respect and served to urge me on to conquer the biggest and toughest words extant. The entry clerk at Toronto in addressing, on a certain occasion, envelopes in which were to be enclosed message for delivery, had one for Charlie Gates, the keeper of a race course on King street, east of the Don River. This he addressed "Charlie Gates, Race Corse." Manager Dwight, on looking over the messages before the messenger left the office, to see that all was right, discovered the grave blunder, and the lecture he gave that unsophisticated clerk on bad spelling was "a teaser." He explained that there were three or four words pronounced almost alike, but each with a different meaning, viz.: course, coarse, corse, and curse. Corse, he said, meant a dead body. What would Charlie Gates have said had he received an envelope with an inscription on it so suggestive of gloom and agony and his latter end? He informed the now frightened clerk that the proper way to address the message was "Race Course." Mr. Dwight's language was neither coarse language, nor curse language, nor corse (dead) language, but it was language lively, refined, and effective. He wound up by recommending to the bucolic young man a course of Lindley Murray, telling him that unless he mended his ways he need never aspire to become a useful member of society or to take a prize at a spelling bee. The poor fellow, whose skin was of the pachydermatous order, soon got over his word-castigation, but as I listened to it all I vowed never to lay myself open to such an overhauling. I was, therefore, pretty well up in spelling.

But to return to Mr. Cornell. Coming down to business, that gentleman enquired how much salary I had been receiving at Toronto, I replied, $20 per month. (This was then considered liberal payment for a youth of fourteen.) After cogitating a short time, Mr. Cornell said he thought he could improve upon that and would give me $21 per month. This certainly was not what might be called a munificent increase, but it was, as Mr. Cornell remarked, an improvement, though a slight one, upon the remuneration I had been receiving in Canada, and I arranged to go to work next day. After being employed at general clerical work in the Chicago office for a few days, I was ordered to Laporte, Ind., to relieve a Mr. Milliken, who was editor of a newspaper, as well as operator, at that place. Of course, I only relieved him of his telegraphic duties. Mr. Milliken, like all editors of newspapers, was a gentleman and a scholar, but he was a poor telegrapher, and used paper, being unable to read by sound, that is, his office was provided with a telegraphic register, and he received messages by means of the characters traced on the tape as it ran through the instrument. That register, too, was a curiosity—I should, perhaps, say a monstrosity. It was more like a miniature modern threshing machine than a telegraph instrument, and it was not so very miniature either. When the wheels were in motion the buzz and burr and whiz was terrific, completely drowning the sound of the lever as it worked between the magnets and rollers, and effectually preventing one, were he ever so competent to do so, from reading by sound. I thought how different were the registers they use in the Hoosier country from the neat and simply constructed Chubbuck registers, with their almost noiseless running motion and loud sounding lever, in use in Canada.

After remaining at Laporte a couple of weeks, I proceeded thence to Plymouth, Ind., and remained there a month, teaching an operator, Daniel McDonald, who was also postmaster. The wagon road from Laporte to Plymouth, about fifty miles, ran mostly through the woods, and crossed the Kankakee river a considerable distance back of Laporte. The Kankakee at this point was a great rendezvous for snapping turtles and black snakes, and while crossing the long, ricketty old bridge we could see large numbers of these reptiles down below, sprawling about in the mud and slime, while others had sought advantageous positions on logs or tufts of moss, on which they reclined, lazily basking in the sun. The country between Laporte and Plymouth was full of game, and it was a common occurrence for a deer to run across the road from one side of the woods to the other in front of the team; and at one wayside inn at least there was quite a herd of deer in an enclosure, among which were a number of spotted fawns. "Bob White's" cheery note could be heard in all directions. Raccoons were also very plentiful. As we drove along large flocks of beautiful doves, such as we see in cages in Canada, rose at frequent intervals from the middle of the road, and alighting on the trees by the wayside, remained there until our vehicle had passed, when they returned to their grub on the road again, just as sparrows do here. I found that the Hoosiers did not encourage shooting these birds. The line between Laporte and Plymouth was often down, sometimes falling in the ditches along the roadside, and as these ditches were swarming with black snakes, it was with considerable trepidation that we entered them to handle the wire. Rattlesnakes, and a venomous hooded snake, and other species of the great Ophidian family, were also numerous on the higher grounds.

While on a line-repairing excursion one day, we stopped at a country house for dinner. On reaching the place we saw quite a display of dead birds hanging up around the back door. The most attractive of the collection was a large crane, a handsome bird which, when standing erect, must have been five feet high. We had some distance further to go, but arranged to return in time for dinner, which we did. At dinner, instead of the never-failing ham and eggs, we were proffered a treat in the shape of wild goose. My companion and myself were both ravenously hungry and we ate heartily of the dark-colored wild goose meat. After dinner, in looking around the back premises, we noticed that the crane had disappeared, and on further investigation we elicited the fact that we had eaten it for dinner—it had been palmed off on us as roast goose. Upon remonstrating with the old chap who kept the place, he, with a knowing gleam in his eye, acknowledged the deception, but said that so far from being considered unfit to eat, the people out there deemed a good fat crane (isn't this an anomaly?) superior to any other feathered game. I was not so sure about this. Without any pretensions to the whimsically fastidious taste of an epicure, I thought there were too many snakes in that country to permit of one ever acquiring a consuming desire for roast crane.

From Plymouth I was ordered to Logansport, Ind. John Duret had charge of the Logansport office and having obtained a few holidays, I was sent to relieve him. Duret went off on his vacation on the day I reached Logansport. For reasons best known to himself he never returned and the management of the office devolved upon me.

Mrs. Moore, with whom I boarded at Logansport, a kind and motherly lady, one for whom I shall always entertain the warmest feelings of gratitude, nursed me through a rather severe attack of typhoid fever. The disease was epidemic, and a great many deaths took place from it in Logansport at that time. At Mrs. Moore's was an intelligent and good looking young negress, about eighteen years of age, a slave, owned by friends of the Moore family residing in Kentucky, then a slave state, and who was "loaned" to the Moore's to help as a domestic for a season. Indiana was, of course, a free state, but this young girl had no idea of making her escape, and was willing to return "home" whenever her services could be dispensed with. It might be of interest to mention here that nice peaches could then be bought at Logansport for five cents a bushel. The shade and ornamental trees on the streets were principally peach trees. Large watermelons could be bought for a cent apiece.

I left Logansport for Chicago in the fall of 1853, having been absent about six months. The Wabash Canal was in full operation in those days, and for long stretches the wires ran alongside the canal. On leaving Logansport I sailed down the canal, not on a canal boat, but on a packet—a packet on the canal is equivalent to a parlor car on the railway—Governor Wright of Indiana was a passenger. He had a young son about my own age with him, and he and I became very chummy. On reaching Lafayette I called at the telegraph office and met Mr. Haas the manager and had a short visit with him.

Frank Speed, a son of J. J. Speed, a pioneer in Western telegraphy, succeeded me at Logansport. On returning to work in Chicago office, I saw a great deal of Mr. Cornell. About this time an attempt was made on Mr. Cornell's lines to effect a change in the telegraphic alphabet by substituting the letter K for the letter C, and C for K, J for R and R for J. It had been discovered at that early date that the occurrence of spaced telegraphic letters in such words as iron, corn, coin, perceive, conceive, and other words that will readily occur to telegraphers, was the cause of frequent and sometimes serious blunders; but the attempt to effect the transposition of these letters was attended with so many mistakes, particularly in the addresses and signatures of messages, that, after a trial of several months, the innovation was abandoned and the old style again restored. The telegraph business up to this time had not yet "evolved" either a battery-man or a line repairer. During the winter of 1853-54 Mr. Cornell was around Chicago a good deal of the time, and that gentleman and myself often came down to the office on Sunday forenoon to clean the battery. It was a Grove battery of about sixty cups, and as it was

only cleaned once a week, it required a careful and complete furbishing up. We amalgamated the zincs and weeded out all the defective ones. The fumes arising from the sulphuric acid during the cleansing process almost stifled us, and we had frequently to leave the room to great a breath of fresh air.

Mr. Cornell was particular in examining the platina connections to see that none were defective. He took great pains to explain the disastrous effect one faulty connection would have in a battery which was in every other respect perfect. We worked two lines out of this battery. Mr. Cornell was probably as well informed as regards all kinds of telegraphic appliances, wire connections, and galvanic electricity, as any one engaged in the business at that time, and his conversation was exceedingly interesting and profitable. Moreover, he seemed to take a pleasure in giving his young assistant battery-man the benefit of his superior knowledge in electrical science. I do not know whether Mr. Cornell is entitled to the credit of having made the discovery that it was practicable to work more than one line out of a single main battery, but in Canada up to that time separate main batteries were employed for each separate line, and it was only after it had been learned that in Chicago a number of lines were worked from the same battery that an attempt was made to do the like in Toronto. I never knew Mr. Cornell to personally send a message or do any work at the instruments, but I have every reason to believe that he was *au fait* in this as well as in cleaning batteries. A little incident which took place one afternoon confirms me in this impression. The line to Toledo had been down for a couple of days —no very unusual occurrence. When it came "O.K." again, a good-sized pile of messages was waiting for me to forward. I entered upon my task with much energy, and, as Mr. Cornell was sitting near the instrument table, I was ambitious to show him how fast I could reduce the pile; and, being aware that I was sending to a good receiver, I resorted to a good many little artifices, intended to save time by shortening up on the full complement of dots and dashes. Among other little vain tricks was to omit the full stop, or period, at the end of the address before commencing the body of the message. Mr. Cornell listened for a while, and then deliberately walking over to my table, said: "Now, I know you are a pretty good operator and good sender, but I would rather you would put in the period after the address. It's the rule, and it should be observed in every instance, as it prevents the address from becoming mixed up with the body of the message, and may some time save a mint of trouble." I felt crestfallen, humiliated, guilty. My little scheme had been easily discovered and exposed, and instead of being complimented for my fast work, as I anticipated, I was chided, though mildly, for not obeying the rules. I knew after this that Mr. Cornell could read by sound.

(To be Continued.)

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

(Page 80.) How does the diaphragm of a telephone receiver vary the reluctance of the magnetic circuit?

What is the effect of varying the air gap between the diaphragm and the pole pieces of a telephone receiver?

Does the e.m.f. set up in the coils act in one direction?

Was there any difference between the original Bell receiver and transmitter?

Why cannot a telephone receiver be used also as a transmitter?

(Page 81.) What is the effect on the magnetic field of increasing the strength of the current?

When the current decreases what is the effect on the magnetic field?

How does the magnetic field of an alternating current behave?

If the lines of force around one wire cut across a second wire, what will be the effect upon the latter?

If the primary current is alternating how will the secondary behave?

When the primary current is increasing in value what is the direction of the secondary current, and when the primary is decreasing what is the direction of the secondary?

If the secondary wire is at right angles with the primary will the lines of force in the primary have any influence on the secondary?

What is the effect of introducing an iron core in a coil of insulated wire?

In an induction coil what ratio exists between the primary and secondary electromotive forces?

(Page 83.) What is the function of a telephone repeating coil?

In a telephone induction coil how is the secondary current made higher than the primary?

What is the difference between such a coil and electric light and power transformers?

How are losses in transformation allowed for?

What winding of an induction coil or a transformer is usually designated the low resistance winding?

What is the unit of electrical power and how is it found in a given circuit?

If the primary voltage in a transformer is stepped down in a ratio of ten to one, what will be the available current in the secondary?

Why was the great increase in the practical application of electricity made possible through the use of alternating current?

(To be Continued.)

THE RAILROAD.

W. G. VAN VLECK, aged fifty-seven years, vice-president and general manager of the Sunset Central Railroad system, and a former telegrapher, died in Houston, Tex., November 10. He was born in Elbridge, N. Y., and entered the railway business in 1873.

PROCEEDINGS OF NEW ORLEANS CONVENTION.—The report of the proceedings of the New Orleans convention of the Association of Railway Telegraph Superintendents, May 19-22, has been issued. It makes a volume of 330 pages, and is gotten up in the association's standard style. Mr. P. W. Drew, secretary of the association, has done well to get the report out in good season.

TOPICS COMMITTEE ASSOCIATION RAILWAY TELEGRAPH SUPERINTENDENTS.—Mr. E. P. Griffith, superintendent of telegraph, Erie Railroad, Jersey City, N. J., has been appointed a member of the topics committee of the Association of Railway Telegraph Superintendents, in place of Mr. W. P. Cline. The committee now consists of J. F. Caskey, chairman; E. P. Griffith and W. Marshall.

TELEPHONE TRAIN DISPATCHING ON THE CEDAR RAPIDS & IOWA CITY RAILWAY.—The Cedar Rapids & Iowa City Railway has in successful operation a telephone train dispatching equipment. This railroad runs from Cedar Rapids south to Iowa City a distance of approximately thirty miles with a branch going east from Cedar Rapids to Mt. Vernon, a distance of fifteen miles. The passenger trains on these lines are operated by electricity and the freight trains by steam. Ten way (or open) stations are equipped with telephone and selective signaling apparatus. Selector sets containing the Western Electric selector are used for signaling the way station operators while the self-contained folding gate telephone arm is used for the operators' talking apparatus. Six way station outfits are installed between Cedar Rapids and Iowa City and the two between Cedar Rapids and Mt. Vernon. The power house, the superintendent's office and the shop are also connected with the telephone dispatching circuit. The dispatcher is located two miles south of Cedar Rapids. A portable telephone set has been furnished to each train crew so that communication may be had with headquarters at various points along the line.

Overhead Wire Crossings.

At the meeting of the American Railway Association in Chicago on November 18, the specification of the American Electrical Railway Engineering Association for overhead crossings of electric light and power lines was adopted as recommended practice.

The committee advised that consideration of overhead crossings for telegraph and telephone lines had been referred to a sub-committee which has been in conference with similar committees of the American Railway Engineering Association and the American Electrical Railway Association. The sub-committee recommended the adoption of the telephone, telegraph and signal wire crossing specification prepared by the Association of Railway Telegraph Superintendents, with the exception of one paragraph relating to minimum clearances of poles from railway tracks. The side clearance specified by the telegraph superintendents was not considered sufficient, and it was recommended that the minimum clearance of poles be made to conform to that established for the transmission line crossing structures.

The specification which the committee offered has not been definitely acted upon by the engineering associations, but the committee thought it desirable to place on record at this time the essentials of a matter which is of immediate and increasing importance to railroads, and the committee, therefore, offered the specifications for adoption as recommended practice of the association. The association took action accordingly.

Inductive Interferences on Railway Telephone Circuits.*

BY S. L. VAN AKIN, JR., ASSISTANT SUPERINTENDENT, NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, SYRACUSE, N. Y.

Our experience in inductive disturbances dates from 1904 in so far as telephone circuits are concerned. Prior to that year the railroad telephone service was limited to city service and to local yard circuits. Many of the latter were run straight without transpositions, some were quiet, and some were noisy, but as they were workable everybody appeared satisfied.

Looking backward at the construction methods employed—metallic circuits strung on the end pins of a cross-arm with three or four telegraph wires on the intervening pins; one wire on one arm and one wire on another arm, etc.—we can realize what progress has been made in construction methods, improved service and the neutralizing of inductive disturbances.

Our first long distance telephone circuit, New York to Buffalo via the West Shore Railroad route and a similar circuit Buffalo to Chicago via the Lake Shore route was constructed in 1904 and was transposed every half mile. Although the advice of prominent engineers was followed the circuit for through service New York and Chicago did not give satisfactory transmission until the fall of 1906.

This bit of New York Central history establishes the date of, or, the awakening so to speak to inductive disturbances on long haul circuits.

The first serious inductive disturbance to normal conditions did not make its appearance until 1907 or 1908, on the section between Buffalo and Cleveland. This was traced to the automatic printer in Western Union service. After covering the line time and again, extra transpositions were cut in without diminishing the effect and finally, instead of devising some means to overcome it, the printer was transferred to the Nickel Plate route and the long distance circuit was again normal.

