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REMOTE STORAGE

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Mr. George E. Sornberger, manager, Postal Telegraph-Cable Company, Williamsport, Pa., in renewing his subscription for two years writes: "I like you and I like your paper and I like to keep in touch with my friends, so that's the reason I'm sending you some cash, so that you can keep on printing your paper and continue to keep me in touch with my friends; for what is life without friends?"

Mr. Frank N. Dowler, eastern freight agent of one of the western railroads, with headquarters in New York, in renewing his subscription for

another year writes: "It gives me great pleasure to acknowledge receipt of your letter advising that my subscription had expired and that you had renewed the same. I appreciate your kindness. I sincerely hope that I may have the pleasure of reading your publication for many years." Mr. Dowler, who is another one of New York's prominent railroad men, hails from the state of Ohio. He was for many years in the railroad and commercial telegraph service, and is well acquainted with many of the older members of the telegraph profession. He has been prominent in the affairs of the Ohio Society of New York.



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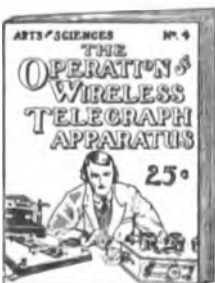
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Books on the telephone are Cummings' Electricity and Magnetism in Telephone Maintenance, price \$1.50; McMeen and Miller's Telephony, price \$4.00; Van Deventer's Telephony, price \$4.00.

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.

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Thirty-third Year.

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SOME POINTS ON ELECTRICITY.

Fundamental and Derived Units.

Telegraph students are constantly meeting with such technical terms as "ohms," "microfarads," "henries," "volts," etc., and while the practical meaning of these is generally understood, few, perhaps, know of their origin. It is the purpose of this article to throw a little light on this phase of the subject. All physical qualities, such as force, velocity, weight, etc., can be expressed in terms of the three fundamental quantities, length, mass and time, and each of these quantities is measured in terms of its own units.

The system of units in general use is the so-called "centimeter, gramme, second" system, these three terms being generally abbreviated to "C. G. S."

The centimeter is the unit of length, the gramme the unit of mass and the second the unit of time. The centimeter is equal to 0.3937 inch in length; the gramme represents the mass of a cubic centimeter of water at 4° centigrade (7.2° Fahrenheit), and the second used in this system is the ordinary division of time. These three are called the fundamental units, and all other units representing physical quantities and qualities are derived from them. For our purpose we will omit reference to those units not used in electrical work.

DYNE, UNIT OF FORCE. The unit of force is called the "dyne." It is that force which, acting for one second on a mass of one gramme, will give to the mass a velocity of one centimeter per second. The force with which the earth attracts any mass is called the weight of that mass. The force of one pound is about 445,000 dynes.

ERG, UNIT OF WORK. The unit of work done in overcoming unit force (dyne) through unit distance (centimeter) is called the "Erg." The work done in raising one gramme through the height of one centimeter against the force of gravity (attraction of the earth on the mass) is 981 ergs.

CALORIE, UNIT OF HEAT. The unit of heat, called the "calorie," is the amount of heat required to warm one gramme of water (unit of mass) from 0° to 1° centigrade (32° to 33.8° Fahrenheit).

These units are sometimes called "absolute" units, meaning that they are independent of the size of any particular instrument, or of the value of gravity or of any other arbitrary quantities than the "C. G. S." standards.

ELECTRICAL UNITS. Two systems of electrical units are derived from the fundamental "C. G. S." units. One is based on the force exerted between two quantities of electricity and the other upon the force exerted between two magnet poles. The former units are called electrostatic units, and the latter, electromagnetic.

In the electrostatic system no special names have yet been given to the units of quantity, potential, capacity, etc.

UNIT OF QUANTITY. This unit is that quantity of electricity which, when placed at a distance of one centimeter (in air) from a similar and equal quantity, repels it with a force of one dyne.

POTENTIAL. The unit of potential is measured by the unit of work, erg. It represents the work done in moving a unit of + (positive) electricity against the electric forces.

UNIT DIFFERENCE OF POTENTIAL. Unit difference of potential exists between two points, when the expenditure of one erg of work is required to bring a + unit of electricity from one point to another against the electric force.

UNIT OF CAPACITY. A conductor possesses unit capacity when it requires a charge of one unit of electricity to bring it up to unit potential. A sphere of one centimeter radius possesses unit capacity.

SPECIFIC INDUCTIVE CAPACITY. This is also called the dielectric coefficient, and is defined as the ratio between two quantities of electricity. The specific inductive capacity of air is taken as unity.

In order to reduce electro-static units to corresponding values in terms of practical electromagnetic units the following rules should be applied:

To reduce potential to volts multiply by 300; capacity to microfarads, divide by 900,000; quantity to coulombs, divide by 3×10^9 ; current to amperes, divide by 3×10^9 ; resistance to ohms, multiply by 9×10^{11} .

[NOTE.—The notation presented in the preceding paragraph is called index notation, and is employed to avoid use of long rows of ciphers. For instance, 3×10^9 is equivalent to 3,000,000,000, the index figure meaning that as many ciphers must be placed after the significant figures as the index indicates.

Multiplying 9×10^{11} is equivalent to 90,000,000,000—eleven ciphers following the significant figure 9 as called for by the index.]

In our next issue we will take up the subject of electromagnetic units.

(To be Continued.)

Stock Quotations.

The New York Stock Exchange is now conducting business without any restrictions whatsoever, and trading is being carried on as freely as it was at the time the exchange was closed (July 30, 1914), on account of the European war. Following are the closing quotations of telegraph and telephone stocks on December 29, 1914:

American Telephone and Telegraph Co.....	117
Mackay Companies	70
Mackay Companies, preferred	67
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	21 $\frac{1}{8}$
Western Union Telegraph Co.	58 $\frac{1}{2}$

Recent Telegraph and Telephone Patents.

ISSUED DECEMBER 8, 1914.

1,119,952. Transmitter for Wireless Communication. To W. Harrison, New York.

1,120,049. Telephone Apparatus. To O. M. Glunt, Rutherford, N. J., and C. G. Mueller, Elizabeth, N. J.

1,120,054. System for Signaling Through Space. To W. Harrison, New York.

1,120,261. Translator for Printing-Telegraph Systems. To J. E. Wright, New York.

1,120,517. Device for Protecting Telegraph and Like Lines Against Inductive Action from Neighboring Circuits. To O. Moll and P. Kuschewitz, County of Kent, England.

1,120,605. Telephone System. To W. W. Dean, Elyria, Ohio.

1,120,606. Party-Line Telephone System. To W. W. Dean, Chicago, Ill.

ISSUED DECEMBER 15, 1914.

1,120,849. Moisture-Proofing and Moisture-Proofed Telephone and Switchboard Cord Conductor. To A. Pruessman, Chicago, Ill.

1,121,356. Telephone System. To J. Harrison, Glendale, Mo.

1,121,400. Automatic Telephone Calling Device. To P. Richardt, Prague, Austria-Hungary.

PERSONAL.

MR. G. W. FOSTER, of Dallas, Tex., an old-time telegrapher, contributed an interesting article to the *Dallas Times-Herald* of December 20, on the report of postmaster-general Burleson. Mr. Foster shows up the fallacy of government ownership of the telegraph and telephone in a very convincing manner.

WIVES OF ENGLISH OPERATORS RETURN TO WORK.—In order to release telegraph clerks and engineers for military duty the British post-office is securing the services of former female clerks who left the service to get married. There has been a ready response to the demand.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. E. REYNOLDS, vice-president and general manager, expects to start on a trip through the west and southwest about January 11, in accordance with the plan announced some time ago of visiting all offices. Mr. Reynolds expects to visit a very large number of Postal offices during the next few months.

MR. W. I. CAPEN, vice-president, New York, has returned from a trip of inspection through the Southern States.

MR. C. P. BRUCH, vice-president, made a trip to Philadelphia last week on company business.

MR. A. C. CURRIE, manager at Titusville, Pa., has been appointed manager at Sharon, Pa., vice Mr. E. F. Quinn, transferred to Beaver Falls, Pa.

ALLAN HARGRAVE, son of Mr. Jesse Hargrave, superintendent of the Mackay Telegraph and Cable Company, Dallas, Tex., is editor-in-chief of *The Dallas Journal*, a school paper published by the students of the Dallas, Tex., high school. The paper shows intelligent editorial work, and is attractively gotten up. Mr. Hargrave will graduate this year.

AMONG RECENT EXECUTIVE OFFICE VISITORS were Mr. C. E. Bagley, superintendent, Philadelphia, Pa.; Mr. Y. Yano and Mr. M. Watanabe, of the department of communications, Tokio, Japan.

MANAGERS have recently been appointed as follows: A. Beutler, Moline, Ill., vice J. Landau, resigned; C. S. Fearer, Lorain, Ohio, vice F. W. Krock, resigned; C. C. Barr, Ashland, Ohio, vice C. Fearer, transferred; R. E. Tooke, Ypsilanti, Mich., vice M. Evans, resigned.

THE MACKAY TELEGRAPH AND CABLE COMPANY has started work on the extension of its lines from McAlester, Okla., to Sherman, Tex.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. R. H. MORRIS, former electrician of this company, New York, and now retired, is in the German hospital in Greenville, N. J., where he underwent a surgical operation. His many friends will be pleased to know that he is doing well.

MR. W. J. QUINN, who for over forty years has held the position of chief of the time-keeping department of the general operating room of this company, New York, will soon retire from active service. A dinner will be tendered to him by his many friends on Saturday night, January 23, at the Broadway Central Hotel, New York.

A RECORD CABLE BUSINESS was done by the Western Union Telegraph Company on Christmas day. Cablegrams of a social nature seemed to be more numerous than usual.

MR. R. B. FERGUSON, former district commercial manager at Syracuse, N. Y., has been appointed manager of the Chamber of Commerce office at Buffalo, N. Y.; Mr. J. W. Gaffey, former district commercial manager at New Haven, Conn., has been appointed commercial agent of superintendent W. A. Sawyer's office, New York, and Mr. G. R. Daniels, former district commercial manager at Scranton, Pa., has been appointed manager at the same place.

MR. CHARLES HOLMES, formerly connected with the president's office at 195 Broadway, was a recent executive office visitor.

MR. W. W. BROWNE, former manager for the Western Union Telegraph Company at Columbus, Ohio, has been appointed superintendent of a new division of the American District Telegraph Company, with headquarters at Toledo, Ohio. The new division includes the States of Ohio, Indiana, and Michigan.

BURLINGTON, IOWA, MANAGERSHIP.—On page 658, of our issue dated December 16, it was stated that Mr. George Heldorfer, manager at Burlington, Iowa, had returned to his office after a vacation. We were in error in stating that he was manager there. The reference should have read "former manager." Mr. E. F. Sweetser is the manager, having succeeded Mr. Heldorfer in July, 1911. Mr. Heldorfer was retired on a pension in July. Mr. Charles H. Ebert, wire chief at Burlington, has returned to duty after a vacation.

Western Union Experimental and Testing Laboratory.

A new experimental and testing laboratory is now being completed by the Western Union Telegraph Company at its headquarters, 16 Dey street, New York. It comprises three rooms, one of which will be used for experimental work of a general nature, such as routine acceptance tests, and the like. This room will contain the motor-generators for supplying the direct and alternating current voltages required for various tests.