* Paper read at meeting of Eastern Division Association of Railway Telegraph Superintendents, New York, November 11.

The next source of induction was the construction of a paralleling three-phase transmission line designed to carry 60,000 volts. This line follows our West Shore route, crosses over us several times and is partly built on the right of way for 113 miles from Oakfield to Syracuse.

Mr. A. B. Taylor kept in close touch with the construction and arranged to transpose the transmission line every four miles. Under normal conditions, no serious induction is noticeable but the line is a constant menace to both telephone and telegraph service on this route. In case one wire of the three-phase system becomes grounded, or, when one wire is thrown out and a wire on alternate route employed thus breaking up the normal conditions, induction is thrown into the West Shore line and both telegraph and telephone circuits are unworkable; telegraph relays buzz or chatter, telephone circuits roar, telephone selectors vibrate continually, fuses are blown and arresters grounded. These serious interruptions are not frequent but are a constant possibility. Occasionally telegraph relays will buzz for a few seconds and usually we have protector grounds to clear. This latter induction of a few seconds duration is quite frequent and is somewhat of a mystery. My opinion of the cause and effect is that it can be charged to carbon smoke.

When black smoke from a locomotive envelopes the transmission line wires, flashes are seen in the smoke resembling lightning and if this smoke settled or floated in one mass from our lines to the power transmission line it follows that we would get the induction effect.

The longest interruptions experienced was one of four days and another of two days; others have been of comparatively short duration. During one of these, a cable pole at Buffalo was set on fire and burned; switchboards at Buffalo and Syracuse were set on fire, 37A repeating coils were heated to such an extent that the resinous filling about the coils ran out to the floor like water, Argus arresters were grounded and fuses blown for eighty-eight miles east of the terminal of the transmission line.

Against this induction we are helpless. We follow up the power company to hasten repairs and to establish normal conditions and when this is done, we clean up our protectors and get the wires in service as quickly as possible.

INDUCTION FROM 22,000 VOLT TRANSMISSION LINE ON PHOENIX BRANCH BETWEEN FULTON AND PHOENIX, N. Y.

This line parallels our right-of-way for about nine miles and is only a few feet from our pole line and was put in service about three years ago. At that time we had only one railroad telegraph wire on this route. Induction was noticeable at all times and relays could be adjusted to show it at any time and at times it interfered with the working of the wire. A possible remedy would have been to string a ground wire all the way or to build a new pole line on the opposite side of the track. This expense was not incurred as the wire was workable but shaky. Two years ago we strung a copper telephone dispatching circuit on this route with transpositions about every half mile. The induction caused the telephone circuit to be slightly noisy and extra transpositions were cut in which transposed it every quarter of a mile. The circuit is quiet but the wires are heavily charged from the induction and when working on them the linemen cannot work bare handed. On one occasion in cutting in an additional office one man received such a shock that he barely saved himself from falling off the pole. Last winter during a sleet storm one side of our telephone dispatching circuit broke down. One lineman tried to put it up and finally succeeded but he advised making several attempts before he could get the wire closed on account of the induced current on it.

(To be Continued.)

MUNICIPAL ELECTRICIANS.

Electrolysis of Reinforced Concrete.

In the report of the committee on electrolysis at the Atlantic City convention of the International Association of Municipal Electricians, Mr. Leon Taylor, the chairman, said the Bureau of Standards found that the cause of the cracking of reinforced concrete when the reinforcing material discharges current into the concrete is due to the formation of rust upon the anode only at temperatures around 100 degrees Fahrenheit, and that damage to the concrete is therefore not to be expected unless the density of the discharge is very high or some other conditions keep the concrete above the critical temperature. The addition of a fraction of one per cent of salt to concrete increases its conductivity and destroys the passivity of the iron, thus multiplying the corrosion many hundred times. Salt should, therefore, never be used in structures that may be subject to electrolytic action.

The passage of current from the concrete to the reinforcing material has been found to cause a softening of the bond between the iron and the concrete due to the accumulation of alkali there. The danger from electrolysis of concrete is greater where the current flows to the reinforcing material than where the current flows from the metal to the concrete. The passage of a current through unreinforced concrete has no effect upon the concrete other than that produced by the heating effect of the current. Electrolytic corrosion seems to be independent of the quality of the iron.

Fire Chiefs and Fire Alarm Superintendents.

Mr. H. C. Bundy, former superintendent of fire telegraph, and now chief engineer of the Watertown, N. Y., fire department, read a paper at the convention of the International Association of Fire Engineers held at New Orleans, La., October 20-23, entitled: "Best Methods to be Used by a Fire Chief Who is also Superintendent for a Fire Alarm."

"Of late years," he said, "the telephone has come into such general use that this means of sending in an alarm is often resorted to. On first thought this would seem an ideal way, as the exact location of the fire could be given, but this practice is discouraged as far as possible by fire chiefs and fire department officials the world over. In the confusion and excitement that invariably exists in the time of fire, someone rushes to the telephone, shouts

a street and number and then rushes back to the fire, without assuring himself that his directions have been understood or even heard, by the man on the other end of the line. As a result, oftentimes valuable time is lost, and the small fire becomes a conflagration, beyond the control of the fire department. For a city the size of Watertown we have one of the finest fire alarm systems in the country. In the care of this system, the superintendent of fire alarm has one assistant at all times, and what other help he might need at other times. I wish to state right here that in my opinion a chief should at all times furnish his superintendent of fire alarm all the help he needs in taking care of his system, for there is no economy in having one or two men drag along on a job two or three days that three men could do in a day, especially fire alarm work that needs to be done immediately. At times I have found it necessary at some seasons of the year when we have had trouble with our overhead wires, and in installing underground cable, to use a man from one, possibly two companies to assist in fire alarm work, but the results were worth the temporary inconvenience caused by so doing.

In enumerating some of the methods used by our superintendent of fire alarm, it will be necessary for me to go into detail in regard to a few of the duties that he must do himself. Every morning and evening he takes a reading from his charging board, and this record is filed away for future reference. Once every month every street box on the fire alarm system is rung in and a record kept of the same. These duties together with his other work makes quite a busy man of the superintendent of fire alarm, and I can't see where he could assume the duties of chief of a fire department, and do justice to the office. In my opinion the first method to be used by a fire chief, who is superintendent of fire alarm, is to divorce the two positions and turn his attention to making one profession a success. While I do not think it is practical for a chief of a fire department to be superintendent of fire alarm, I think a chief should co-operate with his superintendent of fire alarm. To do this it is necessary for the chief of a fire department, at times, to come down from that elevated pedestal of authority and have a good heart to heart talk with his subordinate, and get closer together. There are a hundred and one minor suggestions that a chief can offer the superintendent of fire alarm, and there might be a few things the superintendent of fire alarm could hand the chief. The chief that is a success in his department to-day is a man that is ready and willing at all times to co-operate with his subordinates, for they are the men that help him to lower the fire loss in his city or town.

Mr. J. W. Storror, of the Pacific Telephone and Telegraph Company, San Francisco, Cal., and for many years general superintendent of the Postal Telegraph-Cable Company at that point, writes: "Once more it becomes my pleasant duty to renew my subscription to TELEGRAPH AND TELEPHONE AGE. I wonder if you realize how much we all get for the little investment?"

Entertainment of the New York Telegraphers' Aid Society.

The annual entertainment and reception of the New York Telegraphers' Aid Society, for the benefit of the relief fund, took place on the evening of November 17 at the Lexington Avenue Opera House, New York, a large number of telegraphers and their friends being present. The programme was arranged with excellent taste, and consisted of eight parts of vaudeville entertainment of the highest class. At the conclusion of the vaudeville dancing was indulged in by many, the programme including the fox trot, the hesitation and other modern dances.

Mr. A. M. Lewis, president of the society, and his assistants deserve much credit for the successful manner in which the entertainment was planned and carried out.

Mr. W. J. Quinn was chairman of the reception committee and was ably assisted by Messrs. J. F. E. Hopkins and J. C. Watts. The floor committee was headed by Mr. J. Williams, assisted by Messrs. F. J. Sheridan and A. F. Kavanaugh.

The entertainment committee consisted of twenty-nine members, headed by Mr. R. J. Marrin, and the excellent results of its work was evident and recognized by all.

The officers of the society are: A. M. Lewis, president; J. F. Zeiss, vice-president; T. M. Brennan, treasurer; C. A. Kilfoyle, financial secretary; Mary E. Saunders, recording secretary.

Executive Committee—W. W. Price, E. J. Oakley, R. J. Marrin, J. J. Keefe, Miss S. Dougherty, J. L. Young, D. H. DeBaun, A. J. Fancell, E. F. Howell, J. V. Riddick, F. J. Sheridan, A. J. Gillman.

Relief Fund—E. F. Howell, Miss S. Dougherty, W. W. Price.

Auditing Committee—F. J. Nurnberg, J. F. E. Hopkins, H. M. Heffner.

Trustees—T. M. Brennan, J. C. Robinson, Gardner Irving.

The relief fund, for the benefit of which this annual entertainment is held, provides funds for defraying the expenses incident to the sickness and deaths of members of the telegraphic profession in New York, who are not qualified for membership in any of the existing organizations. The society is receiving very liberal moral and financial support from the telegraph companies as well as from the telegraph fraternity in and about New York.

The financial result of this year's entertainment was very gratifying and a substantial sum will go to the credit of the fund.

The hall was tastefully decorated and every one present had a very enjoyable time.

The San Francisco Telegraph Tournament.

Interest in the telegraph tournament to be held in San Francisco in May next year is growing rapidly in all sections of the country, judging from letters and reports received. From present indications it will be the most successful affair of the kind ever held in this country, and those in charge of the

tournament are working hard to make it so. As has already been stated, it is planned to hold elimination contests in all cities possessing sufficient telegraph talent to warrant it, and only the winners of these preliminary contests will compete in the finals at San Francisco. This will make the tournament a contest between the real champions.

The prizes will be attractive and liberal and will be worth going long distances and contending for. It is stated that the first prize may reach the sum of $1,000 in cash, but its size will be largely dependent upon the liberality of contributors.

The dates selected for the tournament are May 27, 28 and 29. It is urged that expert operators put forth their best efforts henceforth, both at sending and receiving, in order to participate in this contest.

In our issue dated November 1 was given a full list of the names of the members of the executive committee, the eastern advisory board, and others concerned in making a success of the undertaking.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 577 to meet the claims arising from the deaths of S. W. Wetmore at Anamosa, Iowa; W. A. Cusher at Philadelphia, Pa.; F. J. Kihn at Astoria, N. Y.; J. J. Martin at Buffalo, N. Y.; F. L. Brenziger at West Falls Church, Va.; W. H. Anthony at Boston, Mass.

Mr. R. L. Hanners, San Pedro, Los Angeles and Salt Lake Railroad Company, Caliente, Nev., in renewing his subscription for another year, writes: "I value your paper very highly and have boosted for it at every opportunity."

MR. JOHN LONEGRAN, of Marysville, Kan., one of the brilliant old time and military telegraphers during the civil war, now living in retirement at that point in remitting to cover his subscription for another year, writes: "The AGE does not grow old and renews my youth."

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

W. F. Murray has been advanced to the piece-work grade and assigned to the Pittsburgh circuit days. Mr. Murray has made a consistently good record for six months.

As usual, the Philadelphia squad aided manager Dean in handling the telegraph arrangements for the Princeton-Yale football game at Princeton's new stadium. Managers Crouch and Maloney, of Trenton, also lent able assistance.

Night special officer Henry Schyrie, of the protective service department, died suddenly at his home November 21. Death was due to heart disease. Mr. Schyrie has been connected with the burglar alarm service for a number of years.

M. R. Hansberry is another of our capable men who has recently been advanced to the bonus class.

L. J. Floum and J. P. Collins of the operating staff, have resigned.

Fire, starting in an adjacent store, burned out our Coatesville, Pa. office ,on November 21. Temporary quarters were quickly established and there was no service interruption. J. F. Logan is manager.

CHICAGO WESTERN UNION.

Mrs. Mary A. Hanson died November 22. She had a record of long service with this company and was retired on pension several years ago. She was prominent in various patriotic societies and social and charitable movements of the Chicago office.

ST. LOUIS WESTERN UNION.

A number of deaths have occurred recently in the families of local Western Union officials, among them being the wife of Mr. G. R. Alger, chief operator, on November 20, and the wife of Mr. W. J. Armstrong, district traffic supervisor, on November 22. The mother of Mr. H. G. Gosting, chief operator at Kansas City, Mo., and formerly assistant chief operator at St. Louis, died on November 19.

Telegraph and Telephone Age

No. 24. NEW YORK, DECEMBER 16, 1914. Thirty-second Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Wire Joints.

The jointing of wires is one of the most important things to be looked after in telegraph line building and in office wiring. In former years, when system and science were not so much in evidence as they are these days, the importance of wire joints was not wholly appreciated and the result was that many wires possessed abnormally high electrical resistance on account of the poor joints. They were veritable "bug traps."

The great aim to be attained in making a wire-joint is to avoid introducing the seeds of future resistance, and in order to do this successfully joints must be made with the greatest of care.

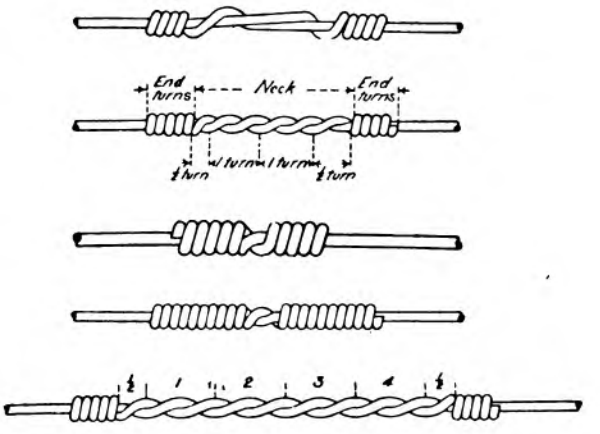
There are several kinds of joints for iron wire, but the telegraph companies are now using only one kind, which has been proved by tests and experience to be the best. Copper wire, which is now employed extensively for telegraph purposes, as well as for telephone lines, is handled differently on account of the different characteristics of the metal. Hard drawn copper wire, such as is used for telegraph and telephone lines, is rather brittle and easily injured, and nicks and abrasions introduce mechanically weak spots that soon result in breaks. Short bends and kinks are also to be avoided because, in attempting to straighten them out, the wire is liable to break at such points.

In the accompanying illustration five typical forms of wire joints are shown. For the present we are concerned with the second one from the top, because it represents the standard joint of the Western Union and Postal Telegraph-Cable Companies. The technical terms for the different parts of the joint are there given.

The Western Union specifications for iron-wire joints calls for two and one-half twists in the neck and five end turns—that is, five turns at each end of the neck. The entire joint is then soldered.

When iron wires are to be jointed the two ends must first be cleaned so that the bright metal is seen, and after the joint is made a flux must be applied before soldering, to insure a secure and reliable union. When the joint is finished it must be wiped off with common machine oil, to neutralize the acid and prevent corrosion.

The Postal company also uses iron sleeves in making joints in new iron wires, the sleeves being made to fit the different gauges of wire. In making sleeve joints the ends of the wire are passed through the sleeve until they extend one-quarter



WIRE JOINTS.

of an inch beyond the end of each sleeve. Then each sleeve is given three complete turns. Special connectors are used for twisting these joints.

Joints in copper wire are always made by means of copper sleeves. This is the common American practice. The sleeves consist of two tubes fastened together one above the other. Into these tubes the ends of the line wires are inserted and twisted in the manner described, special tools being used for the purpose.

All the joints shown in the illustration look strong and reliable, but in reality they differ considerably in this respect. Tests made on iron wire joints established these facts: (1) End turns do not have much holding power; (2) most of the holding power of a joint is due to the turns in the neck; (3) a joint having five properly made turns in its neck will be as strong as the wire from which it is made and will yield but little when stressed.

In these tests it was also shown that almost any joint, if soldered, would develop a strength greater than that of the wires composing it. It

would seem, therefore, that any of the joints shown might ordinarily be depended upon if soldered.

Tests were also made with wires of different sizes, and it was proven that five turns in the neck always made a safe joint, and that two turns at each end were ample, although five end turns were recommended for appearance sake.

In office wiring jointing does not require as much care as do line-wire joints, because there is practically no strain placed upon them and they are not exposed to the weather. Yet such joints should not be slighted, as much depends upon their being firmly made. "None is too good" is a safe rule to work by in making joints of any kind.

Telegraph and Telephone Patents.

ISSUED NOVEMBER 17.

1,117,156. Secret Telephone Exchange. To R. M. Beard, New York.

1,117,212. Automatic Telephone Exchange Apparatus. To F. R. McBerty, New Rochelle, N. Y.

1,117,215. Telephone-Toll Device and Circuits Therefor. To J. L. McQuarrie, Montclair, N. J.

1,117,231. Loud-Speaking Transmitter. To J. C. R. Palmer, Brooklyn, N. Y., and A. P. Pinkler, Weehawken, N. J.

1,117,290. Semi-Automatic Telephone System. To A. W. Weiss, Chicago, Ill.

1,117,297. Telephone Exchange Systems. To J. L. Wright, Washington, D. C.

1,117,407. Telephone System. To E. Land, and F. L. Fisher, Grand Rapids, Mich.

1,117,681. Spark-Gap for Wireless Telegraphy. To J. Loeffler, Vallejo, Cal.

1,117,832. Signaling System. To H. C. Goldrick, San Francisco, Cal.

1,117,864. Signaling System. To M. E. Launbranch, Chicago, Ill.

ISSUED NOVEMBER 24.

1,118,004. Art of Transmitting Sounds by Means of Hertzian Waves. To W. Harrison, New York.

1,118,120. Selective Signaling Device. To M. F. Geer and R. C. Leake, Rochester, N. Y.

1,118,230. Telephonic Instrument. To G. R. Preusse, New York.

1,118,410. Coherer. To C. A. Glass, Greensburg, Kan.

1,118,490. Automatic Telephone System. To D. S. Hulfish Toronto, Ont., Can.

1,118,650. Printing-Telegraph Alphabet. To D. S. Hulfish, Toronto, Ont., Can.

1,118,655. Calling Device. To W. Kaisling, Chicago, Ill.

1,118,780. Telephone Transmitter. To A. D. Jones, Philadelphia, Pa.

1,118,910. Automatic Telephone System. To A. H. Dyson Chicago, Ill.

ISSUED DECEMBER 1.

1,118,925. Harmonic Ringer. To J. Erickson, Chicago, Ill.

1,118,926. Telephone System Receiver. To J. Erickson, Chicago, Ill.

1,119,083. Telephone System. To B. G. Jamieson, Chicago, Ill.

1,119,117. Telegraph Transmitting System. To E. R. Barker, Wimbledon, England.

1,119,131. Telephone Relay. To H. G. Webster, Chicago, Ill.

1,119,301. Telephone Table Instrument. To G. B. H. Meyer, Hamburg, Germany.

1,119,355. Telephony. To M. L. Johnson, Chicago, Ill.

1,119,366. Support for Telephone Receivers. To H. W. Münch, Arlington, Mass.

1,119,394. Telephone System. To J. G. Blessing, Chicago, Ill.

New York Stock Exchange Reopened.

The New York Stock Exchange was reopened on December 12 for trading in stocks, some of the active ones being restricted. The financial situation having so much improved, the governors decided that open dealings could now be conducted without serious disturbance of the money and credit situation. The Exchange closed on July 30 to avert financial disturbances as a result of the European war.

Following are the closing quotation of telegraph and telephone stocks on the reopening day, December 12:

American Telephone and Telegraph Co.	117⅛
Mackay Companies	
Mackay Companies, preferred	70
Marconi Wireless Tel. Co. of Am. (Par value $5.00)	2⅜
Western Union Telegraph Co.	58⅜

PERSONAL.

SENATOR CHARLES E. GRAHAM, of New Haven, Conn., was a recent New York visitor. He called on numerous friends while in the city.

MR. MORSE-RUMMEL, grandson of Professor S. F. B. Morse, inventor of the telegraph, is a violinist of exceptional ability, and has played with celebrated artists in Europe and America. He recently participated in a concert in Richmond, Va., and was well received.

MR. DAVID B. MITCHELL, of New York, one of the best-known old-time telegraphers in the country, is seriously ill at his home at New Rochelle, N. Y. Mr. Mitchell was manager of the race bureau of the Western Union Telegraph Company and was president of the Serial Building Loan and Savings Institution for many years.

MR. CHARLES R. UNDERHILL, chief electrical engineer, The Acme Wire Company, New Haven, Conn., lectured on electromagnets before the senior and junior electrical engineering students at Union College, Schenectady, N. Y., on December 3. Mr. Underhill showed that the characteristics of all forms of continuous and alternating-current electromagnets may be predetermined when Maxwell's

fundamental equation is properly interpreted, and this involves a thorough knowledge of magnetic leakage.

MR. CARL HEINRICH VON WIEGAND, the representative of the United Press, New York, who recently interviewed the Crown Prince of Germany, is an old-time American telegrapher. He was employed by the Western Union Company as an operator for many years in San Francisco until he became identified with the Associated Press at that point about ten years ago. Three years ago he became associated with the United Press interests and was appointed its representative at Berlin, Germany. Mr. Von Wiegand retains many of his old associations in this country and is a member of the Telegraph and Telephone Life Insurance Association. The interview with the Crown Prince is regarded as a master stroke in journalism.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager of this company, was elected president of the Greene County Society, in the City of New York, for the year 1915, at the eleventh annual meeting of the society, held at the Press Club, New York, on November 28.

MR. C. H. ASHBURN, superintendent at Richmond, Va., was a recent executive office visitor at New York on business connected with the service.

MR. A. L. LAFFERTY, former superintendent at Detroit, Mich., has been appointed manager at Cleveland, Ohio. Superintendent E. S. Williams, Chicago, has been added to the Chicago commercial staff as a business agent.

MR. R. H. HAWKINS, manager at Denver, Col., has been transferred to Dallas, Tex., as manager for the Mackay Telegraph-Cable Company, succeeding Mr. W. Y. Nolley, resigned.

MR. STILES W. SMITH, manager at Saratoga, N. Y., has been appointed manager at Troy, N. Y., vice Marshall L. Barnes, deceased. Miss Harriet McCreedy will succeed Mr. Smith as manager at Saratoga.

MARSHALL L. BARNES, aged fifty-eight years, manager of this company's office at Troy, N. Y., died at his home in that city on December 5. He was for many years prominent in business, civic and political affairs in Troy and was a charter member of the Troy Chamber of Commerce, of which he was president from April 7, 1913, to April 29, this year. For several years he was president of the Electrical Contractors' Association of the United States. He was a city councilman for six years.

SUIT FOR DAMAGED CABLE.—This company has brought a suit against the P. Sanford-Ross Dredging Company, alleging damage to one of its cables while the latter company was dredging in New York Bay.

MANAGERS have been appointed as follows: Thomas O'Brien, Eunice, La.; A. O. Horton, Adrian, Mich.; J. F. Schnitzler, Connellsville, Pa.; C. F. Head, Cornelia, Ga.

MR. A. L. LAFFERTY, former superintendent at Detroit, Mich., was, on November 30, presented with a handsome gold watch by the employes of the fourth district on his retirement from that position. In a letter of presentation, the employes expressed their high regard and esteem for Mr. Lafferty personally and as an official. Mr. Lafferty was much affected by the token of their appreciation. The watch was presented to him by Mr. L. C. McCormick, manager of the Detroit office, in the presence of the chief operators.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Return of Western Union Officials.

Mr. Newcomb Carlton, president; J. C. Willever, commercial general manager; L. McKisick, assistant to the president; G. M. Yorke, general superintendent of plant; W. N. Fashbaugh, general superintendent of traffic; E. Y. Gallaher, comptroller, and W. C. Merly, who acted as secretary for these officials, returned to their offices on December 7, after an extended Western trip of three weeks. Stops were made at Omaha, Denver, Salt Lake, Butte, Spokane, Seattle, Portland, San Francisco, Santa Barbara, Los Angeles, El Paso, Dallas and St. Louis. Meetings for the benefit of the service of department heads and managers of near-by offices were held in most of the cities mentioned.

In commenting on the business outlook and conditions president Carlton stated that what he saw on his 9000-mile trip convinced him that confidence and prosperity are returning. He added:

"I won't say that conditions are improving all over the country, for I don't believe they are yet. I do believe that they are improving in most places, and there can be no possible doubt that the improvement is spreading.

"There is no better gauge of business conditions than the amount of business done by telegraph companies. Each week we get a comparative statement from the six divisions into which the Western Union is divided. About five weeks ago these reports began to show improvement. Last week our business, as a whole, stopped just short of last year's mark. The actual conditions were shown to be as follows:

"The Eastern Division, a seven per cent loss in October to a three per cent loss in November.

"The Western Division reduced a five per cent loss in October to a two per cent loss in November.

"The Southern Division reduced a thirteen per cent loss in October to a nine per cent loss in November.

"The Gulf Division changed a three and one-half per cent loss in October to a one per cent increase in November.

"The Mountain Division changed a four and

one-half per cent loss in October to an increase of one per cent in November.

"The Pacific Division reduced a seven per cent loss in October to a four per cent loss in November."

CHANGES IN SOUTHERN DIVISION.—Mr. B. F. Ragsdale, formerly chief operator at Atlanta, Ga., has been appointed assistant district commercial superintendent at Atlanta, and Mr. R. E. Satterwhite, formerly chief clerk to the division traffic superintendent, succeeds Mr. Ragsdale as chief operator. Mr. F. R. Veale has been appointed assistant district commercial superintendent at Richmond, Va. Mr. T. H. Gore, former manager at Knoxville, Tenn., has been appointed division cable manager, with headquarters at Atlanta.

MR. R. W. WHITEHEAD, former division plant superintendent at Chicago, is now located in the office of the plant engineer, New York.

MR. FRANK D. GILES, special agent in the office of general manager A. G. Saylor, New York, accompanied by his wife, has returned from a pleasant vacation trip to Kingston, Jamaica.

MR. U. W. BOGGESS, manager at Parkersburg, W. Va., has been transferred to his home town, Clarksburg, W. Va., as manager, vice Mr. E. F. Phillips, transferred to Charleston, W. Va. Mr. M. N. Haller, formerly of the Bluefield, W. Va., office, succeeds Mr. Boggess at Parkersburg.

MR. L. L. CRAFT, formerly solicitor at Portland, Ore., has been appointed manager at Tacoma, Wash., vice A. R. Wilson, who has been appointed manager at Salem, Ore.

MR. P. GLENNAN, district commercial manager, Chicago, has been appointed manager at Madison, Wis.

MR. J. D. FELSENHELD, formerly of the commercial superintendent's office, New York, has been appointed manager at Glen's Falls, N. Y., vice B. A. Aldrich, deceased.

MR. GEO. HELDORFER, manager of the Western Union Telegraph Company, at Burlington, Iowa, has returned to his office after a month's vacation.

SENATOR WM. L. IVES has returned to New York much improved in health, after a sojourn of several months in the interior of the state. He celebrated his seventy-third birthday in Syracuse, his boyhood home.

NEW YORK STATE MANAGERS.—Mr. A. E. Reynolds has been appointed manager at Schenectady, N. Y., and Mr. W. J. Madden at Lockport, N. Y.

THOS. F. DUNN, aged fifty-three years, manager of the Merchants' Exchange office, St. Louis, Mo., died recently.

EDWARD DIERKS, attached to the delivery department of this company in New York for the past forty-odd years, died of pneumonia November 28.

H. C. LOCKWOOD, an attache of the auditor's department of this company in New York for many years, but who retired three years ago on a pension, died on November 29.

GEORGE E. HOLLE, aged forty years, chief clerk to secretary W. H. Baker, died at Upper Montclair, N. J., on December 8. Burial took place at Kingston, N. Y., Mr. Holle's birthplace.

J. C. BORDEN, aged fifty-eight years, a well-known operator in the Western Union, New Orleans, La., office, died recently of apoplexy while at work at his desk. He was a native of Goldsboro, N. C., and had been with the Western Union Company in New Orleans since it absorbed the American Union Telegraph Company.

DIVIDEND.—The usual quarterly dividend of one per cent was declared on December 9, payable on January 15 to stockholders of record December 19.

NEW WILKES-BARRE OFFICE.—The office at Wilkes-Barre, Pa., moved to a new location on December 6, and manager E. E. Cowell celebrated the event by giving a dinner to the employes on December 7.

MR. D. S. HARRIS, contract agent of the National District Telegraph Company, New York, has been transferred to the sales department of the American District Telegraph Company, New York.

The New Western Union Quarters at Denver, Col.

The new quarters of the Western Union Telegraph Company at Denver, Col., are located in the Railroad Exchange Building, which is a fire-proof, reinforced concrete structure at the corner of Seventeenth and Champa streets.

The operating room occupies the entire seventh floor and has an area of 6,800 square feet. The switchboard, repeater tables and motor-generators occupy the same general room as the operating department. An emergency engine and generator are located on the seventh floor near the motor-generator plant. There are eight new type fire-proof switchboards installed and three twenty-two foot repeater tables. The understructure of all the operating and repeater tables are constructed of steel, the tops being of wood. These tables are built on the unit system, that is to say, units of one position may be placed together so as to form any number of positions required. There is a total of 130 Morse operators' positions, and positions for the operating forces of eight printers and two Wheatstone circuits.

Traffic is carried from the routing centre to the operating tables, and vice versa, by belt conveyors. The conveyor apparatus is simpler than any of the kind heretofore installed, special precautions having been taken to avoid the electrification due to the high altitude of Denver.

There are windows on all sides of the room, the upper sashes being of prismatic glass so as to admit an abundance of light to all parts of the room. Artificial illumination is provided by twenty-inch, semi-indirect fixtures so located as to give an even distribution of light.

Pneumatic tubes are used between the receiving and delivery offices and the operating department.

The commercial office, on the Seventeenth street side, is a model of its kind, simplicity of design being the characteristic feature. The counters and furniture are of solid oak.

The division and district administration offices are located on the fifth and sixth floors of the same building, the offices of Mr. W. J. Lloyd, general manager of the Mountain Division, being on the sixth floor. Mr. Lloyd is much pleased with the new quarters.

W. H. Schroeder, Assistant to General Manager, Gulf Division, Dallas, Texas.

Mr. W. H. Schroeder, assistant to the general manager of the Gulf Division, Dallas, Tex., was born in St. Louis, Mo., September 12, 1873. He entered the Western Union Telegraph Company's service at St. Louis as messenger, September 1, 1887, and afterwards served as a clerk in practically every department of the St. Louis business office and operating room, and in the superintendent's office from December, 1888, to November, 1895.

He was telephone and ticker inspector and repairer for the Gold and Stock department of the

W. H. SCHROEDER

Western Union Telegraph Company at St. Louis, from November, 1895, to April, 1900. During that period he graduated as a lawyer from the Washington University, St. Louis, with the title of LL.B., having finished the three year course with honorable mention. He was manager for the Gold and Stock department from 1900 to 1906. During this time he graduated in several departments of the electrical course of the International Correspondence School. From 1906 to 1910 Mr. Schroeder was in charge of the claim department in the superintendent's office and he became chief clerk to the district commercial superintendent at Oklahoma City, Okla., acting in this position from August, 1910, to March, 1912. He was chief to general superintendent Mr. L. McKisick, at Dallas, Texas, from March, 1912, to January, 1913; to general manager Mr. E. M. Mulford, Dallas, from January, 1913, to March, 1914, and to general manager Mr. S. M. English, Dallas, from March, 1914, to September, 1914, when he was appointed assistant to the general manager. Mr. Schroeder is licensed to practice law in the courts of the State of Missouri. In a class of 110 students he was one of twenty to graduate with honors.