The second room is to be devoted entirely to tests pertaining to key-worked apparatus. In this room standard duplex, quadruplex and composite sets are being permanently set up. With the aid of these, comparative tests of non-standard and new apparatus with standard equipment will be readily made.

The third room is set aside for tests of automatic apparatus. Here high-speed telegraph sets of all types will be tested and developed, and tests for the final perfection of the new multiplex will be carried out.

Numerous trunk lines are provided from the laboratory to the operating room in the Walker-Lispensard Building, by means of which connections may be made to actual telegraph circuits, and tests thus made under working conditions. For general laboratory use, an artificial telegraph line is being designed.

THE CABLE.

NEW CABLE STATION FOR WESTERN UNION.—Plans are being made for a new station for the Western Union cable system at Rockaway Beach, L. I.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to December 28 as follows:

Azores and Emden (two cables), August 5; 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 Alhucemas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6; Martinique-Guadeloupe, November 24; Mole St. Nicholas-Port au Prince, December 4; Cayenne-Salinas, December 14.

CANADIAN NOTES.

MR. A. H. MORSE, identified with the Marconi Wireless Telegraph Company at London, England, was a recent Montreal visitor.

MR. O. M. STONE, a well-known old-time telegrapher, identified with the Canadian Pacific Railway Company's telegraph service at Edmonton, Alb., was a recent New York business visitor. Mr. Stone is wire chief at Edmonton and is well known in the United States.

MR. R. FERGUSON, wireless operator on the steamer "Empress of Ireland" at the time of the loss of that vessel in the St. Lawrence River last summer, and who was complimented by Lord Mersey at the time of the inquiry looking into the cause of the disaster, has been appointed on the personal staff of Major Maitland Kersey, the manager-in-chief of the Canadian Pacific Railway Company's ocean service.

Consolidation of Canadian Telegraph Companies.

An arrangement of considerable interest to the people of Canada has just been consummated between the Great Northwestern Telegraph Company and the Canadian Northern Telegraph Company. After January 1 these two large telegraph systems will be operated as one, under the name of the Great North Western Company. It is also understood that within the next few months the local lines and offices of the Western Union Telegraph Company in the maritime provinces will be operated by the Great North Western Company, which will then have the largest telegraph system in Canada, it covering the country from the Atlantic to the Pacific. It will have over 1,700 offices in Canada and direct connection with 22,000 offices of the Western Union Telegraph Company in the United States, as well as with eight transatlantic cables, six of which have landing stations in Canada.

Z. A. Lash, K.C., continues as president, and Mr. Geo. D. Perry as general manager of the Great North Western Company.

THE TELEPHONE.

MR. N. C. KINGSBURY, vice-president of the American Telephone and Telegraph Company, New York, made an address on "The Special Service of Statistics to Business" at a dinner of the American Statistical Association held at the Yale Club, New York, on December 11.

MR. C. H. WILSON, general superintendent long-distance lines, New York, has been elected a director and member of the executive committee of the Cumberland Telephone and Telegraph Company, vice E. J. Hall, deceased.

GENERAL THOMAS SHERWIN, aged seventy-six years, chairman of the board of directors, New England Telephone and Telegraph Company, Boston, Mass., died in that city on December 19, after an illness of several weeks. He was a native of Boston; was graduated from the Boston Latin School and Harvard University, and went through the Civil War with a Massachusetts regiment. He was formerly auditor of the American Bell Telephone Company and vice-president of the American Telephone and Telegraph Company.

MR. L. W. STORROR, of the Pacific Telephone and Telegraph Company, San Francisco, Cal., retired from active service at the end of 1914. Mr. Storrer was superintendent of the Pacific Postal Telegraph-Cable Company and afterwards general superintendent of the Postal Telegraph-Cable Company, which position he held until five years ago, when he transferred his services to the Pacific Telephone and Telegraph Company. Mr. Storrer is well and favorably known to telegraph and telephone officials throughout the entire country. He has a record of being an excellent official.

Telephone Stock for Employees.

The American Telephone and Telegraph Company announces that arrangements have been made by which employees of the Bell System who have been two years or more in the service and who so desire may purchase stock of the company for \$110 per share on easy terms of payment. No employee can purchase more than one share for each \$300 of annual wages he receives nor more than ten shares, whatever his wages.

The terms of payment will be \$2.00 per share per month beginning with March, 1915, and the quarterly dividends paid on the stock will go towards paying for it after deducting interest at four per cent per annum on the unpaid balances.

The American Telephone and Telegraph Company has paid eight per cent dividends for seven years, and it is calculated that dividends at this rate and the \$2.00 per share per month payments by employees will pay for the stock in full by November, 1918. Any employee who so desires can, after March 1, 1917, but not before, pay in the balance on his stock and receive his stock certificate.

Should an employee leave the service or die before his stock is fully paid for, the amount he has paid in plus the accumulated dividends (less four per cent interest) will be paid back.

The American Telephone and Telegraph Company has about 60,000 stockholders and 160,000 employees. Its issued capital stock is nearly \$350,000,000, and is quoted on the stock exchanges at about \$118 per share.

The company makes it plain that no employee is under any obligation to buy any stock, but it is believed that a considerable number of employees will take advantage of this opportunity to save a little money every month and invest it in the business.

RADIO-TELEGRAPHY.

HONORS FOR MR. MARCONI.—It is announced that Mr. William Marconi is among those who will be appointed senators on New Year's day by King Victor Emanuel of Italy.

WIRELESS TIME SIGNALS.—An Arkansas City, Kan., jeweler has a wireless aerial above his store and claims that his is the first jewelry store in the United States to receive time signals daily by wireless.

FAREWELL DINNER TO MR. MARRIOTT.—Mr. R. H. Marriott, radio inspector, New York, has been transferred to Seattle, Wash. A farewell dinner was tendered to him at Mouquin's up-town restaurant, New York, on the evening of December 23, by the Board of Direction of the Institute of Radio Engineers, New York, of which institute he is past president and one of the managers. There were about sixty of Mr. Marriott's friends present, and the affair was very enjoyable. The toasts were both amusing and entertaining, Mr. John Stone Stone being the toastmaster.

WIRELESS AMATEUR FINED.—On November 24 Judge Wellborn, of Los Angeles, Cal., fined an amateur for operating a radio station without a license. The defendant contended that because his apparatus had not been reported as interfering with commercial stations, and because, in his opinion, he could not transmit beyond the boundaries of the state in which his station was located, that his equipment did not require a license. The conviction was obtained on the ground that his station could interfere with interstate communication to licensed amateur stations in his vicinity.

DECISION IN FAVOR OF MARCONI COMPANY.—In the suit of the Marconi Company against the DeForest Radio Company and the Standard Oil Company for infringement of certain letters patent, in which Judge Hough recently granted the Marconi Company a preliminary injunction, the court has handed down another decision. It appears that subsequent to the former decision the defendants moved to suspend the injunction pending an appeal, in so far as it related to the boats of the Standard Oil Company, and also another motion to vacate or modify the injunction with respect to both the defendants. These motions were brought upon additional affidavits, but Judge Hough, in a decision filed December 15, denied all of the motions, thus refusing to suspend the injunction as to the Standard Oil Company, and to vacate or modify the injunction as to both defendants.

Marconi Christmas Dinner and Dance.

A dinner and dance was tendered by the Marconi Wireless Telegraph Company of America on the afternoon of December 24 to the New York employees of the company. The affair was held on one of the upper floors of the Woolworth Building, the room being beautifully decorated for the event. Excellent music was provided to enliven the occasion, and there were 100 persons present. The dinner was served by the Woolworth Building caterer.

Messrs. E. J. Nally, vice-president and general manager; John Bottomley, vice-president, secretary and treasurer; F. M. Sammis, chief engineer, and G. S. De Sousa, traffic manager, received the guests. Mr. E. B. Pillsbury, general superintendent, trans-oceanic division, and Miss L. Horton, of the engineering department, had charge of the arrangements.

Function of the Earth in Radio Telegraphy.

Prof. J. A. Fleming delivered an address on "The Function of the Earth in Radio Telegraphy" before the Wireless Society of London, November 13.

It was an undoubted fact, he said, that the nature of the earth's surface exerted a most important effect on wireless transmission over it. In certain districts there was quite abnormal wave attenuation as, for instance, north and northeast of Newport, R. I. (U. S. A.), in the district where Dr. Austin's experiments were carried out between Brant Rock and the cruiser "Birmingham."

Assuming standard physical properties, the depth of the "current skin" in copper was about $\frac{1}{4}$ mm., but in iron it was only $\frac{1}{50}$ mm., owing to the high permeability of this metal. By means of striking cymometer experiments, Prof. Fleming showed that while insulating coverings did not affect the damping produced by the magnetic properties of iron, galvanizing provided a skin of zinc thick enough to carry the high-frequency current without permitting the latter to reach the iron core. Galvanized iron wire was, therefore, permissible for aërials and for earth connections so long as the galvanizing remained continuous and uncorroded.

The materials of the earth's crust were conducting dielectrics, and the problem of current penetration was complicated by the fact that conducted current and dielectric current had both to be taken into account. The conductivity of all dielectric materials, even if imperfect dielectrics, was much greater for alternating than for direct currents and was vastly greater still when carrying currents of radio-telegraphic frequency. There was, he said, a fertile field for research in measuring the conductivity and dielectric constants of sea water and earth crust materials at radio-telegraphic frequencies, and particularly valuable results might be expected from really large scale experiments say, with huge electrodes one-quarter mile or so apart, which would give reliable averages for various kinds of soil under various conditions.

Prof. Fleming showed mathematically that refraction of electrostatic fields between air and earth or water produced a considerable horizontal com-

ponent near the surface, thus producing a periodic displacement or wave in the earth's crust. To this phenomenon the speaker attributed the possibility of reception of time signals on such unorthodox aërials as bedsteads, bicycles and dustbins.

Though much yet remained to be learned, it was definitely established that good conductors prevented deep current penetration; that penetration and attenuation occurred apart from mere weakening by diffusion; that attenuation was greater for short than for long waves, and reached a maximum at certain values of permeability, resistance and dielectric constant; and that the curvature of the earth weakened the true space wave. At 3,000 to 6,000 miles, most of the received effect was probably due to bending by ionic refraction. Long-distance reception was complicated by many factors, and our earth was probably unique in being the only planet on which long-distance radio-telegraphy was possible.

REPORT ON RADIO COMMUNICATION.—Secretary of Commerce W. C. Redfield states in his annual report that during the past year the work of his department relating to radio communication was practically double that of the fiscal year ended June 30, 1913. Ship inspections numbered 6,486, compared with 3,201 during the previous year, and the number of stations licensed was 2,309. There were 2,245 applicants for licenses, 1,547 being found competent, and received permits. There has been a steady elevation of the standards of efficiency of apparatus and operators, the report states. Secretary Redfield recommends that if for any reason the regulation of rentals should not be entrusted to his department it might be assigned to the Interstate Commerce Commission, or to the new Federal Trade Commission.

New Book on Wireless.

WIRELESS TELEGRAPHY. By A. B. Rolfe-Martin. 256 pages; 143 illustrations. Adam and Charles Black, London. Price, \$2.00.

The wide interest in wireless telegraphy is evident from the number of books that have been published on the subject in the past few years, and the justification for so much literature is probably found in the rapid expansion of the wireless art and the endeavor to keep those interested informed on the latest developments. The author has endeavored to produce a book that the student of electrical engineering and the practical man can find profit in. He goes thoroughly into the fundamental principles and has omitted mathematical and theoretical concepts, but retains mathematics enough for actual necessity in developing the studies.

The book has fifteen chapters and the subjects are presented in a clear manner. Nothing new is claimed for the work; it is simply a restatement of a subject from another point of view, and in this instance the author has a lucid way of expressing himself. The book has the merit of being up to date, and explains thoroughly the Marconi and Telefunken practice.

Copies may be had of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Government Ownership of Telegraphs and Telephones.

In his annual report, submitted to Congress on December 14, postmaster-general Burleson renews the recommendation that Congress seriously consider the question of declaring a Government monopoly over all utilities for the public transmission of intelligence and that steps be taken as soon as practicable to incorporate into the postal establishment the telegraph and telephone systems of the country.

"The firm conviction of the department," he says, "is here reiterated, that telegraph and telephone service is inevitably monopolistic and, when operated under private control, does not render the maximum of public service at the minimum cost to the whole people.

"It is an interesting fact," he continues, "that, whereas policies of government have been advocated and some adopted, the constitutionality of which have been seriously questioned, the principle of government ownership and control of the telegraph and telephone finds its greatest strength in the Constitution. This opinion has been shared by practically all postmasters-general of the United States, who have held that the welfare and happiness of the nation depend upon the fullest utilization of these agencies by the people, which can only be accomplished through government ownership."

Mr. Burleson also recommended that the telegraph and telephone facilities of Alaska, Porto Rico, and the Hawaiian Islands be at once taken over and operated by the post-office department. This recommendation is based on an exhaustive investigation which disclosed that the conditions in these territories are generally such as to favor the change.

Mr. N. C. Kingsbury, vice-president of the American Telephone and Telegraph Company, delivered an address on "Publicity" before the Telephone Society of New York, in which he discussed the attitude of his company toward the question of government ownership of the telephone.

"We have heard a good deal recently in regard to government ownership of the telephone and telegraph," he said. "We do not believe it is our duty as a corporation either to champion that plan or to violently oppose it. When the people of this country decide that it is their wish that the government of the United States own the telephone and telegraph, then the government of the United States will own them—there is no doubt about that. We do not intend to set ourselves up in opposition to the expressed wish of the people—that is not our plan nor our policy—but we are going this far: It is our policy to present the salient facts. We do believe it is our duty to let the people of this country know just what is involved in the proposition of government ownership.

"There are no secrets in our business. The annual reports of Mr. Vail have kept nothing back. Investigation could reveal nothing beyond what he has voluntarily published. He has sought to let the public know just what our business means

when viewed as a whole; what purposes it seeks to realize; what prospects for adding to human comfort, convenience and happiness it holds out."

Sleet on Telegraph and Telephone Wires.

BY R. D. COOMBS, CONSULTING ENGINEER, NEW YORK.

The recent sleet storm (December 8) in the region of Derby, Conn., provided an illustration of a number of matters of interest to the telephone and telegraph industry. The writer's examination of the results of the storm was unfortunately confined to observations made from a train, but careful observation disclosed a number of interesting features.

As is frequently the case, the effects of the storm were localized, and it was very noticeable that, along the railroad, sections of heavy sleet deposit were comparatively close to sections of little or no sleet. Along certain portions of the railroad there was a heavy pole line with six ten-pin arms on one side of the track, and a much lighter line on the opposite side. The storm apparently came from the direction of the lighter line, and that line afforded no protection to the heavy line. Indeed, it would seem that, considering opposite sides of the track in the same location, the heavier line received a relatively heavier deposit. If true, this would appear to have been due to the tendency of the heavier line to form a more complete obstruction to the wind, thus promoting the deposit of sleet on the wires of that line.

Considering a rather extended region including the greater deposits, the actual amount of sleet on the wires apparently varied from that sufficient to provide an equivalent thickness of one-quarter of an inch, to an equivalent thickness of one-half inch. The actual deposit of sleet was in general below the wire, and included a large number of icicles hanging from the horizontal ice formation.

The efficiency of adjoining timber as a protection to the pole lines was very noticeable, and this was also true of the protection afforded to the heavy line by the railroad embankment. It would appear further, that the wires withstood a loading of one-quarter inch thickness of sleet, but failed where the loading approached or perhaps exceeded one-half inch, and that the pole failures were generally at the ground line.

Although the writer has no information as to the length of the spans, and the normal sag of the wires, it would appear that the wires must have withstood heavy stresses, and that there could not have been much wind pressure. It is entirely probable that check computations would show that even small wires were able to withstand the mechanical overloading in excess of their theoretical values, since the latter cannot take into account the elongation of the wire, or its slipping at the insulators.

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Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation.

In our issues, dated August 16 and September 1, were printed abstracts of the discussions of several telegraph and telephone engineers on the paper of Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn., entitled, "Comparison of the Telegraph with the Telephone as a Means of Communication in Steam Railroad Operation," which paper was read before the American Institute of Electrical Engineers on March 13.

Among those who took part in the discussion was Mr. Donald McNicol, of the engineer's department of the Postal Telegraph-Cable Company, New York. [See page 502, September 1 issue, for Mr. McNicol's communicated remarks.]

Mr. Clapp has submitted by letter the following reply to Mr. McNicol's discussion. It is printed by TELEGRAPH AND TELEPHONE AGE by permission of the American Institute of Electrical Engineers in advance of its appearance in the regular proceedings of the Institute. Mr. Clapp says:

"I think the points made by Mr. McNicol are very interesting and some of them are well taken. I believe that there is a great deal in the idea that in our desire to extend the application of the telephone to the railroads we have overlooked possibilities in connection with the telegraph. However, I believe at the present time more and more attention is being given to the development of the telegraph, especially to automatic telegraphy.

"It is difficult for me to agree with the assertion that the available supply of operators has been sufficient during the past few years. There has certainly not been an adequate supply in the Northwest during this period. Of course, at the present time there is very little, if any, trouble experienced in obtaining operators. However, we consider that at present, to say the least, we are not having prosperous times. As soon as business conditions improve I think we shall have serious difficulty in obtaining operators necessary to handle our business.

"Relative to the ability of the operators of to-day, I appreciate that first-class operators can, by the aid of the typewriter and other modern equipment, handle more messages per hour than was formerly done under less favorable circumstances. However, it has been our experience, and the experience of other railroads in the West, that the average operator is not as competent as formerly.

"Mr. McNicol apparently misunderstands the point that I was endeavoring to make in connection with the opportunities for the telegraphers to enter fields other than the telegraph. In my paper I made the statement 'Twenty or thirty years ago . . . there were not then the many opportunities to enter electrical pursuits that there are to-day.' In this I was endeavoring to call attention to the fact that two or three decades ago the electrical field was very much limited as compared with the conditions of to-day for the man who desired to take up elec-

trical work, and that the studying and taking up of telegraphy was one of the few opportunities in this line of work, instead of one of many, as is the case to-day. The result of this condition was that a great many high-grade men entered the telegraph field, and as stated by Mr. McNicol, 'twenty years ago the heads of most electrical enterprises of any importance were ex-telegraphers.' Also, a considerable number of these men who started telegraphing in the early days rose to important positions in connection with the different railroad companies of this country. I agree entirely with the statement that under present conditions it is difficult for a telegrapher to change to another line of work. However, this does not change the condition that formerly the telegrapher on the railroads was a higher grade man than at present, and even if he did leave the railroad the railroad had the benefit of his services while he continued on the system.

"The statement is made that operators can send without hardship seventy messages an hour. This may be true in commercial offices in connection with bonus wires and where the messages are short, as compared with those handled on a railroad. In our offices an average of thirty messages an hour is a high one. This is on the basis of handling the messages as they are offered and includes forms, which constitute a considerable percentage of railroad work. Considering now the matter of telephone message circuits, I have watched the operation of several of these circuits and I have yet to find a case where the number of messages handled was not practically double the number handled on the same division or section of line that was formerly handled by telegraph. This statement applies almost exclusively to local or way circuits on railroad divisions, and it is only fair to say that the ability to call in promptly the different way offices along the line is a very important factor in favor of the telephone.

"The saving of time in the transmitting of train orders by telephone, as compared with the telegraph, is not in the sending but in the repeating back of the orders. The same order is often given to five or six operators at the same time. Now, it is necessary to have the order repeated back by each operator receiving it. When this is done by means of the telegraph the order cannot be repeated back by the operators any faster than they can send over the telegraph wire. On the other hand, the operators on a telephone circuit can repeat the order back as fast as they can read it and the dispatcher can underline the words in his order book. Further, in connection with the speed of receiving messages over the telephone, I desire to say that messages can be received by telephone on a typewriter by an expert typist much faster than can be done by the telegraph unless code is used, which is not practicable in connection with an average railroad office.

"In reference to the condition under which telegraph circuits are more susceptible to disturbances than telephone circuits, I had in mind grounded telegraph and metallic telephone circuits. I ap-

preciate that if metallic telegraph circuits were used some of the statements made in my paper in comparing the telegraph and the telephone would not hold true.

"The disadvantage in the use of the telephone mentioned by Mr. McNicol, of the operator being obliged to remain at his desk with the receiver at his ear in order to be informed as to what is taking place on the circuit, is really negligible and is not considered by the railroads, except in a few special cases. It is very easy for the operator to cut in on the dispatcher's circuit and ask the dispatcher any question desired. In many cases the operator can, by using judgment, ask questions and obtain answers when the dispatcher is talking to another operator on the line, and not cause any perceptible interruption to the operation of the circuit. Also, in practice the operator really has more freedom when the telephone is used than is the case with the telegraph, for in connection with the former he does not have to be listening for his call on the wire and can work outside of his office, or at any point in the station, as long as he is within hearing distance of the telephone bell.

"There is no question that the reduction in the cost of the handling on telegraph messages by half a cent per message would be a very profitable matter to consider by any railroad company. However, I desire to call attention to the fact that on a railroad there is not the same opportunity for cutting down the cost per message that is possible in connection with a commercial telegraph company, for the reason that railroad messages are handled in many cases by operators and agents who have a great many other duties to perform, telegraphing being merely incidental to other work. There are only a few offices handling enough messages and having enough operators so that economies can be effected in handling the business. The five million messages per annum to which I referred in my paper were handled by some 1,250 operators."

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 factors does the term "impedance" include? (page 92)

What is the name of the unit employed to express impedance?

How is Ohm's law expressed to include impedance?

Does impedance relate to direct or alternating currents?

What is meant by "effective current"?

How is the magnetic field of a retardation coil made as great as possible?

Why is the magnetic field made large?

How are the ampere-turns made large?

How is the "reluctance" of the magnetic circuit made low?

How are eddy currents minimized in induction coils?

How is an iron core "laminated"?

How are coils wound to make them non-inductive? (page 93)

What is the effect of winding the wire in the manner described?

How is the magnetic effect in a relay preserved, and, at the same time, the effect of self-induction avoided?

How is "effective" current or "effective" pressure ascertained; how are they indicated on the measuring instrument?

What is the type of instrument employed to make such measurements, and what is the principle of its action?

What is a "henry"?

If an alternating current in a self-inductive coil is increased, will the e. m. f. of self-induction be increased in proportion?