ECKERT WILL.—Mr. Thomas T. Eckert, jr., son of the late General Thomas T. Eckert, former president of the Western Union Telegraph Company, petitioned the surrogate to appoint a temporary administrator of his father's property, pending decision of the Supreme Court in the will contest. It was erroneously stated in our December 1 issue that James C. Eckert, brother of Thomas T. Eckert, jr., was the petitioner for the appointment of a temporary administrator. James C. Eckert applied to the Supreme Court for the appointment of a receiver, which application being opposed by the attorneys for T. T. Eckert, jr., was withdrawn by the former's attorney.

THE CABLE.

MR. DANIEL MORRISON, superintendent of the Commercial Cable Company's station at Midway Islands, Pacific Ocean, is now en route for that place, where he expects to arrive about the middle of December. Mr. Morrison, his wife and four-year-old son have been spending a holiday in Scotland.

RUSSIAN CABLES CUT.—The cables between Fredericia, Denmark, and Libau, Russia, and between Fredericia and Petrograd, have been cut in the Baltic Sea.

NEW CABLE STATION AT NORTH SYDNEY.—The North Sydney, N. S., cable office was moved to the new station on December 6. The new building is of concrete and of fire-proof construction. It is a little larger than the Bay Roberts station, which was described on page 586, in our issue dated November 1.

THE COMMERCIAL CABLE COMPANY has removed its main cable operating room from the main floor of the Commercial Cable Building, 20 Broad street, New York, to the thirteenth floor of that building, to provide increased space required for the company's expansion. The new office has been equipped in the most up-to-date manner, and has been laid out in such a way as to obtain the most efficient results by concentration of circuits having relation to each other.

WIRELESS AND THE CUTTING OF CABLES IN WAR.—As the high officials of each country now at war, thanks to wireless telegraphy, says the *New York Times*, can now spread broadcast through the greater part of the world—through all the parts that really interest them—whatever statements, true or false, they choose to make, the cutting of cables is of so little use that there is some excuse for wondering why it is still done. The belligerent governments can, indeed, suppress or censor the wireless stations in the territory under their own control, but they cannot stop "the enemy" from sending out what he pleases, and they would not deem it either safe or expedient to refrain from "receiv-

ing" any messages that may be flying through the air. What they will do with the messages after they have been taken is, of course, another matter, but the silencing of any nation, so that it cannot communicate with neutrals, is no longer possible. The effect of this is that both sides of every story and case come out and have to be answered—an effect which ranks high among the many benefits of wireless telegraphy.

Story of the First Atlantic Cable.

Mr. Frank Kitton, of the engineer's office of the Western Union Telegraph Company, New York, has presented to the Michigan Historical Society and Museum at Lansing, Mich., a bound volume of *Harper's Weekly* of 1857, the May 2 issue of which contained an illustrated story of the laying of the first Atlantic cable.

Mr. Kitton makes some interesting comments on the article, and some excerpts made by him will be of interest to our readers.

It is interesting to note, he says, how closely the first cables resembled in construction the ocean cables of to-day, the main difference being the armor wires which then were made up of strands of smaller iron wires instead of solid wires as at present. The conductor was composed of seven strands of small copper wires the same as in modern cables. The insulation was then, as now, gutta-percha.

The cable was to be laid between St. Johns, Newfoundland, and Valentia, Ireland, an air-line distance of about 1,640 miles. The first attempt to lay the cable was a failure. That there were skeptics regarding the success of the undertaking, he continues, is evident from the following excerpt from the article:

"A question has been raised whether the spark will travel so long a distance as sixteen to eighteen hundred miles. One of the most respectable authorities on telegraph matters in the United States informed the writer some three years since that a transatlantic cable was an impossibility, because the fluid would 'become dispersed' in so long a journey. To set at rest this cavil, Professor Morse, in company with the celebrated English telegraphists, Whitehouse and Bright, made arrangements in October last to operate on two thousand miles of wire in England. Ten subterranean gutta-percha-insulated wires of 200 miles in length each, were connected during the night, and operations were prosecuted for many hours. They telegraphed signals at the rate of 210, 240 and even 270 per minute with perfect and unvarying success. There was no diminution in the force of the current, no perceptible lapse of time between the departure and the receipt of the message. Thus it was demonstrated that distance did not affect the transmission of signals, either in diminishing their legibility or in retarding their passage. The message which leaves Ireland will be received in Newfoundland before a second has elapsed."

The article, continues Mr. Kitton, gives the honor of having laid the first working telegraph under water to the English, and continues: "But the first conception of and the first attempt at submarine telegraphic communication were the fruit of the genius of our countryman, Professor Samuel F. B. Morse.

"In the *New York Herald* of 17th October, 1842, the following paragraph occurs, 'Professor Morse will perform a highly interesting experiment with his electro-magnetic telegraph, by which a correspondence will be carried on between Castle Garden and Governor's Island.' On the following day the same journal refers again to the subject and predicts that 'it is destined to work a complete revolution in the mode of transmitting intelligence throughout the civilized world.'"

The article goes on to state that the success of this experiment was marred by anchors of vessels fouling the wire and destroying its insulation and says: "Somewhat discouraged, in truth, but, of course, firm in confidence, Professor Morse applied his mind to the transmission of electric currents across rivers without the aid of wires. This experiment was successfully performed, and the current sent across the canal at Washington, without intervening wire, in the presence of many members of Congress and distinguished persons, in December, 1842.

"Professor Morse was so satisfied that his failure at Castle Garden was only a step to the success of submarine telegraphs, that he wrote to the Secretary of the Treasury, on 10th August, 1843: 'The practical inference to be drawn from the law (which he had developed) is, that a telegraphic communication may be established across the Atlantic. Startling as this may seem, the time will come when the project will be realized.'"

On page 640 of our December 1 issue we printed an account of the presentation to the Michigan Historical Society and Museum, by Mr. Kitton, of an old telegraph register and relay which we used on the early Michigan lines.

CANADIAN NOTES.

Mr. Thomas Ahearn, of Ottawa, Ont., was a New York visitor on December 2, and he made it the occasion to call on his numerous old telegraph friends.

F. C. Robertson, inspector of the Canadian Pacific Railway Company's telegraph at Toronto, Ont., died at Port Hope, Ont., November 29. He was widely known throughout telegraph circles in Canada and held in high esteem by all with whom he came into contact. He had been in the service of the Canadian Pacific telegraph department since 1886, when he was chief operator at Toronto. He worked in Ohio and the western states for the Western Union and Baltimore and Ohio Telegraph companies prior to going with the Canadian Pacific. His remains were buried at Port Hope on December 1.

THE TELEPHONE.

MR. THEO. N. VAIL has purchased a piece of property in Morristown, N. J., adjoining that already held by him. He started by purchasing the former home of Alfred Vail, who was associated with Professor Morse in the invention of the telegraph. It is stated that Mr. Vail intends to build a Vail museum upon the property.

MR. KEMPSTER B. MILLER, of the firm of McMeen and Miller, consulting engineers, Chicago, has been appointed chief engineer for the receivers of the Central Union Telephone Company. Mr. Miller is a well-known telephone expert and author of a standard book and other literature on the telephone.

TELEPHONES IN THE COUNTRY SCHOOLS are being advocated in Marion County, Indiana.

TELEPHONE VALUATION.—At the telephone rate inquiry in New York by the Public Service Commission of the second district reports were submitted by the commission's accountants, indicating that the book value, as of June 30, of the total plant and service of the New York Telephone Company was $65,961,661.

NO FREE TELEPHONES IN COLORADO.—The Colorado Public Utilities Commission has handed down a ruling forbidding the Mountain States Telephone and Telegraph Company to grant free telephone service to any corporation, municipal or otherwise. Such service, the commission states, would constitute discrimination against private individuals.

REDUCTION OF RATES IN MASSACHUSETTS.—The Massachusetts Public Service Commission has ordered a reduction of telephone rates from ten cents to five cents for all calls from stations of subscribers to the six-party full suburban residence service, located between the five and eight-mile radii, to points within the six central exchanges. This affects the New England Telephone and Telegraph Company only.

JOSEPH J. FOWLER, aged sixty-seven years, for many years secretary of the civil service board, New Orleans, La., and a former telegrapher, died in that city on November 23. He was a military telegrapher during the Civil War, and afterwards went with the Western Union Telegraph Company. In 1882 he became connected with the Cumberland Telephone Company and filled the positions of general manager and secretary, and was also a director. He had supervision of Louisiana and Mississippi, with headquarters at New Orleans.

B. F. LLOYD, aged sixty-two years, of the Central District Telephone Company, Pittsburgh, Pa., and a well-known old-time telegrapher, died in that city November 8. In 1882 he became manager of the Pittsburgh office of the Western Union Telegraph Company and later was appointed superintendent of news service at Washington for the United Press. He afterwards became manager at Chicago. He entered the telephone field in 1902 as Ohio superintendent for the Central Union Telephone Company, and in 1912 he went to Pittsburgh for the same interests. Mr. Lloyd was a member of the Old Time Telegraphers and Historical Association and of the Telephone Pioneers of America.

RADIO-TELEGRAPHY.

RADIO ENGINEERS.—The December meeting of the Institute of Radio Engineers was held in New York, December 2. Dr. Louis W. Austin read a paper entitled, "Seasonal Variation in the Strength of Radio-Telegraphic Signals." Mr. Haraden Pratt also read a paper on "Long Distance Experiments with Combined Crystal Detector and Audion Amplifier."

PORTABLE OUTFITS IN GERMAN ARMY.—The short-range wireless instruments used in the German army will send and receive over an average distance of thirty-five miles. Where the country is level it is possible the range might be forty or even forty-five miles; in hilly country it might not exceed fifteen or twenty miles. The larger sizes have much longer range, and over average country a message could be sent 180 miles or more. While the range is good, the distance to which messages could be sent has not been an object in construction so much as has been portability and ease of erection. As regards the latter point, any of the equipments can be unloaded, set up and at work within fifteen minutes of arrival, and they can be taken down and packed in even less time. As regards portability, a horse will carry an outfit of average range, while a long-distance set can be carried by four horses who also carry riders. A packhorse and a man can take one of the larger sets a distance of thirty miles in the twenty-four hours.

Telephone Receivers for Wireless.

Special features are embodied in telephone receivers for use in wireless telegraphy. The ordinary low-wound receivers are not suitable, as there are not sufficient turns on the winding to make the weak currents energize the pole ends and affect the diaphragm.

The wireless receivers are usually wound with No. 40 silk-covered magnet wire, which size will allow of a large number of turns to be placed in a small space. The standard resistance for each receiver is 1,000 ohms. The diaphragm is made very thin, as it has been found that the best results from weak currents is given with this type.

Tuning in Wireless Telegraphy.

Tuning in wireless telegraphy is a mystery to many, but like anything else it is simple when once understood. The following description taken from the "Operators Wireless Telegraph and Telephone Handbook," will throw much light upon this interesting subject and make clear some points that may be obscure to students and general readers:

Hertz in his original experiments found that his "feeler" or detector would have to be of a certain length before it would respond to the waves sent out by his resonator. From this fact and other experiments it was realized that all Hertzian waves are of some definite length (this length varying in

proportion to the size of spark coil used and the amount of capacity included in the circuit), and that the "feeler" would have to be tuned or syntonized to this length before satisfactory indications were had.

In the analogy of the Leyden jar we have a straight steel spring with one end locked in a vise and one end left free. If a second spring locked in the same manner, but of a greater length is brought near the first, and the first one started in vibration, the longer spring will pick up a certain portion of the sound waves and respond weakly. However, if we regulate the two springs until they are of the same length and one started in vibration the second will respond with the same musical note.

This same operation is had in wireless telegraphy. Waves are set up in the other by means of the spark coil and oscillator, and the waves are in turn controlled by the tuning device. At the receiving end a second tuning device is employed which is regulated until it responds to the same length of wave as sent out from the transmitting coil. Tuning is desired not only for the more efficient working of the system but secrecy as well.

Sir Oliver Lodge made the first applications of tuning and since that time constant developments have been made. At the present time several stations can work in near proximity to one another without interference, each station setting its wave length to the station desired to communicate with. However, tuning has not yet been developed to the point where absolute secrecy is had, for any station with a tuning device could cut in and listen.

Edison Manufacturing Plant Destroyed by Fire.

The plant of The Thomas A. Edison, Incorporated, in West Orange, N. J., except the laboratory, was burned on the night of December 9. The fire covered almost a square mile of ground, making only shells of concrete buildings supposed to be fireproof, and causing a large property loss.

Ten buildings were destroyed. The plant was covered by $3,000,000 regular insurance, and the remainder of the loss, Mr. Edison said, would have to be borne by the self-insurance of the Edison companies.

The fire started about 5:30 o'clock with an explosion in the film-finishing building in the centre of the plant, and rapidly spread to the adjoining buildings. It burned with fierce intensity. One man, an employe of the moving-picture film inspection department, was burned to death.

The Edison fire brigade maintained at the plant was the first to attack the flames. The employes went to work in good order and showed careful training, but no power that they had availed anything. The West Orange firemen were soon on the scene, but they were likewise impotent. Then from other towns the firemen came, but their efforts were useless, except on the laboratory and power buildings.

It was seen that the only important buildings that could be saved were the experimental laboratory and the storage-battery building, and all attention was given to them. The remainder of the plant was permitted to burn as Vesuvius is permitted to belch forth its lava.

Mr. Edison was in the experimental laboratory when the fire began. He helped in the salvage work, and when that was finished he went to the storage-battery building and directed the protection of that structure. The firemen did not have the fire under control until midnight, and Mr. Edison was at his post then. Mrs. Edison did some effective work in the salvage of papers from the office and much other property of a movable character was saved by the united efforts of the employes.

With characteristic determination Mr. Edison said: "Although I am over sixty-seven years old I'll start all over again to-morrow. I am pretty well burned out to-night, but to-morrow there will be a mobilization here and the debris will be cleared away, if it is cooled sufficiently, and I will go right to work to reconstruct the plant."

OBITUARY.

W. J. POKORNEY, an old-time operator, died at Denver, Col. He was employed at El Paso, Tex., at the time he was taken ill.

CARL J. EREON, who had been connected with the telegraph service of the Philippine Islands since the American occupation, was found dead, floating in the sea near the pier at Zamboanga, Department of Mindanao and Sulu, on the night of July 4 last. Foul play was suspected. Mr. Ereon was for several years cable tester on the insular cableship "Rizal," after which he was made inspector of wireless stations, and post-office inspector, which positions he held at the time of his death. He was a native of Niagara Falls, N. Y.

FRANCENA A. PHILLIPS, aged sixty-seven years, wife of Mr. Walter P. Phillips, died of nephritis at her home in Bridgeport, Conn., on November 28. She was born in Attleboro, Mass., and from early childhood evinced a taste for literary work, which rapidly brought her to the front. In 1866 she was married to Mr. Phillips, who was at the time night manager of the Western Union office in Providence, R. I. Mrs. Phillips was a contributor to the columns of various newspapers and was prominent in church work in Bridgeport, being an active member in the foreign mission society of the First Presbyterian Church. She contributed a biographical article, which was published on the editorial page of the New York *Sun* on December 5, 1911, on the late Clara Barton, head of the Red Cross Society. This article was recognized in literary circles as the finest ever written and Miss Barton commended Mrs. Phillips for it. Mrs. Phillips was known to many old-time telegraphers, and her charming personality won from them, as well as from her large circles of friends outside of the fraternity, their highest esteem. Besides her husband she leaves a son, Mr. Albert C. Phillips, who is a prominent member of the editorial staff of the *New York Times*.

Mr. G. R. Simpson, manager of the Western Union Telegraph office at Fort Dodge, Iowa, in remitting to cover his subscription, writes: "I find the 'AGE' very helpful and thank you for renewing my subscription."

Telegraph and Telephone Age

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 are for sale at the office of this journal, 253 Broadway, New York. The price is $3.50 per volume, sent by express, charges collect.

Cable Codes.

The office of TELEGRAPH AND TELEPHONE AGE is headquarters for all cable cipher codes. Telegraph managers would do well to bear this fact in mind when customers make inquiries regarding such codes. We are prepared to furnish full information on the subject, our knowledge being based on thirty-five years' experience in handling the hundreds of codes on the market.

NEW YORK, DECEMBER 16, 1914.

Merry Christmas.

TELEGRAPH AND TELEPHONE AGE extends the season's greetings to all of its readers and friends, and wishes all a Merry Christmas.

The Value of Failures.

Failures are as valuable to us as successes, and were it not for occasional failures in effort little progress would be made in the world. Failure is often one of the best of experiences and an excellent developer of character as well.

It requires heroic courage to face fruitless effort, but what we learn when we fail to immediately accomplish what we set out to do, probably could not have been gained in any other way. When we temporarily fail in any endeavor we at least know what not to do in the future, and if we are determined to succeed, our chances of success are enhanced several degrees.

Failures, as we call them, are stepping stones to greater achievement—"blessings in disguise," really—if a dauntless spirit dominates us, and the failures of others often reveal to us large possibilities. For instance, a few years ago a lumberman conceived the idea of sending logs in large quantities from Canada to New York, by sea, strongly binding them together into a raft. During a storm the raft was broken up and the logs were widely scattered. The hydrographic office at Washington immediately saw in this mishap possibilities for good. It sent word to ship captains all over the world to watch for these logs and note their location and the date of observation. The result of this was that the department collected a lot of valuable data about ocean currents that could not have been obtained in any other way.

The raft experiment was tried again with success, by the way, and, in the meantime, the whole world had profited by this one man's failure.

Never yield to the depressing influence of failure in a just cause. Be master of it and try again and again, and success will surely be the reward.

Relations of Employer and Employe.

The tone of our editorial in the November 1 issue, printed under the heading, "Relations of Employer and Employe," has met with wide approval and we have received many letters bearing on the subject commending the expressions. One prominent telegraph official stated that it was an excellent presentation of actual conditions as found in many offices, and thought the article would do a great deal of good.

When the article was written we, of course, had no one person in mind; it was intended for general application, knowing the tendency in some individuals to become oppressive and arrogant under the influence of a little brief authority.

When one is elevated from the ranks to a position a step or two higher the distinction does not carry with it the right to become tyrannical and unreasonable. Any man who becomes so afflicted is not worthy to hold the position. We need broad minds in positions of trust in the telegraph service. What does an individual's opinion of himself amount to really? It is what others think of him that determines his character and standing among his fellowmen. If he shows a domineering spirit the natural inference is that he feels himself better than other men. He is behind the times, for the tendency at the present moment is to strive to earn the respect and confidence of those in subordinate positions, by fair and just treatment.

CHICAGO'S EARLY DAYS.—It will be interesting to Chicago telegraph people to learn from the article in this issue, by Mr. R. F. Easson, on the "Early Telegraph Days in Canada," that when Mr. Easson was an operator in that city, prairie chickens, quail and other game abounded in the outskirts of the town. His recital of the telegraph in the early fifties is certainly interesting, as there were no railroads in those days. Now it is one of the greatest railroad centers in the world.

Every telegrapher should begin the new year by promising to read TELEGRAPH AND TELEPHONE AGE diligently and faithfully. He will be better for it.

Western Union Ground Specifications.

The Western Union Telegraph Company has just issued complete specifications for the installation of ground wires.

These specifications, practically in full, are as follows:

The functions of grounds in telegraphy are to provide a return for the various signal currents transmitted over the line and to provide a means of protection against high potential crosses and lightning discharges. Those under the first class are known as "return grounds," and those under the second as "protector grounds."

These specifications cover grounds for the following: Testing, protection, compensating transformer systems, central offices, small offices, test stations, substations.

A good ground is of importance. Its location and method of connection should be such as to insure high conductivity. Ground connections should be made to water pipe systems wherever available. Other means of establishing ground connections are driven pipes or rods or buried wire. These are known as "made grounds." The preferable location for made grounds is where the surrounding earth will usually be moist. Abundant vegetation usually indicates underlying moisture and favorable conditions for grounds. Where the soil is such that the surface water readily seeps away, the natural salts in the earth are dissolved and carried off, leaving the earth a relatively poor conductor medium. For this reason filled-in ground, gravelly or sandy soil and, in some cases, a fresh water stream is not desirable for making ground connections.

ALLOWABLE RESISTANCES FOR GROUNDING.

In general the resistance of various classes of grounds should not exceed the values given below:

Central office grounds	0.1	ohms
Small office and test station grounds	5.	"
Compensating transformer	5.	"
Lightning arrester grounds (office and cable terminals)	15.	"
High potential protection grounds (screen and guard rope type)	25.	"
High potential protection grounds	100.	"
Aerial cable grounds	100.	"

MADE GROUNDS.

Wherever a good ground cannot be obtained by connecting to water pipes, or where more than one ground connection is desired, driven iron pipe grounds should be constructed. These pipes should be driven in the ground to a depth of not less than six feet. Made grounds should, in general, be located so that the ground wire follows the shortest practicable run. Ground pipes driven in the basements of buildings should, where possible, be left with the upper end about three inches above the surface of the floor. Ground pipes outside of buildings should be driven until the upper end is about one and one-half feet below the surface.

After the pipe is driven, the inside of the upper end should be roughened, thoroughly cleaned and tinned. A tightly fitting wood plug should be driven into the pipe so as to form a well about three inches deep. The end of the ground wire should be cleaned, tinned, looped back about an inch and placed in the well. The end of the pipe and the wire should be thoroughly heated with a blow torch, the well filled with molten solder, first making sure that all moisture has been expelled from the end of the pipe. The joint between the ground wire and the pipe should be thoroughly taped and given three coats of black asphaltum paint.

When a ground pipe is driven in any locality, except where the soil is continually moist, as in soggy or marshy ground, an excavation one and one-half to two feet deep should be made around the top of the pipe and about four pounds of common rock salt (one-eighth inch crystals) spread over the bottom of the excavation before it is refilled with earth. This is for the purpose of decreasing the resistance of the surrounding earth, but is not long effective in soil where the salt will be rapidly dissolved and diffused. If it is necessary to renew the salt frequently *i. e.*, every few months, a sewer tile may be set in the ground around the end of the pipe.

When it is found that the resistance of an existing made ground is not low enough to meet the requirements specified under "allowable resistance," it can probably be brought within the limit by salting the immediately surrounding soil, or by driving a longer pipe and bonding it to the original ground. When salt is used, it should be so placed that as it dissolves it will diffuse throughout the earth near the pipe. A single charge will usually remain effective for a few years when not in contact with freely flowing water. The object of driving the second pipe is to obtain a better connection with damp earth and not necessarily to increase the area of contact with the earth. Therefore, if the additional pipe is driven too close to the original ground or not driven any deeper in the earth, it may not reduce the resistance. The second pipe should be driven at least six feet away from the first one.

When the resistance of a ground is considerably higher than the required value, the probability of obtaining a lower resistance ground within a few hundred feet should be investigated. If it is found that no such low resistance ground can be obtained the longer pipe should be driven.

POLE LINE GROUNDS.

Grounds for aerial cables, cable terminals, high potential protections and primary circuits of compensating transformers should be made by driving a one-inch black iron pipe as described under "made grounds." The ground wire for cable terminals and compensating transformer grounds should consist of two No. 9 B. & S. gauge copper wires or their equivalent. In localities where copper wire is liable to be tampered with or stolen, 4,000 or 6,000 pound strand may be substituted. Ground wires for high potential grounds should have a conductivity adjusted to the short-circuit capacity of the power system on which they are installed,

but in no case should their conductivity be less than a No. 4 B. & S. gauge copper wire or its equivalent. When steel strand is used for ground wires a coil of the same strand may be buried in the earth and used in place of a driven pipe. This should be done only when it will be cheaper in cost than a driven pipe, as, for example, when the coil can be placed in a pole hole before the pole is set. The ground wire should be carried up the pole on the side where it is least liable to injury and should be attached to the pole by staples placed about two feet apart. Wherever wire is carried underground it should be buried about one and one-half feet below the surface. In cultivated ground and other places where it would be subject to injury this depth may be increased sufficiently to avoid trouble.

CENTRAL OFFICE RETURN GROUNDS.

Central offices having a local load greater than ten amperes should have no less than two permanent return ground connections bonded together.

Ground No. 1 should consist of a connection to the main water pipe on the street side of the meter at a point as near as possible to where the pipe enters the building. This connection should be made by means of a suitably proportioned copper pipe clamp.

For mechanical reasons, the clamp should be no less than one-eighth inch thick and one inch wide. It should be shaped to fit the pipe and the contact surfaces should be thoroughly tinned. It should be provided with a blank cast copper terminal lug of proper size and carrying capacity and having a rectangular contact surface. The contact surface of the lug and the corresponding contact surface of the pipe clamp should be thoroughly tinned.

Three layers of tinfoil should be wrapped around the pipe over the cleaned surface to insure good contact and take up any irregularities in the surfaces of the pipe and clamp. The clamp should then be placed over the tinfoil and firmly bolted in place.

Where there is more than one water main, ground No. 1 should connect to all. The use of water pipes for making grounds should conform with any city requirements which may exist and a permit should be obtained, if necessary, before the attachment is made.

Ground No. 2 should be a driven pipe ground, located in the basement of the building or immediately outside the building, and, if possible, near the point where the arrester ground wire enters the basement. This ground should be made by driving two or more two-inch black iron pipes as described under "made grounds." The pipes should be so spaced that the shortest distance between any two pipes is not less than six feet. The several pipes should be bonded together by bare stranded copper wire not smaller than No. 6 B. & S. gauge, all soldered joints being taped and painted as described under "made grounds.

In buildings where there is a three-wire, direct-current power system, having a permanently grounded neutral wire, grounds No. 1 and No. 2 should be bonded to this neutral wire, first obtaining permission from the power company to do so.

RETURN GROUND WIRES.

The return ground wire should be of one size between the office grid and the ground strap on the motor-generator or battery panel board, and from there to the ground connections it may be of smaller size, but never less than No. 6 B. & S. gauge. The size of return ground wires and the number of pipes for made grounds is governed by the total rated amperes of the local machines or normal discharge rates of local battery, including in either case a margin for the current of other potentials.

The main ground wire should be run from the power board ground strap to the ground clamp on the water pipe and should be in one length without splices. The bonding lead from the driven pipe ground should follow the most practicable run through the basement to the nearest point in the main ground lead and should be firmly spliced and soldered to it, the joint being taped and painted with black asphaltum paint. Ground clamp connections should be inspected at least every six months and all discovered defects immediately remedied.

PROTECTOR GROUNDS FOR CENTRAL OFFICES.

Central offices should be provided with a protector ground lead which should be run from the protector frame to the basement of the building and should be soldered into the ground pipe or to the return ground wire at a point as near as practicable to the made ground. Protector ground leads should be run as directly as possible and should be free from kinks or sharp bends. They should not be run in conduit or iron pipe, but should be held in position by porcelain cleats and tubes. Central office protector ground leads should not be smaller than No. 6 nor larger than No. 2 B. & S. gauge, National Electrical Code, rubber-covered, single-braid wire.

TEST GROUNDS.

Two test grounds should be provided at central offices, for the purpose of obtaining the resistance of the main ground. Test ground should normally be opened and should not be bonded together. One pipe should be driven for each test ground as described under "made grounds." These two pipes should be not less than fifteen feet apart, and should be located not less than fifteen feet from the main grounds.

Leads should be run from the two test ground pipes to two conveniently located terminals on the distributing frame. These leads should be of copper not smaller than No. 16 B. & S. gauge. These two leads should be cross-connected at the distributing frame to terminals of two jacks in the main test board.

SMALL OFFICE AND TEST STATION RETURN GROUNDS.

Stations having a local load greater than five amperes and less than ten amperes and test stations at which twenty or more wires enter the

switchboard should come within the scope of the following specifications.

The return ground should be made by means of (a) a clamp, firmly bolted to the building water pipe on the street side of the meter after the surface of the pipe has been thoroughly scraped, and (b) a single driven pipe, the two grounds being bonded together as described under "central office return grounds." Where water pipes are not available, the ground should consist of not less than three driven pipes bonded together as before specified. Ground wires should be of copper not smaller than No. 12 B. & S. gauge.

SMALL OFFICE AND TEST STATION PROTECTOR GROUNDS.

Small office protector ground leads should be run as directly as possible and should be free from kinks or sharp bends. They should not be run in conduit nor iron pipe, but should be held in position by porcelain cleats and tubes. They should be run directly to the driven pipe ground and soldered into the pipe end with the bond wire. The protector ground leads should not be smaller than No. 12 nor larger than No. 6 B. & S. gauge, rubber-covered, single-braid copper wire. The smaller sized wires should be used only when the number of open wires entering the office is comparatively small.

SUBSTATION RETURN GROUNDS.

Stations having a local load of less than five amperes should be considered as substations. This will include small branch offices, newspaper offices, leased wire subscribers' offices, synchronized clocks, tickers and messenger call boxes. The return ground connection for this class of station should be made by means of a ground clamp firmly bolted to water or gas pipe or by means of a ground rod. When connection is made to a water pipe, it should be as near as possible to the point where the pipe enters the building, preferably on the street side of the meter. Connections to gas pipes should always be made on the street side of the meter. Where water or gas pipes cannot be conveniently reached, steam pipes or other substitutes may be used for loads of less than one ampere, provided the ground connection thus obtained is good and permanent.

Pipes should be thoroughly cleaned and covered with a wrapping of tinfoil before applying the ground clamp. Iron pipe should be filed, lead pipe scraped and galvanized pipe sand papered. Ground clamps should be carefully tightened and the connection taped if exposed to the weather. Connections should be so located as not to be exposed to mechanical injury. Ground rods should be avoided wherever possible. When ground rods are necessary, they should be installed in a manner similar to driven iron pipe grounds, care being taken not to loosen the connecting wire from the rod. The ground wire should be spliced to the connecting wire in the ground rod and soldered, using resin flux or should be spliced by means of a copper sleeve. The ground wire should be of copper not smaller than No. 18 B. & S. gauge.

SUBSTATION PROTECTOR GROUNDS.

Protector ground connections for substations should be made as described under "substation return grounds" to water or gas pipes, or to ground rods. In no case, however, should a steam, hot water or sprinkler pipe be used for a protector ground connection.

The ground wire should be of copper not smaller than No. 18 B. & S. gauge with National Electrical Code insulation for voltages from 0 to 600, except that the preservative compound may be omitted. The protector ground wire should be run as directly as possible to the ground connection in a neat, workmanlike manner and should be securely fastened in place, using porcelain knobs where they are not objectionable. Under no circumstances should there be spirals, coils, knots or sharp bends in the wire, nor should the wire be run through iron pipe or conduit.

Telephone Troubles and Their Remedy.

In the practical work of installing and caring for telephones it is important to know just how to remedy the troubles that occur in the operation of telephone apparatus and systems. Mr. W. A. Gibson, in his book, "Manual of Telephone Troubles," covers this phase of telephone work very thoroughly, and every telephone man should have a copy at hand, as it will help him out of many difficulties. The book is gotten up in loose-leaf style and the pages, which are removable, are printed on one side only, the blank side being available for drawings of special circuit diagrams, etc. With the book come forty sheets of diagrams of circuits, showing connections, etc.

The author of this work is an experienced telephone man and describes actual troubles met with during a period of twenty years' experience in the telephone field. The publishers have included only such data as the telephone man needs, eliminating the unnecessary details and avoiding technical words and phrases, wherever possible. The information is written in clear, simple language and constitutes an every-day encyclopedia for the practical telephone man.