How may the mathematical relations between impedance, reactance, resistance and lag be expressed? (See Fig. 35 on page 94.)

Answer the fifteen questions on pages 95 and 96.

Upon what does the electrostatic capacity of a body depend? (page 98)

How is a condenser made?

What may be the insulating substance of a condenser?

What is such a substance called?

What are the coatings or conducting surfaces of a condenser named?

Does a condenser store electricity?

What is the unit of condenser capacity?

Why is a "farad" subdivided for practical purposes? (page 99)

Does a static charge ever appear on the inside of a conductor?

Where does it appear?

Does the thickness of the plates of a condenser affect its capacity?

What influence does the surface of the plates have upon the capacity of a condenser?

(To be Continued.)

BRITISH TELEGRAPH AND TELEPHONE REPORT.—The recent report of the British postmaster-general states that in 1913-14, 87,089,000 telegrams were transmitted, showing a decrease of 1,405,000; the revenue was \$14,100,000, a decrease of \$240,000, ascribed to the diminished use of the telegraph for short-distance messages, in competition with the telephone. Radio-telegrams numbered 57,252, as compared with 51,109 in the previous year. The total number of licenses in existence on March 31 was 1,063, compared with 942 in the previous year. At the same date the post-office telephone system comprised 774,821 stations, of which 47,165 were private lines. The number of effective calls during the year was 834,000,000, an increase of about five per cent.

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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, JANUARY 1, 1915.

New Year's Greetings.

We hope that the new year will bring happiness and prosperity to each and every one of our friends.

The Government Ownership Bugaboo.

Once more the American people have been told what great benefits they are missing by not letting the government do the telegraphing and the telephoning for them. The government ownership proposition has again come to the surface through the second effort of postmaster-general Burleson, who, in his annual report to Congress, reiterates the thread-worn argument. He states that it is the conviction of his department that the telegraph and telephone service is inevitably monopolistic, and, when operated under private control, does not render the maximum of public service at the minimum cost to the whole people.

As we interpret the public sentiment at the present time the people are not in favor of government ownership of telegraphs and telephones. Evidently, the postmaster-general does not know that a very small percentage of the "whole people" use the telegraph and it is extremely doubtful that if the

government controlled this service the "whole people" would telegraph any more than they do now.

The great majority of the people will not pay more money for a telegram, which, necessarily, must be brief, when they can write a letter and say all they desire, and send the letter by mail for two cents.

For private correspondence, where speed of transmission is not essential, the telegraph will never compete with the mail, and the government, or any other power, cannot make the people use the telegraph in preference to the mail. The real users of the telegraph are the business men, with whom time is an important element, and it is only in case of urgency that private communications are sent by telegraph.

Under government ownership the "whole people" would be taxed enormously to buy and maintain an institution for the benefit of the business community which is not complaining at all of the telegraph rates and service, and who can afford to pay for the service in proportion to their use of it. Better service and lower operating costs come from private operation under adequate regulation than from public operation.

A Worthy Association.

One of the most praiseworthy agencies for the relief of unfortunate members of the telegraph fraternity in New York and vicinity is the New York Telegraphers' Aid Society. It performs its work silently and unostentatiously, and ought to be more widely known and supported. Its activities are directed along two lines—insurance benefits and a relief fund. The insurance feature is conducted in the usual manner of assessment companies, but the relief fund, which is a separate but closely related function, is maintained in a different manner. It is largely supported through the income derived from an annual entertainment given by the association in New York, which, for character and quality, is one of the events of the season. The proceeds of these annual entertainments are applied to the relief fund and are devoted to the help of members of the craft who have become stricken with illness and are not able to secure proper medical attention, and who, for any reason beyond their control, are debarred from membership in the association.

The association is doing a grand work in relieving distress among those who are worthy of aid, and hundreds of unfortunate operators who have passed away while under its care have received decent burial, which, likely, they would not have received except for this fraternal aid.

The association and its relief fund are conducted in a systematic manner; there is no waste whatever; it is a labor of love on the part of the officers and managers, and every penny is faithfully accounted for. Surely, such an organization is deserving of the thoughtful and helpful consideration of the more fortunate members of the fraternity. It cares for the sick and buries the dead, and what more humane agency could there be?

Printing Telegraph Systems.

One of the most noteworthy features in connection with the development of the telegraph in recent years is the multiplicity of printing telegraph systems in actual service, or bidding for recognition. It used to be the practice for inventors to ask the telegraph companies to buy their patent rights, leaving the development of the invention to the companies, to be carried on at the latter's expense. For this reason inventors received scant encouragement, or none at all. Now the conditions are changed. The inventor is only too willing to invest his own or borrowed money in the development of his invention and give it a practical test at his own expense, the only requirement asked of the companies being the use of their wires for the purpose.

The merits of the invention having been demonstrated, the inventor is in a position to approach the companies with a definite proposition to equip the lines with the new system. The companies are usually asked to pay a royalty on each set of instruments used by them, the inventors guaranteeing to keep the systems in working order. Such a proposition naturally appeals to the companies, because they are relieved of much of the burden incident to introduction and operation. They have little to lose and possibly much to gain. On the other hand, the inventor finds such an arrangement much more satisfactory to himself because it enables him to operate his system at its highest efficiency by the employment of a specially trained force. If he fails to back his claims with performance, it is his own fault, and not that of the companies.

REOPENING OF EXCHANGES REVIVE BUSINESS.—The reopening of the New York stock exchange has resulted in a great boom to business and the re-employment of several hundred first-class telegraphers in New York and throughout the country. Another result of the reopening is the renewal of the leases of a large number of telegraph and telephone circuits to various sections of the country. The opening of the Cotton Exchange has also caused a notable revival of business throughout the South. Cotton prices are advancing and there is a decided change for the better in all large southern cities which, to a considerable extent, depend upon the cotton industry. Altogether the outlook for 1915 is very favorable.

TELEGRAPH FORCES ENTERTAINED.—The managers, operators and messengers of the Western Union and Postal Telegraph-Cable companies at Wilmington, N. C., were entertained at dinner on December 23 by Mr. H. A. Webber, manager of the Elks' Club in that city. During the dinner Mr. W. H. Stansell, manager of the Postal office, reproduced some beautiful Morse on a talking machine from a set of Morse disc records received by him recently, which was much enjoyed by all the operators present. The Elks entertain the messenger boys of Wilmington at a dinner annually, and on this occasion there were about twenty boys present. It was a very enjoyable affair to all.

Holiday Greetings.

We acknowledge, with hearty thanks, the receipt of holiday greetings from E. Reynolds, vice-president and general manager, Postal Telegraph-Cable Company, New York; S. M. English, general manager, Gulf Division, Western Union Telegraph Company, Dallas, Tex.; A. S. Hibbard, American Telephone and Telegraph Company, Chicago; Commercial Cable Company, New York; H. C. Worthen, general manager, Southern Division, Western Union Telegraph Company, Atlanta, Ga.; W. H. Baker, secretary, Western Union Telegraph Company, New York; J. F. Skirrow, associate electrical engineer, Postal Telegraph-Cable Company, New York; H. A. Tuttle, president and general manager, North American Telegraph Company, Minneapolis, Minn.; W. C. Lloyd, superintendent, Postal Telegraph-Cable Company, Birmingham, Ala.; J. McMillan, general superintendent, Canadian Pacific Railway Company's telegraph, Winnipeg, Man.; T. F. Clohesey, Langdon and Hughes Electric Company, Utica, N. Y.; W. P. Cline, superintendent of telegraph, Atlantic Coast Line, Wilmington, N. C.; E. W. Collins, general superintendent, Postal Telegraph-Cable Company, Chicago; E. W. Miller, chief operator, Postal Telegraph-Cable Company, Philadelphia; G. M. Myers, past president, Old Time Telegraphers and Historical Association, Kansas City, Mo.; J. H. Bunnell and Company, New York; J. D. McLelland, manager, Western Union Telegraph Company, Houston, Tex.; G. E. Sornberger, manager, Western Union Telegraph Company, Williamsport, Pa.; G. H. Mills, manager, Postal Telegraph-Cable Company, Providence, R. I.; J. W. McMahon, manager, Western Union Telegraph Company, Bridgeport, Conn.; D. F. Ingold, chief operator, Western Union Telegraph Company, San Francisco, Cal.; J. Z. Hayes, chief operator, Postal Telegraph-Cable Company, Detroit, Mich.; C. A. Crane, manager, Western Union Telegraph Company, St. Paul, Minn.; Jesse Hargrave, superintendent, Mackay Telegraph and Cable Company, Dallas, Tex.; E. D. Slingerland, bureau of posts, Dumaguete, Oriental Negros, Philippine Islands; L. C. McIntosh, Southern Pacific Company, Los Angeles, Cal.

TELEGRAPH COMPANY'S VIGILANCE IN DETECTING FRAUD.—D. A. Walderen, alias R. L. Newburn, alias J. W. Clark, a telegraph operator, was recently convicted of forging telegrams, and sentenced to two years' imprisonment. A bank which he attempted to defraud took the precaution to wire for confirmation of the payment which it was called on to make. The operator who handled the bank's message requesting verification and the ensuing telegraphic correspondence suspected that something was wrong, and brought the matter to the attention of his superior. When circumstances developed, which indicated that a telegraph employee was concerned in the attempt at fraud, the telegraph company took immediate and energetic steps to discover the guilty person, and the arrest and conviction of Walderen followed.

Government Ownership and Wireless.*

Government ownership enthusiasts might well study the present development in the Alaska telegraph situation. The United States Government, through its signal corps, has for years had control of all communication by telegraphic cable between Seattle and various Alaska ports. This is designated as a cable to be used by the various departments of the government, but as it has been utilized to a far greater extent as a commercial telegraph line it would have been described as a monopoly if it had been owned and operated by a private individual or corporation. It has been shown that the Alaska cable in every way is most inefficient and the service given of the poorest possible kind.

At the present time the Marconi Wireless Telegraph Company has entered into the Alaska situa-

the antennæ have been stretched from the top of each building, making this practically one of the highest wireless towers in the United States. While the plant in the Smith Building is of five-kilowatt, yet the great height of the two buildings has increased the efficiency of the Seattle office 200 per cent, and, while Friday Harbor, in the San Juan Island, was formerly used as a relay station, this has been eliminated, although Friday Harbor will continue as a commercial station. Seattle is now in direct communication with all ships plying in Alaska waters and has successfully reported the movement of Nome boats as well as important wreck details. The antennæ at Ketchikan and at Astoria are stretched from four 300-foot, self-supporting steel towers, while Juneau has but two towers. All of the plants include the necessary mechanical and



NEW MARCONI STATION AT KETCHIKAN.

tion and presents the unique spectacle of a wireless preparing to eliminate a submarine cable by giving better service at much lower rates. Just completed at Ketchikan, which is the first important point in Southeastern Alaska, is a Marconi wireless station which is one of the most powerful and complete in the Pacific Northwest. It is a twenty-five-kilowatt plant and is to be used as the great relay station for the dissemination of all Alaska messages. To the north, 250 miles, at Juneau, a ten-kilowatt station has been erected, while at Astoria is another twenty-five-kilowatt station which will be the central plant for the North Pacific Coast.

In addition to these three stations the company's northwest headquarters have been moved to the twenty-first floor of the new forty-two-story L. C. Smith Building in Seattle, and by special arrangements with the owners of this building and of the Alaska Building, two blocks up Second Avenue,

administrative residences and buildings for appliances and repairs.

The most prominent feature of this new and important departure is the promised cut in rates under those charged by the government cable. Under the new system, while the government cable charges nineteen cents a word, minimum of ten words, to Ketchikan, the Marconi Wireless reduces this to twelve cents a word, minimum of ten words. From Seattle to Juneau the United States rate is sixteen cents per word, minimum of ten words, while the Marconi Wireless rates will be ten cents, minimum ten words. More important than all is the fact that the United States cable operates but six hours per day and six days per week. This, in the past, has been the greatest cause of annoyance to industrial operators and ship owners in Alaska, as wrecks and other casualties are more likely to happen at night than any other time, and yet the United States Government cable has never been

* From *Railway and Marine News*.

available at night. The Marconi wireless will operate throughout the entire year, Sundays and holidays, day and night. It is already furnishing news bulletins to all of the ships plying in Alaska waters and the newspaper men throughout Alaska daily visit the ships while in port to find out the latest news from all over the world.

This suggests the inconsistency of the government cable in making rates. While it charges a most unheard of rate for commercial messages, it charges but one cent a word for newspaper telegrams, and this, in the past, has enabled various people operating in Alaska to save considerable and beat the government on its own rate, that is to say, it was often unnecessary to cable orders to the Northland at anywhere from sixteen cents to thirty-eight cents a word, when the news of such order was included in the daily dispatches sent to the newspapers. There was nothing deliberate about such moves but, as many clever newspaper men in Seattle were supplying all the papers in Alaska with current happenings, it was oftentimes quite unnecessary for operators to go to the great expense of signing an official order covering the same information. Thereby, the government by its excessive rates for commercial messages, lost much business and discouraged the building up of commercial telegrams. It never adopted any reduced rates or night-letters, but under the new system of the wireless, a regular night-letter service will be established and the whole of southeastern Alaska is at once placed in direct communication with Seattle and, therefore, throughout the world at a lower rate.

The Marconi wireless will not stop at the busy ports of the southeast section but will move to Prince William Sound. The moment it is determined where the terminus of the railroad is to be, near that point four 300-foot towers will be set up and a twenty-five-kilowatt station will be established. Later, a relay station will be established at some point along the Alaska peninsula and this station will undoubtedly become next to the immense plant at Honolulu the most important station in the Pacific. As business justifies, various other stations will be established throughout Alaska and in each case the rates charged by the United States Government cable will be reduced from thirty to fifty per cent.

This is merely a résumé of current events in the development of Alaska's telegraph system. Generally speaking, such an announcement would be regarded as but another important step in the industrial development of a great, resourceful region. Importance is given to the subject at this time simply because it presents such an interesting phase of government ownership. Here is a case where the government had absolute control and, quoting former Governor Stubbs of Kansas, that government ownership would mean economy in operation, better service and lower rates to the public, the reverse is shown to be the case.

When Governor Stubbs wrote his theoretical paper he overlooked the fact that in this country we have a government owned and operated submarine

cable, steam railroad, steamship line and any number of municipal public utilities which can be taken as examples of what might be accomplished under public ownership. In every case the actual reports of the companies named have been taken and, without quoting any other authority, operation under government ownership is shown to be inefficient and expensive.

In the present instance the government had a chance to greatly aid in the development of Alaska by giving good service and all the week-day and night service at reasonable rates. In place of this it has refused to operate its cable office on Sundays, holidays and at night and it has not given good service. In its mechanical maintenance it has been extravagant. The telegraphic tolls it has charged have been without exception far greater than those charged on any telegraph or cable system in the world and, at the present time, a wireless is enabled to go into the field and, in some cases, cut the rates right in half and get the business, in the face of the fact that wireless telegraphy has to date been considered by the public the most expensive telegraph service of all.

Mr. A. V. Bouillon, former superintendent of public utilities of Seattle, made an address at a recent convention of the League of Pacific Municipalities. He showed conclusively that municipal ownership in Seattle has been a failure, not only in the railway department but in the lighting department, he making use of rather startling figures, which showed that instead of a profit during the last few years the Seattle lighting plant has shown a loss of about \$350,000. Quite steadily and consistently the opponents of the mismanagement, the misleading bookkeeping and misrepresentation of the Seattle municipal ownership failure are giving publicity to their findings much to the chagrin of those in favor of the experiment. The result is that the public is being brought to a realization of the failure in these departments of the city government and their relation to increased taxation.

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.

Rules for the Wiring of Offices.

The engineering department of the Postal Telegraph-Cable Company has just issued a set of rules for the wiring of offices. The rules are as follows:

ENTRANCE OF WIRES.

1. Where the overhead wires come to an office pole, standard lead-covered paired cable or standard leading-in cable (preferably the former) must be used from the office pole cable box to the switchboard equipment. (The term switchboard equipment is used to designate the terminals of the protective devices, terminal bars, switchboard bars, etc.) Connections at the switchboard vary according to the type of equipment used, as explained in the rules following:

2. Cables entering a building above ground must have drip loops immediately outside the building at entrance. The holes through which cables pass (except lead-covered cables) should be bushed with non-combustible, non-absorptive, insulating tubes, slanting upward towards the inside. Lead cables should also be provided with a lead bushing or other protective covering where they enter the building. Where lead-covered cable is used the sheath must be permanently and effectively grounded.

3. All cables (except lead-covered cables) must be supported on porcelain insulators, so that they will come in contact with nothing, except their designed supports between the entrance and the switchboard equipment. Where desirable as an alternative, cable may be run in pipe. Where this is done, the pipe must be permanently and effectively grounded.

4. Lead-covered cable may be secured to the walls or ceiling by pipe straps or other convenient means. Underground cable entering an office may be supported in the same manner as lead-covered aerial cable.

5. If there are not more than four wires from the office cable pole to the switchboard equipment, Postal standard outside twisted pair may be used for the purpose. This wire must be run and supported in the building as specified for cable in paragraph three, and must enter the building through a porcelain bushing, drip loops to be made outside the entrance.

6. Cable used between the office cable pole and the entrance to the building must be run in conduit, or otherwise supported in accordance with the rules of the plant department governing such construction.

7. Except for short spans, twisted pair, when used between the office cable pole box and the building, should be supported in rings hung on a messenger wire.

8. At the cable box end, the cable, if paper lead covered, should be terminated in a pothead. The top of the pothead must extend up into the cable box not less than three inches. All the conductors (including spares) from the pothead must be terminated upon standard lock-nut strips. If rubber-covered leading in cable is used the conductors must be terminated directly upon the lock-

nut strips. The lock-nut strips in the cable box must be mounted upon porcelain knobs.

SWITCHBOARD EQUIPMENT.

9. Postal switchboard and instrument equipment is of a character classified under the National Electrical Code as "installations where the current-carrying parts of the apparatus installed are not capable of carrying indefinitely a current of ten amperes." Postal new standard No. 41 fuses will carry but three amperes indefinitely, and will blow at three and three-tenths amperes. Postal new standard No. 42 fuses will carry but six-tenths of an ampere indefinitely and will blow at nine-tenths of an ampere.

10. Standard fuse and arrester equipment for intermediate offices consists of Postal No. 65 blocks inserted between the line and the switchboard. Each such block carries a No. 41 fuse and an arrester having a separation between its plates of 100 mils. This constitutes the protection for the switchboard.

11. A Postal standard No. 66 block is connected into each wire between the switchboard and the instruments. This block carries a Postal standard No. 42 fuse and an arrester having a separation between its plates of ten mils.

12. No. 65 blocks will be connected with the fuse end of the block to the line, so that the fuse will protect the arrester. No. 66 blocks will be connected with the fuse next to the switchboard.

13. Wires to branch or customers' offices will be fused at the main office in the same manner as instrument circuits.

14. All new installations of switchboards must be of fireproof or fire-resisting equipment approved by the engineering department, and must be mounted on non-combustible, non-absorptive supports. Switchboards must not be moved from old to new offices without the permission of the division engineer.

15. Division engineers will decide as to which offices shall be classed as intermediate, terminal or semi-terminal offices for the purposes of these rules.

16. When, for any reason, it would appear to be desirable to retain existing switchboard equipment or to install switchboard or other electrical equipment or wiring in a manner that does not comply with the rules the matter must be taken up with the division engineer and his approval obtained.

INTERMEDIATE OFFICES.

17. Switchboard equipment for intermediate offices will be furnished as follows: For intermediate offices in which not more than two line wires are looped, porcelain base spring jacks will be used. These jacks, the line fuses, the instrument fuses, and other equipment in connection with them, must be mounted on non-combustible, non-absorptive supports, so that the live parts of the equipment will have at least two inches clearance from the wall, except when the back of the mounting is covered with sheet metal. Approved mountings for such installations can be had on requisition.

(To be Continued.)

How Submarine Cables are Made, Laid, Operated and Repaired.*

(Continued from page 572, October 16.)

The ship then steams to a convenient distance from the broken end of the cable; a heavy iron grapnel is lowered and is dragged along the bottom of the ocean at right angles to the line of the cable for the purpose of hooking it. There are different kinds of grapnels, but all have the same general features. The ordinary kind has a shank about four

dynamometer. When the cable is hooked the ship is stopped and the picking-up machinery started. In due course the grapnel holding the cable appears.

Men are then lowered over the bow of the boat strapped in "bosun's chairs," and the cable is secured by chains on each side of the bight. The cable is then cut and hauled on board and connected with the ship's testing room. The end of the cable which is found intact to the shore, is then chained to a mooring anchor with a buoy attached and dropped overboard temporarily. The other end of



PLACING "STOPPERS" ON A PICKED-UP CABLE TO PREVENT IT
SLIPPING BACK INTO THE SEA.

feet long with five prongs and weighs about 230 pounds. This style of grapnel is used for general work. For very deep water work a special type of grapnel is used, which cuts one side of the cable and clutches and holds the other. This is done to avoid excessive strain on the cable when lifting it from great depths.

As the ship steams across the line of the cable the iron fingers of the grapnel rake the bottom of the sea. The hooking of the cable is indicated on the deck of the ship by an instrument called a dynamometer, which registers a steadily increasing strain on the grapnel rope. If rocks or other obstructions are encountered by the grapnel the fact is shown by the irregularity of the strain on the

the point of fracture is picked up and stowed away. The steamer then proceeds to drag for the other end. Having secured it, and the tests indicating that it is in perfect condition, it is spliced onto a length of spare cable on board, and the ship commences to pay out toward the buoyed end, which in due course is reached and taken on board. The two ends now on board are tested by the ship's electrician. If these tests are satisfactory the cable is handed to the ship's joiner for the jointing of the core.

The two ends of the conductor are neatly and firmly soldered together. A small amount of Chatterton's compound is evenly applied with a hot iron so as to leave no air spaces. The ends of the

*From *Postal Telegraph*.

gutta percha insulation are heated with a spirit lamp and drawn down until they meet about the middle of the exposed conductor. A very thin strip of gutta percha is then softened and wrapped round and round upon itself at the joint, and is gradually worked down by the jointer with his fingers to the original diameter of the core. The joint is then placed in a trough of cold water, and allowed to remain there about twenty minutes so that it may become hard throughout. The jointer now gives way to the splicer, who places a serving of jute yarn around the core as a cushion for the armor wires.