The book can be carried in the pocket. It is bound in flexible leatherette and the price, including the separate diagram sheets, is $3.50. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

ELECTRICAL DICTIONARY.—Every student of electricity should have an electrical dictionary within easy reach to explain the technical terms he meets with in his reading and studies. "Handy Electrical Dictionary," by W. L. Weber, a little book of vest-pocket size, meets all the requirements of the student and practical man. It is a key that unlocks the meaning of technical words, and is a great aid to the making of progress in studies. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price, 25 cents per copy for cloth binding, and 50 cents for leather binding.

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(Continued from page 648, December 1.)

When I first arrived in Chicago, in 1853, all the different lines which entered the city, and which were controlled and owned by a number of separate companies, centred in one general office on the northwest corner of Clark and Lake streets, and were under the management of one general local manager, Emory Cobb. After I had been there about a year and a half Mr. Cornell had some sort of misunderstanding with Mr. Cobb, which resulted in Mr. Cornell moving his wires to other quarters. Rooms were secured in the same building upstairs, and there we set up business for ourselves, with John Draper as local manager. Our new premises proved to be inconvenient and unsuitable, and we shortly moved down stairs to the ground floor of the same building, northwest corner of Clark and Lake, with the entrance to our office on Clark street. Here we got a new local manager in the person of Ike Downs. We had two wires at first, one to Toledo and the other to Milwaukee, but we accepted business for all points, east, north and south, through Indiana to Cincinnati, Louisville, etc.

The heading of the message blank used by us was in red ink and read as follows:

MORSE AMERICAN TELEGRAPH LINE.

Consolidation of Morse, Speed & O'Reilly's Lines. Office No. 22 ground floor, Davisson's building, near corner of Lake and Clark streets. Red pole.

The only line to Oswego and Ogdensburg. Communications strictly confidential, and must be prepaid. Write plainly. Give full address. Use no figures.

Chicago, ... 1855.

By telegraph from .....

To .....

The instruments were placed, for advertising purposes close to the window, and attracted considerable attention. People passing along the street could, if they chose, look right in and see all that was going on. I have seen more than a dozen people at a time gazing in at the window, with open mouth, watching me send or receive messages. I was Mr. Cornell's only operator for a while, but by-and-by, as business increased we got another, Charlie Bassett, a good operator and good fellow.

The line to Milwaukee was interrupted with provoking frequency by vessels carrying away the cable at the Randolph street bridge. At one time tall masts erected on either side of the river carried the wire clear of the masts of vessels passing through the bridge, but later a copper wire covered with a thin coating of gutta percha—the whole about the thickness of a lead pencil—was used as a cable. Passing vessels easily reached and tore up this skimpy thing. The bridge, however, was but a short distance from the office and little time was lost in making repairs. The bridges crossing the river were originally operated by a man turning a crank from the center of the bridge, but later on a horse was employed for this purpose. An unpretentious little shanty at the end of the bridge provided shelter for the horse and man when their services were not required. Philo Clark was the operator at Waukegan, but his sister, Miss Clark, a prepossessing and clever young girl, and a capital operator, relieved him of most of his work. Miss Clark was undoubtedly amongst the very earliest of lady operators. The only offices between Chicago and Milwaukee were Waukegan, Kenosha (Sholes, manager) and Racine.

Mr. Cornell about this time was constantly on the move and was kept very busy. He was still much of the time about Chicago, but he was often east, west, north and south. When we set up for ourselves in our new office, I signed an agreement to work for Mr. Cornell for one year, that is, from November 1, 1854, to November 1, 1855, at a salary exceeding twice the amount he started me with eighteen months previously. This agreement, which was in duplicate, Mr. Cornell keeping one copy and I the other, was a formidable looking document. It was written by Mr. Cornell himself and covered one whole sheet of foolscap closely written, and bristled with whereases, provisos, conditions and penalties. How Mr. Cornell, with his multifarious duties and complicated business engagements, ever found time to write two such papers puzzled me, and all that was involved in the expenditure of so much time and labor and legal lore was merely the hiring of an operator. This, however, was only another striking illustration of Mr. Cornell's painstaking and thorough-going character. He was a rigid economist, frugal in his mode of living and dressed very plainly, but he was one of those men who could afford to dress in any manner he chose. The poet Burns must have had such a man in his mind when he wrote:

"What though on hamely fare we dine,
Wear hoddin grey and a' that.

. . . . . .

Rank is but the guinea's stamp,
The man's the gowd (gold) for a' that."

Mr. Cornell had a distinctive, if not distinguished, personality—always in earnest, always serious, but always pleasant. After I had been with him two years, said he one day: "Do you know that when you came from Canada to Chicago, although I employed you, I was not specially in need of an operator at that time; but I had three reasons for engaging you." I said, "Might I ask what they were?" "Yes," he said, "I will tell you. First, because you came from Mr. Wood's line (Montreal line); second, because you had a good recommendation from Mr. Dwight, and third, because you were a Scotch boy."

In the spring of 1853 there were perhaps half a dozen regular operators, all told, in the Chicago office. When I left there in the fall of 1855 the number had increased to 10 or 12. Among the few operators employed in Chicago in 1853 was S. C.

Mason. He was then quite a youth, but had already graduated as a first rate sound operator, and worked an important circuit. There were also E. B. Stevens, Geo. E. Weir, R. C. Rankin. Rankin was a popular fellow and excellent operator. He was the only one in the room who used a sounder, all the others used registers, though many of them read by sound. Col. J. J. S. Wilson, then quite a young man, had charge in Chicago of the Caton lines. Hiram Whipple, a bright young operator, worked the St. Louis circuit. Col. R. C. Clowry was then an operator in St. Louis and was one of the best of his time. Marvin Hughitt, who afterwards became a distinguished railroad man, was an operator in the Chicago office in 1854. Al Seymour and Jule Lumbard were on the operating staff in 1855. Among the pioneers and those interested financially in early telegraphy, who flitted in and out of Chicago at that time, were J. J. Speed, Henry O'Reilly, Judge Caton, Haviland of Cleveland, etc., etc. John G. Saxe, the poet, was a frequent visitor. In the winter of 1854 Mr. Cornell sent me to Detroit to help out for a week or two—the Michigan Central Railway had then been completed right into Chicago. Charlie Wendall had charge of the Detroit office, and his operators were C. S. Jones, for a long time afterwards employed in the Buffalo office, and Hen Pratt. About 1854 an attempt was made to introduce the House printing telegraph system at Chicago. Madison Buell, lately deceased, was sent out to install the instruments. The intention was to operate this system on a Toledo circuit, but it proved a failure. The instrument was occasionally short-circuited, however, and for the novelty of the thing used to copy messages for city delivery. At that time operators receiving messages copied the same with a pencil on plain paper and a clerk employed as copyist recopied such as were intended for city delivery on the company's regular printed blank forms. The House instrument therefore only relieved the copyist of his job for the time being.

Away back in the fifties the lines were cheaply and unsubstantially constructed, and were often out of order.

Operators of the present day can have but a faint idea of the hardships, trials, and difficulties their congeners of sixty years ago had to undergo. As we had to do our own repairing I saw a great deal of the country on all sides of Chicago. Certain sections of the different lines ran across the prairies and others through the bush. In some instances, for nearly a quarter of a mile at a stretch in the bush, poles were dispensed with altogether and growing trees, with an insulator nailed to them, used in their stead. In some places the bush roads were so narrow and trees grew so close to the road that poles were unnecessary, in fact, they were an impossibility. In the open country the poles were slim, and as a rule made from the cheapest and commonest timber; the wire, too was mostly unglazed and rusty. The company, of course, paid all the expenses of any one whom I chose to take along to help fix the breaks, and in nice weather I had no trouble in getting a good companion, but in the winter season the weather was sometimes so boisterous and cold as to deter anyone from facing the cruel "winds that blew across the wild moors," who could possibly stay at home. There was very little fun in these excursions, when the thermometer hovered around zero and the playful Western zephyrs were gamboling across the prairies and getting in their fine work. When the weather and season were favorable we sometimes took a gun with us, and without wasting time hunting, generally bagged some game. I have had the horses run away across the prairie more than once when ten or twelve miles from Chicago, on the old road to the right of the Milwaukee plank road, strewing the contents of the buggy over the prairie, doing considerable damage, and almost reaching the city before being caught. On the open prairie there was nothing to which to fasten them, but the telegraph poles and the sighing of the winds and the clanging and jangling of the wire were too much for them. Their restlessness and efforts to free themselves presently caused something to give way, and off they started, helter-skelter across the prairie. On one occasion, while crossing the prairie ten miles from Chicago, one of the horses, an ill-tempered kicker, in trying to reach my head with his heels, got one of his hind legs over the pole; the other horse just then drew the buggy forward, bending the kicker's leg and lacerating it in a shocking manner. Luckily there was a farm house close by, and the farmer took charge of the brutes while I and my companion tramped back to Chicago over the ties of the first railway ever built between Chicago and Milwaukee, which was only then in course of construction, and on arriving at Chicago, foot sore and tired, we received orders to start off again with a fresh team.

The old Erie and Michigan line between Chicago and Detroit, which Mr. Cornell controlled, ran quite close to the lake shore, right through the woods between Chicago and the Calumet River. In the winter time this road, which was not travelled a great deal, became choked up with snow, and I have known the cutter to upset and spill us out in the snow heaps, which were five to six feet deep, at least a dozen times between what is now Jackson Park—World's Fair grounds—and the Calumet River. Everybody wore top boots (Wellingtons) in those days, and the snow was often of so tenacious character that, as we tried to extricate ourselves, it held fast to our boots, while we drew our feet out of them. We then had the pleasure of digging our boots out in our stocking feet, and when recovered, of jabbing our feet into them with the snow only partially excavated from the boot legs. The difficulties and sufferings attending the mending of a break, perchance a serious one, under these conditions, can be more easily imagined than described. I drove from Chicago to Rockford, Ill., 100 miles, in the year 1854, on the old Hotchkiss Line, in which Mr. Cornell was interested. The roads were bad and the line in a horrible condition, and it took us ten days to go out. We passed through a number of pretty little towns en route, among others Elgin, Ill. Elgin was then a very unimportant little place, in which a telegraph office

had been opened, but which at that time had not yet been provided with an operator.

Prairie chickens were very plentiful on the prairies west and northwest of Chicago, and quail and wild pigeons in the scrub oak along the lake shore between Chicago and the Calumet; and we have shot quail and wild pigeons right on the grounds where the World's Fair was held. Wild pigeons were also quite numerous just outside of Cleaverville, as that section of the city where the Douglass monument is situated was then called. At the Calumet, about fifteen miles from Chicago, there was good fishing and duck-shooting. Deer also were plentiful in the woods right there, and at the proper season we could always depend upon being regaled with venison steaks when we drove out in that direction to fix the line.

I returned to Toronto at Mr. Dwight's solicitation in the fall of 1855. There were but four operators employed in the Toronto office at that time, viz.: Ben. B. Toye, Lyman Dwight, John Henderson and Horace Thurber. A. M. Mackay, who later became superintendent of the Anglo-American Cable Company's wires at St. John, N. F., was employed as an operator in the Toronto office during my absence in Chicago, and resigned his position in Toronto to accept a similar one in Halifax on my return.

(To be Continued.)

QUESTIONS TO BE ANSWERED.

[An excellent means of self-education, and one which follows the methods of school examinations, is the asking of questions to be answered by the student. The appended questions are made up from "Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, and any student can give the answers to them by studying the book closely. This is an approved method of self-instruction, and a great aid to acquiring the habit of concentration of thought, without which it is extremely difficult, or impossible, to make satisfactory progress in studies. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, at $1.50 per copy.]

How is the desired high pressure of an alternating current attained? (Page 84.)

If an alternating current is stepped-up for line transmission, how is it reduced at the receiving end?

What devices are used for increasing the line voltage and decreasing it?

What are the advantages of alternating-current transmission?

What is a single-phase transformer?

What is a three-phase transformer?

What are the two methods of connecting the windings of three-phase transformers?

How can the action of self-induction be analyzed? (Page 84)

In what respect does it differ from simple induction between two separate windings?

Under what conditions does self-induction appear, and how long does it last in a given case?

What is the rule for determining the value of the generated e.m.f. of self-induction?

What is the cause of the lagging or retarding effect in an alternating current. (Page 88)

Why is is important to be exact in the use of terms in dealing with alternating current values? (Page 89)

What is meant by the voltage of a current?

How is an alternating-current voltmeter calibrated?

If a direct-current voltmeter and an alternating-current voltmeter are connected to a pulsating generator, will the readings of both instruments be alike?

What is the explanation for the difference?

What is the rule for ascertaining the power in an alternating-current circuit at any instant? (Page 90)

What is meant by "the square root of the mean square?"

How is the power of a direct current ascertained? (Page 91)

What are the fundamental differences between resistance and self-induction?

Does self-induction exist when a current is continuous and unvarying?

How does resistance reduce the value of a current, and how does self-induction accomplish the same purpose?

Is there any waste of current under both conditions?

What is a "choke coil?" (Page 92)

What is a "reactance coil?"

(To be Continued.)

Easy Lessons in Technical Telegraphy.

Every student in telegraphy will find a copy of the "Correspondence School Lessons in Telegraphy" a great help in his studies. It is a telegraph school in itself and is a real practical work; it gives the student a solid foundation to build practice upon. It is elementary but fundamental, and no ambitious telegraph student can afford to be without a copy.

The first chapter deals with the simple mathematics necessary to apply to the facts and problems met with in every-day practice. Then follow chapters on electricity, gravity battery, circuits. ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement, magnetism, electromagnetism, self-induction, the induction coil, the relay, the local circuit, the key, Morse circuit, "earth's" switches and switchboards, single circuits in bad weather, line leakage, static induction, testing, testing instruments, repeaters, the duplex, etc.

The book is amply illustrated and the subjects are treated in the text in simple language, so as to make it understandable to the student. Each chapter is followed by a few review questions which are very helpful in keeping the memory fresh as the student progresses.

The price of this excellent work is $2.00 per copy. Sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

UTILITY RATES IN CALIFORNIA.—A constitutional amendment was passed at the recent election in California, which places in the hands of the State railway commission the exclusive power to fix public utility rates in all incorporated municipalities. This includes telegraph and telephone service.

Local Action and Polarization in Batteries.*

A certain amount of waste is caused in every primary battery by local action. This is due to variations in the composition or density of either the zinc plate or the electrolyte. If there are particles of other metals or of carbon in the zinc plate, or if one portion is harder than another, a local difference of potential will be set up and both zinc and electrolyte will be consumed in maintaining the resultant current. Similarly, if the density of the electrolyte is greater at one place than at another, or if its composition has been made non-uniform by the chemical reactions in the cell, it will display a greater affinity for the zinc at one place than at another. This difficulty may be minimized by either alloying the zinc with a small proportion of mercury or by amalgamating its surface.

In the gravity cell a plate of copper, so shaped as to offer a large surface, is placed at the bottom of a glass jar and covered with crystals of copper sulphate. Near the top of the jar is placed a plate or "crowfoot"—so called from its shape—of zinc. The cell is filled with water and a small amount of zinc sulphate added to lower its resistance. In action, the copper sulphate is decomposed and the copper deposited on the copper plate, while the zinc plate is dissolved as zinc sulphate. The solution of copper sulphate, being heavy, remains at the bottom of the jar, with the lighter and weaker solution of zinc sulphate floating above it. The name of the cell is derived from this use of gravity to keep the depolarizing solution and the electrolyte separate.

Polarization, the bane of other cells, is here actually turned to a slight advantage, as the copper, which is liberated instead of hydrogen, decreases the resistance of the cell somewhat by increasing the surface of the copper plate. The gravity cell is therefore perfectly fitted for constant, closed circuit service. It is not fitted for intermittent work because the two solutions tend to mix by gradual diffusion except when there is some current flowing. While its field is thus limited, it has been an invaluable factor in the development of telegraph and telephone work; and is undoubtedly, in that field, the most generally satisfactory type of primary cell which has been devised.