The armor wires are then put back as nearly as possible in their original lay, and a heavy tarred jute yarn is put on as tightly as possible over a distance of fifteen or twenty feet, which completes the splice and the cable is dropped overboard.

(To be Continued.)

Some Primary Battery History.

BY DONALD MCNICOL, NEW YORK.

1800. Alessandro Volta (1745-1827), professor of natural philosophy at Pavia, Italy, invents the "Voltaic pile," or *couronne de tasses*; in reality a "pile" of discs, which was the first known source of electric current as distinguished from static charges previously employed. One of the first piles consisted of a number of discs of zinc, copper, and cloth piled one upon another.

1804. Cruikshank constructs a "trough" arrangement of alternate zinc and copper discs.

1815. William Hyde Wollaston (1766-1828) made an improvement in the Cruikshank battery by making provision for raising the zinc and copper elements out of the acid when the battery was not in use.

1826. William Sturgeon (1783-1850) discovers that a more constant current is obtainable from a battery when the zinc employed is chemically pure. As a substitute for pure zinc, which is quite expensive, Sturgeon amalgamated the zinc with mercury, thereby securing practically all the advantages of pure zinc.

1836. John Frederick Daniell (1790-1845), professor of chemistry, London, invents a two fluid type of primary cell, employing a porous cup to separate the fluids, sulphate of copper and dilute sulphuric acid. The elements employed were copper and zinc.

1837. William Robert Grove (1811-1896) introduces nitric acid as an electronegative fluid or "depolarizer" more powerful than copper sulphate as used by Daniell. A platinum negative element was employed to withstand the destructive action of the nitric acid. Grove cells were used in connection with early American telegraph operations.

1840. Alfred Smee (1818-1877) develops a negative element by depositing a plate of silver on a copper sheet, and on top of the silver a deposit of platinum dust. This greatly reduced the cost of the negative element of the cell.

1843. Robert Wilhelm Bunsen (1811-1899) employs a carbon negative element in place of the platinized negative elements previously used.

1849. C. V. Walker improves existing methods of preparing carbon negative elements for primary cells.

1850. C. T. Chester, in America, develops a standard telegraph battery cell, employing dilute sulphuric acid only.

1855. Cromwell F. Varley (1828-1883), also Meidinger, in Germany, invents the gravity cell. In this double fluid cell, employing a copper and a zinc element, the sulphate of copper solution and zinc sulphate solution are kept separate due to the action of gravity. This cell is sometimes called the Callaud cell.

1857. Grenet "bottle" battery developed. This cell had two comparatively large carbon and one zinc element, and employed two liquids mixed; viz., sulphuric acid designed to act upon the zinc element, and a mixture of acid and bichromate to depolarize the carbon.

1859. Raymond L. G. Plante (1834-1889) employs lead plates in the construction of secondary cells.

1860. Edme H. Marie-Davy (1820-1893) invents a cell in which the sulphate of copper of the Daniell cell is replaced by sulphate of mercury, while the copper element of the Daniell is replaced by carbon.

1868. Georges Leclanche (1839-1882) invents the sal-ammoniac battery, employing a carbon element encased in a porous cell.

1877. Fuller bichromate of potash battery invented.

1875. Latimer Clark standard cell invented.

1878. Dr. Byrne of Brooklyn improves the form of the Grenet cell.

1882. Lalande and Chaperon caustic soda battery invented, employing as electrodes amalgamated zinc and red granulated copper oxide. (The Edison-Lalande cell of a later date was a modification of this battery).

1886. Dry cells introduced.

1896. Jacques cell invented.

1903. Decker cell invented, employing graphite and zinc elements, with a sodium bichromate depolarizer.

PARALYZED OPERATOR TELEGRAPHS WITH EYE.—

The following curious story comes from Seattle, Wash.: Mr. J. C. Mann, an operator in that city, was recently stricken with paralysis. In order to secure a power of attorney to draw on a bank for funds, one of his sons brought a telegraph instrument to the sick man's room, hoping to open communication in that way. The message was telegraphed on the instrument and the key was placed at the sick man's right hand with the hope of getting a response. He could not use it, however, but it was noticed that he was twitching one of his eyes. The attendants finally read "left" from the eye-winks, and the key was placed at his left hand. The sick man feebly telegraphed his responses to necessary questions put to him. When the document was ready for the signature the son ticked off "mk ur mark" and with some assistance Mann managed to make a cross under the signature on the paper.

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(Continued from page 606, December 16, 1914.)

In 1859 the Allan Steamship Company established a regular weekly line of steamers between Liverpool and Quebec, and D. H. Craig, agent for the New York Associated Press, at New York, ever on the alert for means of accelerating the early receipt, in this country, of European news, at once proposed to Mr. O. S. Wood that the Montreal Telegraph Company extend its lines to some suitable point on the lower St. Lawrence River, where the steamers could be intercepted, and the latest old country news obtained and forwarded by telegraph in advance of the arrival of the steamer at Quebec.

Mr. Wood acquiesced in the proposition, and Canada presently furnished a much more reliable point as an oceanic repeating station for old country news than Cape Race, or Halifax or even Sandy Hook.

After much correspondence and investigation, Father Point, some 200 miles below Quebec, was selected as the place at which incoming steamers were to call, and from whence the news they brought, as per arrangement between Mr. Wood and Mr. Craig, was to be telegraphed to the New York Associated Press. A telegraph line along the sparsely settled shores of the lower St. Lawrence must have been, at that time, a failure financially had it depended upon local business, but the Associated Press agreed to pay a large sum for the transmission of the weekly despatch, and it was soon clearly demonstrated that Mr. Wood was amply justified in incurring the expense of building the line.

The telegraph company's lines were already in operation to Riviere Du Loup, and early in April, 1859, the original and only Jim Poustie, who superintended the construction of the Montreal Telegraph Company's wires, and his hardy gang of French Canadian line builders, set out from that place to build the telegraph line to Father Point. The writer of this sketch was appointed to take charge of Father Point station. I reached Riviere du Loup about the first of May, and at once started out for a long drive along the picturesque banks of the river St. Lawrence, reaching Trois Pistoles in due time, where, as the new line was finished to this point, I found that I was expected to teach the school marm of the place—a French Canadian lady in the sere and yellow leaf as to age, and also in the sere and yellow as to color, to telegraph, and thus fit her to take charge of the office. Fancy my consternation, on meeting her, to find that she could not speak a word of English, and as I was unable to speak her language, the result was a deadlock. It did not take long to find out that we had "no use for each other," that there was, as it were, no "affinity" between us. Trois Pistoles had a population of perhaps 200 or 300 people, but there was not one person in the place sufficiently well versed in English to come under my manipulations, and on

reporting the same to headquarters I received instructions to move on. It was a great relief to me to get away from this bailiwick. At the Maison Pension, at which I was housed, the food was not of that character which is described as being "fit for the gods." I have by no means the same poor opinion of the hog that the Jews are said to have, but when you get that animal served up three times a day in hunks—flabby, rancid and rank, and with the bristles still on, you are apt to lose all respect for him.

On my way down, after leaving Trois Pistoles, I overtook Poustie and his gang of line-builders, and remained with them until we reached Bic. I remained at Bic two weeks, and there taught a clever young Frenchman, M. Mercier, to telegraph. By this time Jim and his gang had reached Father Point, and I left Bic for that place on May 23, reaching my destination the same afternoon. We were fortunate enough to secure board for myself, and office room at the house of Pilot Charlemagne Chouinard. As it happened, the day following my arrival was the Queen's birthday, and on Jim, who spoke French like a native, remarking on this fact to the habitants, who had assembled to celebrate the inauguration of the telegraph, they wanted to know who the queen was? where she lived? and whether she was really yet alive?

At first, the arrival of an ocean mail steamer at Father Point was an event of unparalleled interest to the habitants; and the furore it created was surprising, if not laughable. Every pilot, fisherman, and the farmer living in the neighborhood, it seemed, had congregated at the point on these occasions, and they ran about gesticulating and jabbering in the most frantic manner. If one did not know the cause of so much excitement, he could be easily excused for surmising that some terrible catastrophe had happened. The steamers arrived regularly once a week, generally on Sunday, but they often turned up on Saturday, and once or twice they surprised us by putting in an appearance on Friday. In the stormy fall weather they were sometimes detained as late as Monday or Tuesday.

During my term at Father Point I was fortunate enough not to have missed either an outgoing or incoming steamer. The press despatches were prepared by an agency of the Associated Press in Liverpool, and sent in duplicate in two separate tin boxes, each box nearly a foot long, and made in the shape of a roll of music, loaded at one end and so constructed as to float, top end up, when thrown into the water. The idea being that should one become lost, through any mishap, we had the other to fall back upon. In clear weather the steamer could be seen coming up the river a long way off—twenty-five or thirty miles—and the boatmen, who were under my control, had sufficient time to get their boat out, and were generally well into the stream, ready to board her before she arrived opposite the point. When the weather was clear and calm the steamer came very close to the shore, so close that the passengers could be distinctly seen crowding her decks watching the news boat and welcoming the pilot on board. In foggy weather the steamer groped

along very slowly and carefully, firing a cannon at short intervals to announce that she was in the neighborhood. I had a monster cannon, which I fired in response, and so the steamer crawled along, exchanging shots with us until our men boarded her. The first time we fired our big gun the concussion was so great that it broke nearly all the window-panes in the houses within a radius of a mile from the Point, and caused many an exclamation of "Seigneur!" or "Mon Dieu!" among the people. The Allan Steamship Company, upon the opening of Father Point station, made that place the rendezvous for their pilots, and the boat which went out for the news box carried with it the pilot who was to take the "great steamer" up to Quebec. The despatches were generally of a length to occupy from two to three columns of a newspaper. Accompanying the news-box was a file of the latest London and Liverpool papers, from which I made copious extracts with which to supplement the written despatches. These despatches were sent direct from Father Point to New York, the Quebec and Montreal offices having made the necessary wire connections to allow of this being done. From New York they were distributed all over the United States, suitable extracts coming back to Canada later on in the regular Associated Press despatches. So soon as the pilot had scrambled aboard the incoming steamer and the boatmen had got the news box safely in their possession, they made the speediest possible time for the shore, and I have known the master boatman, a very wiry and supple chap, and handy as a seal in the water, jump into two or three feet of water when necessary to expedite his reaching land, and, once on terra firma, Nancy Hanks could not have made better time than he between the landing and the telegraph station. The steamer always slowed up when the news boat went out to meet her, and before she fully got under way again the boatmen had come ashore with the news, and it had been started on the wire at a rattling pace for New York.

(To be Continued.)

"Old Farmer" Lawton to Retire.

Mr. George E. Lawton, assistant manager of the Denver, Col., office, familiarly known as "Old Farmer" Lawton, will retire from active telegraph service on January 1, 1915, on a company pension. Mr. Lawton has been employed in the Denver office for forty-two years, and has had an interesting career. The title "Old Farmer" was given him by Eugene Field, Bill Nye and other old-school Denver newspaper men. He has a wide acquaintance among journalists and writers. Men prominent in the development of the West, knowing Mr. Lawton's character for honesty and trustworthiness, would not entrust their telegrams to anyone else. Mr. Lawton is of a highly appreciative nature and loves everybody. He is anything but a pessimist and a fault-finder, and from his viewpoint everybody has been kind to him.

Referring to his long service he writes: "It has certainly been a very happy two score years, that

will always be held most dear in my memory. I presume it will be difficult at first to wean myself from an organization composed of such fine people, and expect that I will be standing on the street corners for some time to come singing praises to those that have been so kind to me for all these years.

"I have received many well wishes from dear old friends since my retirement on January 1 was made public. One was from Mr. E. M. Herr, president of the Westinghouse Company at Pittsburgh. It carried me back to 1878 when friend Herr was finishing up his Denver school days and picked up the dot-and-dash language with me evenings. He was out here a few months ago and told me many nice things about our president, Mr. Newcomb Carlton, who had been associated with him at one time. I was anxious to meet Mr. Carlton, but unfortunately I was attending to my outside duties the day he was here recently, so I missed him. However, all of our employees who had the pleasure of meeting him have been singing nothing but praises to our new president ever since, which I am glad to see, as I have always thought that our company has been managed by the very best men living, from presidents down, otherwise we would not have been so popular with the public to-day, and my retirement is not changing my love for those good men and the company that have provided me with employment all these years."

Referring to his future plans Mr. Lawton says:

"I presume it will seem a little odd at first to be out of sound of the telegraph instrument after being in the business continually for forty-two years. I am not going out with the expectation of living an idle life and will find something to do, if only to take care of a garden, milk a little Jersey cow a couple of times a day, and chase the chickens around and see that they drop an egg every day instead of every other day. Or I can walk down town occasionally and give our little messenger band a friendly chat. Good advice from outsiders frequently assists boys in becoming useful men. I can hardly go into a bank or business house here that I do not run into some employe that has to tell me about some little kind word I may have given him twenty-five or thirty years ago when he was 'only a messenger boy,' so I feel that I have done some good in this world of ours besides always being loyal to the company and my superiors, and hope to do more good before it's time for me to cross that great snowy range."

Mr. Lawton will retire to a modest little farm near Denver, and while he gives up active telegraphy, he has very positive ideas as to his inability to give up reading TELEGRAPH AND TELEPHONE AGE, and makes himself secure on this point by renewing his subscription until 1916, when he hopes he may "have a pig or two to sell" at that time to help him extend the subscription period.

Two dollars per year for TELEGRAPH AND TELEPHONE AGE, is a wise and profitable investment for telegraph and telephone employes.

New Edition of Jones' Diagrams Now Ready.

JONES' POCKET EDITION OF DIAGRAMS AND COMPLETE INFORMATION FOR TELEGRAPH ENGINEERS AND STUDENTS, by Willis H. Jones. 480 pages, 236 illustrations. Published by TELEGRAPH AND TELEPHONE AGE, New York. Bound in flexible leather. Price, \$2.00.

A newly revised and greatly enlarged edition of this standard work is now ready for delivery. It is brought up to date and includes a great quantity of new matter, covering every recent development in American telegraphy up to the time of issue—December, 1914.

It is safe to state that so complete a work on practical telegraphy was never previously produced, and that it will become the standard work of reference in America. It is authoritative, the assistance of the officials and engineers of the telegraph, wireless and other companies having been secured in the preparation of the descriptive matter and the illustrations.

Telegraph engineers, operators and students will find that a copy of this book will be indispensable. The vast fund of information that has been provided is surprising, and the book will be a rich possession to every progressive telegraph man.

The descriptive matter is complete in every detail, and covers the latest devices in practical use at the present time by the Western Union and the Postal Telegraph-Cable companies, including the new types of switchboards, the time service, the ticker system, the new duplexes and quadruplexes, wireless telegraphy, the selector, complete instruction for wire testing, etc., etc. This is only a partial list of the new subjects covered. The matter in the former edition has been retained but extensively revised and brought up to date, and the result is a work that every telegrapher will be proud to have a copy of.

Some idea of the scope of the book may be obtained from the fact that there are sixty-four chapters, covering the following partial list of subjects:

Magnetism and electricity; generator; electrical measurements; formulæ and examples; magnet windings; local batteries; generator arrangement; sounders in multiple; comparative efficiencies of chemical batteries and generators; self-induction of relays; Stearns duplex; polar duplex; gravity battery quadruplex; "bug catchers;" quadruplex accessories; how to balance a quadruplex; care and handling of quadruplex apparatus; quadruplex faults and disturbances; theory and arrangement of resistance coils for quadruplex apparatus employing generator currents; Western Union old standard quadruplex; Morris duplex; bridge duplex; bridge quadruplex; loop switchboards; intermediate peg switchboards; new Western Union standard telephone jack switchboard; Skirrow Postal switchboard system; equipment of a modern telegraph office; arrangement of house and floor conductors; repeaters, showing diagrams of all makes; automatic duplex; office loop connections; combination set for duplex or single-line circuits; direct repeating relay for multiplex circuits; vibrating cable relay; relay pro-

tective device; the telephone; simultaneous telegraphy and telephony; wireless or radio telegraphy; mercury vapor rectifier; polar relay; district call-box service; selector; Varley loop tests; conductivity measurement by the three-wire method; students home practice circuit; storage battery and its application to telegraphy; time signal service; Postal Telegraph-Cable Company's improved multiplex apparatus; Postal high potential leak duplex; Diehl bug-trap; wire testing; direct-current volt and ampere meters; specifications for installation and operation of the volt-mil-ammeter; specifications for installation and operation of the bridge testing set; automatic printing telegraph systems; protection of duplexes against alternating-current disturbances; ticker service; the telautograph; miscellaneous diagrams.

Many of the new illustrations were made expressly for this work from official drawings. The price of this book is \$2.00 per copy.

Address and remit by check, express or post-office money order to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Merry Christmas.

Mr. P. J. Tierney, the veteran cable manager, New York, relates the following amusing experience in a downtown office at a Christmas-tide some years ago.

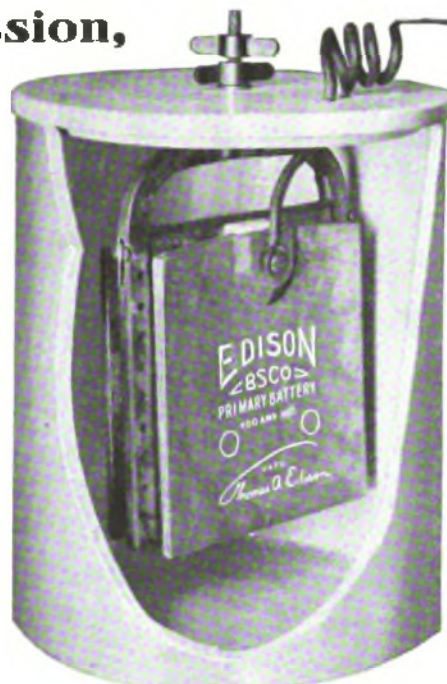
Handsome Charles had been the receiving clerk for many years, and Thomas Sears had just been assigned as his assistant. Christmas time was coming and Charlie, in an unguarded moment, let it be known that he feared some of his clients, who desired to remember him pleasantly at Christmas, might, through an error, hand their contributions to Tommy. That was enough for the others in the office; they determined to get Charlie's "goat." All day long messenger boys, carrying nicely wrapped packages and envelopes, presumably full of money, came to Charlie's window and inquired if he was Mr. Sears. "No, that is Mr. Sears at the next window," he replied, and the boys would go there, hand in the package or envelope, remarking loud enough for Charlie to hear "With the firm's compliments," or "the firm hopes you will have a Merry Christmas." Tommy thanked them, putting the package in the drawer, or, if an envelope, in his pocket, the others in the office watching and enjoying Charlie's discomfiture. Later, the same package and same envelope would come in again, Tommy remarking in a pleased sort of way to Charlie, "Gee, I'm glad the old man put me here in time for Christmas; I hope you're doing well, too."

This happened many years ago, but to this day Charlie thinks Tommy must have received a million dollars and three million cigars that Christmas eve.

THE JAMES D. REID MEMORIAL.—The work on the Reid monument has been unavoidably delayed somewhat, but is now completed. The monument will be shipped to Rochester within the next few days and put in place at the head of Mr. Reid's grave as soon as the weather conditions will permit.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



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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.

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.

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.

Mr. Thomas F. Clohesy, an old-time telegrapher, who has been in other lines of business for many years past, now located at Utica, New York, writes under date of December 10: "I am rushing this \$2.00 to you by special delivery, thinking the 1915 edition may be subscribed for before my money reaches you."

KERITE¹⁸⁵⁰



**Another year added to the
PERFORMANCE RECORD OF KERITE**

KERITE INSULATED WIRE & CABLE **COMPANY**
NEW YORK CHICAGO

THE RAILROAD.

MR. C. S. RHOADS, JR., has been appointed sales engineer, in charge of the selector department of the Hall Switch and Signal Company, with headquarters at New York.

POSITION ABOLISHED.—The position of assistant superintendent of telegraph of the Southern Pacific Railway, San Francisco, Cal., has been abolished. It was last occupied by Mr. E. F. Raymond, who resigned recently to engage in other business, as was announced in our December 16 issue. Mr. E. L. King is superintendent of telegraph.

RAILWAY TELEGRAPH SUPERINTENDENTS.—The next annual convention of the Association of Railway Telegraph Superintendents will be held at Rochester, N. Y., on June 22, 23, 24 and 25, and plans are already being laid for the meeting. Following are the officers of the Association for this year: President, W. C. Walstrum, Roanoke, Va.; first vice-president, E. C. Keenan, Chicago; second vice-president, L. S. Wells, New York; secretary-treasurer, P. W. Drew, Chicago; chairman Eastern Division, W. H. Potter, Washington, D. C.; chairman Western division, M. H. Clapp, St. Paul, Minn.

EXTENSION OF TELEPHONE TRAIN DISPATCHING ON THE ERIE.—Mr. J. P. Kreiter, telephone supervisor, Erie Railroad, Susquehanna, Pa., has just completed the installation of telephone train dispatching and message circuits on the Alleghany and Bradford divisions. The train circuit on the Alleghany division extends from Salamanca, N. Y., to Hornell, N. Y., with a branch from Cuba, N. Y., to Hunts, N. Y., covering a distance of 114 miles, with a total of twenty-eight stations. The Bradford division train circuit extends from Mt. Jewett, Pa., to Dunkirk, N. Y., a distance of eighty miles, having a total of twenty-three stations. The message circuit extends from Hornell to Dunkirk, with a loop from Salamanca, N. Y., to Bradford, Pa., covering a distance of 146 miles, with a total of forty offices. The next installation will be on the Niagara Falls branch, from Buffalo to Niagara Falls. This branch will be equipped with loud-speaking receivers.

The Train Dispatcher's Office.

Generally speaking, says Mr. E. T. Mulquin in the *Train Dispatchers' Bulletin*, there is a lack of painstaking effort exercised as to location and office equipment for the train dispatcher, to aid him in reaching and maintaining the highest standard of efficiency. How often do we see the dispatcher's office consolidated with the telegraph office with its boiler-shop noises and with persons continually running in and out. This disturbs the dispatcher, as he will unconsciously take some notice of what is going on about him.

Where the telephone is used for train dispatching and at offices where more than one set of dispatchers are employed they are frequently located too close together; often one table being equipped for two men. The conversation of one dispatcher on the telephone is annoying to the other. If the chief dispatcher is also quartered in the same office,

this adds to the confusion, as he has many callers.