* From "Electricity and Magnetism in Telephone Maintenance."

Seasoning Wood by Electricity.

A method of seasoning wood by electricity has been devised by A. Nodon, and tests of the process show that there is a triple effect, viz., chemical, physical and aseptic. The resinous materials in the sap are oxidized. There is a transformation of the cellulose which modifies the mechanical properties, and the actions of germs is inhibited.

The material to be treated is placed between two electrodes consisting of flexible metallic cloth, which is saturated with water. A number of layers of material may be used, an electrode being inserted between each two layers. These are connected alternately to conductors at each side and the internal resistance is thus reduced to as low a value as possible. The resistance will vary with the humidity of the wood and the amount of oil which it contains. The electromotive force is adjusted so as to send a current through the pile amounting to about five amperes for each cubic meter of material to be treated. Alternating current may also be employed.

It is said that the process may be carried on at the point where the timber is cut. The time consumed in the operation is from one to two days, according to the condition of the lumber. If the process is carried on too rapidly, the wood may be cracked. About 150 ampere-hours per cubic meter of wood is required and the process need not be continuous. The cost of installation is restricted to the carpet electrodes which are used, while the cost of operation, of course, depends upon the amount of energy consumed. The average life is twelve months, the depreciation amounting to about two cents per day per cubic meter of wood treated by this process.

Tests carried out by the French Government gave very satisfactory results. The results with wooden paving blocks were much better after treatment and it is also desirable for material for carpentry, joinery and general construction work.

Telegraph and telephone poles and railway ties have also been treated by this method.

Wireless Direction Finder.

The wireless direction finder enables the navigating officer of a ship to take bearings of wireless telegraph stations, with a view to finding the position of his ship or to avoid collisions with other ships. It is especially adapted to use when fog or other weather conditions prevent employing the usual direct-bearing method. Under reasonably good conditions bearings may be obtained within two or three degrees of the correct value, and under the worst conditions within five degrees. One advantage of this apparatus is that a ship equipped therewith does not have to be swung around while bearings are being taken. The range of the installation is from about ten miles to fifty miles, or more, depending on the power of the wireless stations from which the signals are being received, and, in the case of small ships, on the size of aerial which can be erected.

The operation of the apparatus is based on the principle that wireless antennas will receive Hertzian waves best when the plane of the aerial is in the direction of the station propagating the waves which are being received. If the plane of the aerial is at right angles to the direction from which the signals are coming it receives no impulses. In the intermediate positions the current induced in the aerial due to the Hertzian waves varies as the cosine of the angle between the plane of the aerial loop and the direction of the sending station.

This apparatus was developed by the Marconi Wireless Telegraph Company of America.

Inductive Interferences on Railway Telephone Circuits.

BY S. L. VAN AKIN, JR., ASSISTANT SUPERINTENDENT OF TELEGRAPH, NEW YORK CENTRAL AND HUDSON RIVER RAILROAD, SYRACUSE, N. Y.

(*concluded from page 652, December 1*)

ROCHESTER-SODUS TROLLEY LINE.

This line parallels our pole line on the Ontario division in the vicinity of Ontario, N. Y., for approximately four miles. The trolley poles and our poles separated by a line fence only. The induction affected our telegraph circuits to such an extent that they were very shaky and inclined to buzz and at times they were scarcely workable. A remedy was applied by stringing a ground wire on the end pin of the cross-arm the entire distance which killed the disturbance.

ROME-LITTLE FALLS TROLLEY LINE.

The trouble we experienced from this line was not on a paralleling line but on a wire about ten miles long on the Little Falls-Dolgeville branch. The trolley line terminates at Little Falls and our wire starts from there. This trouble had been in evidence a long time before the property came under New York Central control and it was the first thing put up to us to clear up. Prior to this time the Postal Telegraph-Cable Company had a wire on this branch line, the telephone company also had three or four metallic circuits on the same poles.

The Postal company finally abandoned trying to get service from its wire and took it down. Then the Western Union Telegraph Company strung a No. 8 iron wire and tried to make it work but without any success. The wire would go open and then close as was the case with the Postal company's wire and as a matter of interest there were as many as eleven officials and others on the ground at one time with the one object in mind to determine the cause of the wire opening and closing. Mr. J. B. Taylor, of the General Electric Company investigated it and finally all agreed that the trouble was caused by induction from a 33,000 volt transmission line which parallels all the way, but on the opposite side of the track. This conclusion was not reached until ground wires had been run to the Mohawk River at Little Falls and to Canada Creek at Dolgeville, and it was recommended to string another wire and make a metallic telegraph circuit. At this point it was turned over to us in the shape of a complaint and Mr. A. B. Taylor instructed me to see what was the trouble. On my arrival at Little Falls armed with a volt-meter and a mil-ammeter I found that the voltage was constantly changing in steps of two volts at nearly regular intervals. The voltage and current would be zero then begin to show in steps of two positive and run up to sixty and 100 volts, then gradually decrease in steps of two to zero, then show negative in steps of two up and down then positive again, etc., regularly. While I was getting this line-up the information previously given was imparted to me by local employes. I decided that the trouble was due to earth current and not to induction from the 33,000 volt transmission line, but no one appeared to take any stock in my diagnosis of the case in view of what had gone before; but notwithstanding I started to experiment and as the source of the ground current was a mystery, it was about two months before I solved it, without stringing another wire to make the circuit metallic. Every inch of the line was inspected and thoroughly insulated.

A reading from a coil of wire in the Mohawk River to a ground on the railroad bank showed two volts steady negative, a reading between a coil of wire in Canada Creek and a water pipe about 500 feet distant showed six volts positive current and both readings were steady. At this time I had in mind mineral deposits, as there is an iron ore mine at Dolgeville. When covering the ground wire extension at the Dolgeville end we cleared a cross with a fire alarm circuit and thought we had the trouble, but were disappointed. The increase and decrease of voltage and current, also the changes from positive to negative current at regular intervals indicated a cross with some kind of a burglar alarm system but no such system could be located in that territory.

I then decided to try the rail as a return and obtained material to insulate both rails south of the yard at Dolgeville and north of all switches at Little Falls. Ground wires were run to the rail and we still had the same trouble; then we put in new charcoal grounds at both ends which did not clear it. At this time I decided to do what I should have done in the first place, which was, to take a man and cut the wire and test it both ways until the trouble was cornered. This located all of the trouble at the Little Falls end and we were clear of it at a two mile point. To get a ground two miles east of Little Falls, spare conductors in a permanent cable were employed for about one mile and we ran the remainder in with open wire and the circuit has worked perfectly since. My conclusion was that on account of poor bonding of the trolley rails that when a trolley car approached Little Falls, presumably at some distance, that the current from the ground began to be in evidence and as it passed out of the disturbing zone the natural or permanent earth currents referred to, together with our battery voltage closed the wire on the opposite polarity. I am not, however, entirely satisfied with this conclusion for the reason that the positive and negative voltages were in evidence in equal amounts without any battery on the wire and in view of the fact that we could not locate enough steady earth current to produce such a result; in other words did we get one polarity from the trolley wire and the other from the power house via the rail, the one neutralizing the other, causing a momentary cessation of current flow to earth, at which times the voltmeter would stand at zero?

11,000 ALTERNATING-CURRENT THIRD RAIL SUPPLY SYSTEM, YONKERS AND 138TH STREET, NEW YORK.

From this system with power houses located at Point Morris and Yonkers, we are experiencing induction which we have not been able to neutralize.

Extra transpositions have been rolled in circuits between Spuyten Duyvil and Yonkers without any improvement and while it is quite bad, its effect is not noticeable at the Grand Central Terminal dispatcher's office, the cable killing the noise.

The 11,000 alternating-current is transformed through rotary transformers to supply 660 volts direct-current to the third rail through various automatic switching stations. The transmission line is on the opposite side of the tracks from our pole line. We would like to get this induction cleared up: The question is, how can it be done?

WESTERN UNION TICKER SERVICE.

Our first real effort to eliminate ticker induction on our telephone circuits was in the spring of 1912. At that time we had just completed telephone dispatching circuits on the Falls road and over the Buffalo division. The induction was bad; to wear a receiver for eight hours meant for the dispatcher to endure a noise like that in a saw mill; at night these circuits were perfectly quiet and all that could be desired. We covered these two circuits very carefully, checked all the transpositions, made sure that we had perfect insulation yet the induction was just as bad as before. We then covered the Falls road again and insulated the ticker wire all the way through, we also replaced all cracked glass and there was no improvement. After considering the whole proposition, we decided that the only remaining place to kill the induction was in the ticker equipment itself.

Mr. Taylor took up the question of modified ticker equipment with the telegraph company and was advised by Mr. Yorke that it would be looked into at once. Impedance coils were soon installed which cleared up the situation to the extent that although the induction could still be heard, winding and printing, it was cut down to a satisfactory point. In the fall of 1912, these coils were removed on account of world series installations and practically had us out of service until the series were over. The spring of 1913 saw the ball tickers started up again at Rochester without the impedance coils. We had them put in. September 3, 1913, the local employes again cut them out. Mr. Yorke was again appealed to and on October 4 we were advised that coils had been installed, but we had no relief until after the world series were played off.

On April 27, this year, we went through the same experience. Coils had been removed and not installed again, and, on this date, inductive interference on a new ticker district, Watertown to Massena Springs and Ogdensburg on the St. Lawrence Division was reported. This was so bad that after giving the telegraph company sufficient time to modify the equipment, the railroad company's superintendent ordered the ticker wire opened and when it was transferred to another wire, that was opened. While we must admit this was arbitrary action in the fullest sense of the word a thorough investigation both of this and the Rochester circuits brought about the elimination of the induction which is now only faintly heard and our dispatchers are perfectly satisfied.

The telegraph company modified the ticker service at Watertown and Ogdensburg about May 10 and I was advised that our circuit was O. K. but the trouble kept coming back at times. In July a careful inspection of our circuit was ordered and our foreman advised that the telephone circuit was perfect and no trouble on it. On August 19 railroad employes again opened the ticker wire and that afternoon Mr. C. R. Tilghman, superintendent of the ticker service; J. F. Latteauret and I, went to Watertown. We found the ticker wire cut at Gouverneur and the telephone circuit noisy but in use. The noise in this case was not induction wholly but was partly due to trouble on our own wires and the opening of the ticker circuit was not justified. I requisitioned a motor car and started the next morning and covered every inch of the circuit, renewed office pole connections and put everything in first-class shape, Mr. Tilghman experimented with the ticker equipment (which is the universal type) added additional impedance at Watertown and also on the extension from Ogdensburg to Malone. I spent six days on the circuit to clean it up and when we left the induction was faint and our circuit and also the ticker service was working well.

HOW KITCHENER GOT WAR OPERATORS.—A story is told in the *Telegraph and Telephone Journal*, London, England, of how Lord Kitchener obtained telegraphers for war service: "A fortnight after the war he wrote to the post-office for thirty-eight telegraphers. He waited a week before he received a reply to the effect that the post-office had no men to spare. On reading the reply he at once left his office, took his motor-car and proceeded to the post-office. He went direct to the telegraphing room, looked at the various telegraphers working there, and picked out the thirty-eight men he required. Then, without saying a word to the authorities, he marched them to the war office."

Mr. J. H. Baughman, of Bellefontaine, Ohio, in remitting to cover his subscription, writes: "Keep 'em coming."

THE RAILROAD.

COL. H. G. PROUT, a widely known railroad authority, and formerly president of the Union Switch and Signal Company, Swissvale, Pa., has been elected president of the Hall Switch and Signal Company, with headquarters in New York.

MR. W. J. GILLINGHAM, resident manager of the Hall Switch and Signal Company, at Chicago, has been promoted to the position of general sales manager of the same company, with headquarters in New York. Mr. Gillingham is a railroad man, and has had a wide experience. He was formerly signal engineer for the Pennsylvania Railroad and the Chicago and Northwestern Railroad.

MR. W. E. HARKNESS, of the Hall Switch and Signal Company, New York, and Mr. E. E. Backus, representing the same interests at Chicago, have severed their relations with that company, taking effect January 1. Mr. Harkness will devote his time, at least for the present, to consulting engineering work.

MR. E. F. RAYMOND, assistant superintendent of telegraph of the Southern Pacific Railway, San Francisco, Cal., has resigned to engage in other business.

MR. W. F. BAUER, assistant manager of the railway department of the Edison Storage Battery Company, has been appointed Chicago manager for the same interests.

DOCTOR F. H. MILLINER, experimental engineer of the Union Pacific Railway, Omaha, Neb., was in New York on a business trip last week and inspected the wireless service of the Lackawanna Railroad. The day of his visit at Hoboken, December 8, he found all of the wires prostrated by the severe storm. The company had resorted to its wireless system to transact its telegraph business, which was admirably handled. Dr. Milliner expressed himself as greatly pleased with what he saw in connection with the exchange of telegraphic communications by wireless throughout the Lackawanna system.

JOHN C. MUIR, aged fifty years, general superintendent of the Chicago, Terre Haute and Southeastern Railroad, and a former operator and train despatcher, died at Terre Haute, Ind., on November 4.

WIRELESS ON THE LACKAWANNA.—The wind and sleet storm of December 6, 7 and 8 demoralized the wire service on the Lackawanna Railroad, more than 100 poles having been blown down between Hoboken, N. J., and Scranton, Pa. The wireless telegraph was resorted to and many messages were exchanged between the two points. For points where there was no wireless equipment messages were sent by wire by roundabout routes. The damage to the wires was particularly severe around Passaic and Paterson, N. J., and Stroudsburg, Pa.

Safer Than Government Ownership.

President Ripley, of the Atchison, Topeka and Santa Fe Railroad, in an address in Kansas City, Mo., on October 24, made the interesting suggestion that steps be taken to reduce the wastes of railway competition, to have the government guarantee a minimum of earnings on investments in railways and to give it representation on the boards of directors. A plan, similar in some important respects, has been proposed by Mr. W. W. Cook, of New York, the well-known authority on the law of corporations.

Underground Wires Along the Pennsylvania Railroad.

The Pennsylvania Railroad Company has completed an underground wire conduit between Jersey City and Rahway N. J., a distance of approximately twenty miles. Through this territory the company expects to operate all of its present overhead circuits through underground cable, thus eliminating both of its pole lines. The conduit line will consist of six multiple ducts through which one trunk and one local cable will be operated. The local signal circuits will also be provided for in a local cable in the same duct system.

In the Philadelphia district the company is constructing a similar underground system between Broad street station and Paoli, Pa., a suburban point about twenty miles out on the main line.

The completed section of underground conduits between Jersey City and Rahway may be considered as the beginning of an underground system between New York and Philadelphia.

Relations of Employer and Employe.

Commenting on our editorial in the November 1 issue on the subject "Relations of Employer and Employe," an ex-telegrapher in the south writes:

"I read with the keenest interest and appreciation your editorial in the November 1 issue entitled, 'Relations of Employer and Employe.' In many sections of the country the dictatorial, tyrannical and oppressive methods employed by some of the 'underlings' who come directly in contact with managers stands out in bold relief. But the man who has the temerity to complain will, in the long run, get the 'short end' of it. Your editorial will set the men 'higher up' to thinking and asking themselves the question, 'Are there any such conditions in my territory?' Individually, I have no interest. Traveling through the southern states I have had opportunity to learn the sentiments and opinions of many telegraphers. Your article will receive universal commendation."

FEDERAL TELEGRAPHS AND TELEPHONES.—Representative D. J. Lewis, of Maryland, announces that he will resume his fight for a postal telegraph and telephone system at the present session of Congress.

SEATTLE OLD TIMERS' REUNION.—Old-time telegraphers in the Seattle, Wash., district were entertained by the Seattle Transportation Club on the evening of November 20. These reunions were inaugurated a year ago by Mr. L. F. Jones, general agent of the passenger department, New York Central Lines, Seattle, and are highly enjoyable. Plans are now being made for the 1915 reunion.

INDUSTRIAL.

Elevator Dispatching by Telephone.

To facilitate the operation of elevators in office buildings, an elevator telephone system has recently been designed by the Western Electric Company. In all of the buildings in which it has been installed it is said to have proved remarkably successful, especially in the Woolworth and new Municipal Buildings in New York, where the elevator traffic is exceptionally heavy.

On one side of the car a wall telephone is set and directly above it a loud-speaking telephone receiver. This apparatus is used for providing means of instant communication between the elevator dispatcher and the car operators. The dispatcher wears a telephone head set consisting of a head receiver and chest transmitter. His small telephone switchboard is electrically connected to all the elevator cars.

ELEVATOR DISPATCHER, WOOLWORTH BUILDING NEW YORK.

Placed directly in front of the dispatcher is a bank of lamps corresponding to the number of elevators under his supervision and the total number of floors having elevator service. The lamps for each elevator are mounted in vertical rows, two rows per car, one to indicate the upward movement and the other the downward movement. As an elevator arrives at the different floors, the corresponding lamp in front of the dispatcher's board is illuminated.

The means for instant communication is the special feature which makes possible the satisfactory dispatching of the elevators. To talk to the operator the dispatcher "plugs in" on that line, and uses the loud-speaking receiver. It is not necessary for the operator to stop his car while receiving these instructions, and should it be necessary to immediately reply to the dispatcher, the operator can talk directly into the loud-speaking receiver, using it as a transmitter. If the operator desires to call and talk to the dispatcher, he needs only to take the receiver off the hook of the standard telephone, so signaling the dispatcher, who "plugs in" on the operator's line, and carries on a conversation.

INDUSTRIAL PLANT TO INSTALL PRIVATE TELEPHONE SYSTEM.—The J. I. Case Threshing Machine Company of Racine, Wis., is preparing to put in operation an unusually complete private telephone system. This company operates a large plant in Racine, the principal buildings of which are about half a mile apart. In order to serve both parts of the organization in the most satisfactory manner, two complete switchboard equipments are to be installed. The switchboards, which will be of the Western Electric central battery private exchange type, will each have an initial equipment of eighty lines with capacity for additional lines to take care of future growth. Complete power plant, ringing, terminal and protective equipment will be used in connection with each switchboard. The two private exchanges will be connected by means of trunk lines running in lead-covered cable. They will not, however, be connected to the city telephone service, as the lines are to be used exclusively for internal business communications. Three thousand feet of 25-pair and 12,300 feet of 50-pair cable will be installed. Loud-ringing bells will be placed at various points inside and outside of buildings to call officials to the nearest telephone. These bells can also be used to sound alarms.

Miscellaneous.

AUTOMOBILE TESTING LABORATORY.—The British post-office authorities are purchasing a number of motor vehicles to be fitted up with apparatus for testing main telegraph cables throughout the country.

TELEGRAPH SPECIALTIES.—A newspaper in a small town, commenting on the facilities of one of the telegraph companies, states: "The companies' own specialties are now their main lines and are unsurpassed by any in the country."

THE MESSAGE TAX.—The following classes of telegrams are exempt from the war tax: United States Government messages, commercial news messages, service messages and "dead-head" company messages, and messages handled "dead-head" on account of railroad companies.

OLD TELEGRAMS.—Mr. J. R. Terhune, district commercial superintendent of the Western Union Telegraph Company at Nashville, Tenn., has forwarded to this publication a number of copies of old telegrams which were handled at Lexington, Ky., in 1853 and 1854. They were sent to Mr. Terhune by Mr. John T. Walsh of that city, and Mr. Terhune adds that Mr. Walsh was thought to be the oldest living ex-messenger in that locality. He is now seventy-five years of age. He was a messenger for the telegraph company in Lexington in the years 1853 and 1855. Recently, on tearing down one of the old buildings on Upper street, Lexington, these old telegrams were found.

Mr. G. E. Clarke, superintendent of the Marconi Wireless Telegraph Company at London, England, writes: "I enclose herewith my annual subscription for 'Our' paper which is absolutely indispensable."

The San Francisco Tournament.

The executive committee of the Panama-Pacific International Telegraphers' Tournament Association, San Francisco, Cal., has about completed the arrangements for the tournament to be held in that city, May 27, 28 and 29, 1915. The entrance fee will be $3.00 for all classes, with the exception of the all-round championship event, which will be $5.00, and the committee requests that those contemplating participation in the tournament notify it of their intention as soon as possible so that it may be able to complete arrangements. Entry blanks will be forwarded on application by Mr. E. Cox, secretary, chief operator Postal Telegraph-Cable Company, San Francisco, to whom all communications should be sent.

Following is a list of the members of the executive and advisory committees:

Executive committee: A. A. Gilson, chairman, E. F. Hutton and Company, brokers, San Francisco; E. Cox, secretary, chief operator, Postal Telegraph-Cable Company, San Francisco; J. I. Hilliard, treasurer, chief operator, E. F. Hutton and Company, San Francisco; Wm. T. Lynch, chief operator, United Press; H. B. Segur, Southern Pacific Railroad, San Francisco; B. Pogue, chief operator, Pacific Telephone and Telegraph Company, San Francisco; Robert Geistlich, chief operator, Associated Press, San Francisco; Guy Fisher, correspondent, International News Service, San Francisco; J. C. Arthur, merchant, San Francisco; D. A. Mahoney, Eastern representative, 203 Broadway, New York, N. Y.

Advisory committee: Thos. A. Edison, Orange, N. J.; C. C. Adams, second vice-president, Postal Telegraph-Cable Company, New York; Melville E. Stone, general manager, Associated Press, New York; David Homer Bates, secretary-treasurer, Society of the U. S. Military Telegraph Corps; Walter P. Phillips, New York; J. B. Taltavall, publisher, New York; J. Frank Howell, member Consolidated Stock Exchange, New York; J. C. Johnson, superintendent telegraph, Pennsylvania Railroad, Philadelphia; John J. Ghegan, president, J. H. Bunnell and Co., New York; Andrew S. Weir, Cassat and Company, bankers, Philadelphia; F. W. Griffin, American Telephone and Telegraph Company, Philadelphia; J. C. Blake, general superintendent, Postal Telegraph-Cable Company, San Francisco; V. V. Stevenson, division electrical engineer, Postal Telegraph-Cable Company, San Francisco; A. H. Ginman, general superintendent, Marconi Wireless Company, San Francisco; C. L. Lewis, superintendent, Postal Telegraph-Cable Company, Los Angeles; C. E. Bagley, superintendent, Postal Telegraph-Cable Company, Philadelphia; Patrick B. Delany, telegraph and electrical expert, Nantucket, Mass.; A. W. Copp, superintendent, Western Division, Associated Press, San Francisco; W. Hearn, superintendent, Postal Telegraph-Cable Company, San Francisco; E. L. King, superintendent telegraph, Southern Pacific Railway, San Francisco; W. T. Teague, division superintendent plant, Pacific Telephone and Telegraph Company, San Francisco; Chas. P. Stewart, manager, Pacific Division, United Press, San Francisco.

THE GERMAN BAZAR, which is being held at the Seventy-first Regiment Armory, New York, for the benefit of the widows and orphans of German, Austrian and Hungarian soldiers, has proven a great success. Many of the men employed in the financial district are devoting their spare time and energy in different ways to help the work along. Two young men connected with a prominent concern have installed, at their own expense, a powerful radio station. The station operates direct with the Telefunken Company's stations at Sayville, L. I., and New York, and messages are accepted for Germany and Austria-Hungary, also, messages are received from great distances, including ships at sea. The working of the station is thoroughly explained in detail by the operators, Mr. Fred Ehlert and Mr. Gerhardt Bleilevens, who are two prominent radio men.

MR. E. B. PILLSBURY, general superintendent transoceanic division of the Marconi Wireless Telegraph Company of America, has been elected by the executive committee of the Telegraph and Telephone Life Insurance Association as a member of the auditing committee, to act during the indisposition of Mr. W. J. Dealy. Mr. G. W. Fleming was also elected a member of the same committee, vice Mr. R. J. Murphy, resigned.

THE SERIAL BUILDING LOAN AND SAVINGS INSTITUTION will hold its annual meeting at 16 Dey street, New York, on January 19, 1915. The election of officers will then take place. A meeting was called for December 15 for the purpose of nominating officers and directors.

DISC TELEGRAPH RECORDS.—Diamond medal telegraph records are interesting and instructive. These are double Morse telegraph records, that is, they have records on each side of the disc, and can be used on any make of talking machine. There are eight discs in the set, sixteen lessons in all, and the lessons lead the student on by easy stages. The specimens of Morse sending are beautiful.

These double discs are for sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at $1.00 each. Send for catalogue.

CHARGED WITH STEALING NEWS.—H. L. Linder, a New York operator, was arrested on November 27, charged with revealing the contents of a news despatch sent out by the Associated Press. The Associated Press charges that its despatches have been systematically stolen and supplied by smaller news agencies to their clients. A decoy despatch was prepared, and in due time it appeared in one of the evening papers, supplied with news by the opposition interests. It was this despatch that led to Linder's arrest. Linder was held in $3,000 bail for the grand jury. James Rice and William M. Patton were also indicted with Linder, on the same charge. Linder failed to appear before the court and his bail was forfeited.

Gold and Stock Life Insurance Association Annual Meeting.

The annual meeting of the Gold and Stock Life Insurance Association will be held in room 2501, No. 195 Broadway, New York, on Monday, January 18, 1915.

In a circular letter to the members, acting secretary H. W. Dealy states that in order to meet conditions arising from the very low rate of dues in force prior to 1902, now confronting the association, and with the prospect of a high death rate among certain classes of its members, the following amendments to the by-laws, to take effect January 1, 1915, have been regularly presented and recommended for adoption at the annual meeting of the association to be held on January 18, 1915:

Section 6. The dues payable by members of this association shall be as follows: By members admitted prior to January 8, 1894, 75 cents per month, instead of 60 cents per month. By members admitted between January 8, 1894, and December 31, 1902, inclusive, 60 cents per month, instead of 50 cents per month.

Old Time Telegraphers' and Historical Association.

QUALIFICATION FOR MEMBERSHIP.

"Any person in good standing, who, prior to twenty-five years before the date of making application, was employed in the telegraph service, and thereafter for five years, shall, upon payment of $2.00 (an initiation fee of $1.00 and $1.00 dues) be eligible to membership."

It is earnestly hoped that all those who are eligible to membership will write for application blanks, and thus become affiliated with one of the most excellent associations in the United States.

The beautifully engraved certificate issued to each new member bears the autograph signature of Mr. Andrew Carnegie, the president of the association for 1914-15.

Blanks can be obtained upon application through Mr. J. B. Taltavall, Committee on Membership, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

Clarence Miller has been appointed station lineman at Clinton, N. J., vice Chas. Lawton.

The task of moving our five submarine cables between Philadelphia and Camden, N. J., in order to make room for a new wharf, has just been completed under the supervision of district foreman Gorsuch.

Louis J. Mackey, chief clerk to superintendent H. Scrivens, Pittsburgh, and manager C. E. Diehl, of Harrisburg, recently paid us a visit.

The sleet and wind storm of December 6 and 7 affected more or less all companies' lines within a radius of fifty miles west of Philadelphia, and we did not escape without trouble. The plant department responded promptly; additional construction gangs were moved in from the western part of the state and the work of restoring full service began without any loss of time.

INDIANA WESTERN UNION.

Mr. R. G. Kettle, of Chicago, has been appointed manager at Bedford, Ind., vice Mr. J. R. Sample.

Mr. F. B. Bradley, manager at Terre Haute, Ind., has been transferred to a similar position at Fort Wayne, vice Mr. C. W. Mason, who has resigned to engage in other business. Mr. Bradley is succeeded at Terre Haute by Mr. H. N. Ullery, formerly a clerk in the office of the district commercial superintendent at Indianapolis.

Mr. Oris Foster, of Vincennes, has been appointed manager at Mount Vernon, Ind., vice Mr. B. F. Stevens, resigned.

Telegraph and Telephone Age

A Semi-Monthly Journal Devoted to Commercial and Railway Telegraph, Telephone and Submarine Cable Interests and Radio-Telegraphy

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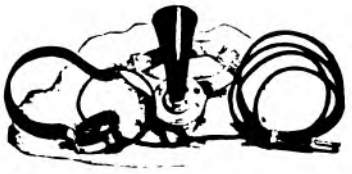

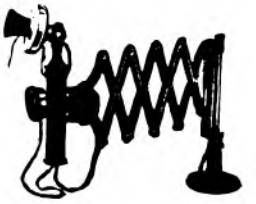

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Advertisements will be accepted, *for this department of the paper only,* at the rate of five cents per word. Terms, cash in advance. In answering advertisements in this column, use the key letter and figure given in the advertisement, and follow it with TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. For instance, if you are answering an advertisement with the key S 4, address should read:

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The correspondence-school lessons in elementary telegraphy which were published in serial form in the columns of TELEGRAPH AND TELEPHONE AGE from October 16, 1911, until April 1, 1914, have been published in book form and the volume is now on sale. The book contains 197 pages and is of a convenient size to carry in the pocket.

It is a valuable addition to telegraph literature and no other work covers the field as it does. As its name implies, it is a course of instruction in the elements of practical and technical telegraphy and during the course of its publication in the columns of this journal great and wide interest in the subject was manifested. Its instruction has started many ambitious telegraph and telephone employes on careers of greater usefulness to the companies employing them as well as to themselves.

The first chapter begins with the simple mathematics applicable to telegraph engineering and then follow chapters on potential current and resistance, gravity, battery, circuits, Ohm's law, wire resistance, fall of potential, derived circuits, battery arrangement, magnetism, electromagnetism, self-induction, the induction coil, the relay, the local circuit, the key, Morse circuit, earths, switches and switchboards, single circuits in bad weather, line leakage in bad weather, static induction, testing at terminal stations, wire testing at intermediate offices, the detector, the milli-ammeter, the voltmeter, automatic repeaters, the condenser, the polarized relay, the rheostat, Stearn's differential duplex, the polar duplex, the quadruplex, neutral relays, relay and circuit relationship.

From this list of subjects the worth of the book may be easily appreciated. Test questions are given throughout the book for review purposes. Taken altogether, this work is as unique as it is important and really constitutes a class in itself. Every telegrapher and telephonist should possess a copy, as in numberless cases it will mean the beginning of a larger life of usefulness.

The price of the book is $2.00 per copy. Remit by post office or express money-order to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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Mr. Eugene E. Bruckner, the well-known press operator now located at Spokane, Wash., has, under the authority of Walter P. Phillips and with the assistance of a number of officials and operators in the press service, thoroughly revised Phillips' Code, and the new edition was ready for delivery on June 1, 1914. Mr. Bruckner was considered by Mr. Phillips the most competent authority to undertake this important work, and so satisfactorily has the task been accomplished that the finished book has received the stamp of approval of the Associated Press, the United Press, the Publishers Press, and all other newspaper agencies, as well as the endorsement of press operators, well qualified to judge of the merits of the new book. A large number of officials and operators in the press service were also frequently consulted on the revision.

The new book was desirable for the same reasons that makes necessary a revision of scientific text books with the progress of each decade.

Thirty years ago, when Mr. Phillips first published his work, a large number of words were used that to-day are almost obsolete, and several hundreds of others, not provided for then, have come into general use. Provision must therefore be made for the newer modes of expression.

As indubitable evidence of this need, men who have joined the ranks of the press associations in recent years have found themselves wholly perplexed, and have been humiliated by apparent incompetence owing to their inability readily to interpret hundreds of contractions in constant use but not honored by Phillips' Code..

The whole object of the revision has been to promote greater accuracy and reduce memorizing to a minimum. Under the new system, an operator who knows the code for *Assist* does not need to know the specific contraction for *Consist, Desist, Insist, Persist, Resist*, etc., for all are formed upon the same basis. Nor is it probable that the operator could make a mistake in their translation if, by force of sheer will power, he tried.

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