The train dispatcher's office should be as private as possible and separate from the chief dispatcher's office. Each dispatcher should have an individual table, and where the telephone is used the tables should be far enough apart to prevent the talk of one dispatcher from attracting the attention of the others.

Friendship Circle.

Mrs. F. H. Van Etten, of Hamilton Park, Ill., entertained the "Friendship Circle" at her home on October 21. Mrs. W. L. Connelly and Mrs. E. A. Burket assisted the hostess. A most enjoyable luncheon was served. After a short business session an entertaining programme of five numbers was rendered. The talent was secured by Mrs. Van Etten, being friends from her home church. On December 2 the "Circle" was again invited to the home of Mrs. J. M. Lorenz, where they were most hospitably received. Mrs. P. W. Drew and Mrs. F. T. Wilbur assisted the hostess. After a bountiful repast the business of the day was taken up, the first item being a vote of thanks to Mr. Lorenz for flowers provided especially for the occasion.

A social afternoon was then enjoyed. Mrs. Drew presented a written romance, in which blank spaces were left, the proper words for which were to be supplied by the ladies. The prizes offered were very appropriate, being a sewing basket for first prize and a thimble for consolation prize. Plans are being laid for entertaining the gentlemen at a banquet the last Monday evening of January. Mrs. J. H. Finley is secretary of the "Circle."

Mr. Joseph P. Church, superintendent of telegraph, Wabash Railroad, Decatur, Ill., in remitting to cover his subscription for another year, writes: "The AGE is the one journal that is indispensable to a telegraph man."

MUNICIPAL ELECTRICIANS.

MR. HARRY R. ALLENSWORTH, superintendent of the fire and police telegraph alarm system, Columbus, Ohio, has resigned to take a position with the Ohio State Telephone Company.

OBITUARY.

T. A. YEARNSHAW, aged sixty-two years, a well-known operator in the Middle West, died at Neligh, Neb., on November 8. He was manager for the Western Union Telegraph Company at Des Moines, Ia., for several years, up to 1894.

DOUGLAS F. MARTIN, aged twenty-seven years, brother of Mr. T. C. Martin, secretary of the National Electric Light Association, and former editor of the *Electrical World*, New York, died recently in a French hospital from injuries received in an engagement between his regiment and the Germans. Deceased, who was a native of England, held a position on the staff of the *Electrical World* when the European war began. This he resigned to enlist under the British colors. Much sympathy is expressed for Mr. T. C. Martin on the sad and untimely ending of his brother's career, which was full of promise.

F. G. Boyer, aged fifty-nine years, superintendent of telegraph of the New York Transit Company, Northern Pipe Line Company, Buckeye Pipe Line Company and the Indiana Pipe Line Company, with headquarters at Oil City, Pa., died at that place on December 16, after an illness of six months. Mr. Boyer was identified with the oil interests since 1880. In February, 1905, when Mr. W. W. Splane resigned as superintendent of telegraph of the National Transit Company and the other associated pipe lines of the Standard Oil Company, Mr. Boyer was appointed his successor. This position he retained until the dissolution of the Standard Oil Company, when he was made superintendent of telegraph of the northern group of pipe lines, comprising the companies named. Mr. Boyer was known from one end of the Standard Oil Company's pipe line system to the other and was universally esteemed for his many admirable qualities.

Civil Service Examinations for Telegraph and Telephone Inspector and Engineer.

The United States Civil Service Commission announces an open competitive examination for telegraph and telephone inspector, for men only, on January 12, to fill vacancies as they may occur in this position in the Interstate Commerce Commission. As a result of this examination three registers of eligibles will be established, the salaries in each case ranging from \$1,200 to \$1,800 per annum.

The three registers to be established are as follows:

- (1) Eligibles who have had telegraph experience with telegraph companies or with railroad companies, or who have had a combination of telephone and telegraph experience with railroad companies.
- (2) Eligibles who have had general experience with telephone companies only.
- (3) Eligibles who have had combined general experience with telegraph companies or railroad companies.

An open competitive examination for junior telegraph and telephone engineer, grades I and II, for men only, will be held on January 20, 1915.

The salaries for junior telegraph and telephone engineer, grade I, are \$1,200 to \$1,680 a year, and for grade II, \$720 to \$1,080 a year.

For further particulars address Mr. John B. Pierce, senior telegraph and telephone engineer, Interstate Commerce Commission, Washington, D. C.

The San Francisco Telegraph Tournament.

Everything seems to be progressing favorably toward making the San Francisco telegraph tournament a great success.

Mr. William M. Gibson, the present holder of the Carnegie diamond medal, has handed that trophy to Mr. D. A. Mahoney, the New York representative of the tournament, to be forwarded to the San Francisco committee. This medal will be competed for at the San Francisco tournament.

The medal, which is of solid gold, is of beautiful design. At the upper part there are two horizontal

panels, the upper one having the usual attaching pin on the back and the word "Carnegie" on the face. To this panel is suspended another containing the word "Medal" on the front surface. Below this panel the circular disc is suspended. The design of this feature shows a likeness of Mr. Carnegie in relief, flanked on either side by a telegraph pole with cross-arms. In the lower segment of the circle are representations, also in relief, of a relay, key and sounder; and a narrow band encircling the design contains the words, in enamel, "American Telegraphers' Tournament. Annual Competition." The inscriptions on the back of the medal read, "F. M. McClintic, 1902," and "W. M. Gibson, 1903."

The medal was won by Mr. McClintic at Atlanta, Ga., in 1902, at the tournament conducted under the auspices of the American Telegraphers' Tournament Association. Mr. Gibson won the medal at the Philadelphia tournament in 1903.

This medal is popularly known as the \$500 Carnegie diamond medal for the all-round championship event, which, of course, means the best all-round telegrapher.

Commenting on the programme of the San Francisco tournament, Mr. W. M. Gibson, of New York, the present holder of the Carnegie medal, writes as follows:

"I think that it would be very unfair to allow machine senders to compete with hand senders, and I would certainly insist on this in the Carnegie medal class. It has never been competed for by machines and in my opinion should be kept in the hand senders' class in order to compare records, etc. For my own part I do not think any machine can compete in speed with a hand sender, that is, of course, one of the machines known as 'bugs.' I do not refer to automatics. I presume it would cause too much work to have classes of both hand and machine exclusively. I am only giving my own opinion in the matter and do not want to discriminate against the 'bugs.'"

"I am sorry to see good hand senders being relegated to the background. The machines were never intended for this purpose. I imagine they were originally intended as a help to poor senders."

Mr. G. W. Conkling, another well-known star, writes as follows:

"I am very much in favor of sending machines and hope that the Tournament Association will afford facilities and inducements to get this class of senders to compete in the coming tournament. I am not, however, in favor of having every class a free-for-all event. It is manifestly unfair to a hand sender, even on a thousand-mile circuit, for him to compete against a machine in all classes."

"It has long since been recognized that a 'wig-wag' sending machine when properly manipulated (and there are many of these uniformly 'perfect' bug senders) is several words faster per minute than any hand sender that ever lived. It seems only a matter of balancing up the dash speed with the speed of the dot vibrator. If a manipulator can attain seventy-five per cent perfection in this, I concede that it is faster than Mr. Armstrong."

"Another objection to hand vs. machine sending

is the totally different style of transmission. How many manipulators of the sending machine are there capable of deceiving the educated ear? The hand-made Morse is one kind of transmission and the sending machine-made Morse is another, and how can we separate the wheat from the chaff?

"My contention is that the perfect rhythm and measured strokes of our now ancient hand senders is more perfect and sounds more beautiful than any machine sending, with the exception of a very few who once have been perfect hand senders, and through stress of circumstances have had to take up machine sending. Invariably these men imitate and adopt their old hand-sending style. In competition with machine senders of that calibre, tell me, what chance would a hand sender have? Again, there would be a certain amount of ill-feeling should the judges select a machine sender as the winner who made 'st' for 'v,' six or seven dots for a 'p,' and numerous other combinations just because he or she showed the best time. The judges' viewpoint would be that 'it could be read,' etc. Of course it could be read, but it would be a long way from being Morse. If judges were given leeway in these matters there would be very much of an aftermath.

"I have talked with a great many prominent operators, and they agree with me that machine should not compete against hand, except possibly in one class, and let that be straight press or straight messages for a period of not less than a half hour. The half-hour trial will tend to equalize the loss sustained by the hand sender in the 'getaway,' because it is a well-known fact that many of our best hand senders cannot get 'under way' in less time than four to five minutes.

"I would like to suggest a class that would attract a considerable number of real telegraphers: A full day's work of eight hours, press report, Associated Press style, with all the trimmings—half hour for lunch, five minutes' rest in mid-forenoon and five minutes in mid-afternoon.

"Let each sender have a receiver and let it be optional whether one man is to do all the sending or receiving or split up half and half; copy to be prepared by a real editor and filed on each circuit; sender and receiver to time and initial each item and number pages; receiver to be allowed to break as on a regular circuit, etc., etc. Perfection of received copy; perfection of transmission; number of receiver's breaks; number of 'breaks,' etc., by sender to count as points for or against the combination of sender and receiver as a unit.

"This class will be a contest of extreme skill and endurance and the winners could and would be rightly judged as the most skillful telegraphers of the present day."

Mr. C. C. Adams, vice-president of the Postal Telegraph-Cable Company, New York, who is a member of the advisory committee of the tournament association, writes:

"Replying to the inquiry whether or not all classes should be open to both machine and hand senders, I consider it unwise and should strenuously object to an open class in which hand senders are to com-

pete with machine senders, especially for the Carnegie medal.

"The machine senders should be in a distinctive class by themselves, in the governing of which two particular points should be emphasized.

"First: The proper adjustment of the machine transmitter, the adjustment of all machines to be uniformly set by the manager or judge of the machine class.

"Second: The proper manipulation of the machine key and quality of signals transmitted as shown on the tape.

"The tape record should be used on both hand and machine circuits to enable the judges to settle any doubt where speed and quality are to be the qualifying factors.

"Much time has been spent by the electrical engineers, chief operators and myself, in studying the proper adjustment, manipulation and the value of signals in the use of machine transmitters as compared with hand senders and we have found that the best results can be obtained by adjusting the machine vibrator to a speed not to exceed eighteen P's in ten seconds. On such an adjustment, with the vibrator properly weighted, the signals are delivered with a value almost, if not equal, to that of a first-class hand sender.

"Further, a class composed of machine and hand senders might be formed for special prize. In fact, I believe that the best way would be to have an open class, combined of the machine and hand senders in competition, and select the winners by elimination for the championship class."

The Christmas Clubs.

Among the many commendable organizations of telegraphers are the several Christmas and vacation clubs that are becoming a strong feature of the fraternity.

During the month of December, the Serial Building Loan and Savings Institution paid over to these clubs \$9,300, representing the savings of 470 employes of the Western Union Telegraph Company, the Postal Telegraph-Cable Company and the Associated Press.

Among the prominent workers in this field who have given their time and service without recompense are Mrs. Anna W. Porter and Mr. F. J. Kernan, of the Postal Company; Geo. S. Scherger and Peter T. Galvin, of the Associated Press, and the Misses Esther Borshotsky, Mary G. Larkin, May G. Charlock, M. Gertrude Curtin, Agnes B. Fitzgerald, Pearl Vaughn, Helen A. Garrett and Mary J. Kihm, together with Mr. H. A. Moody, G. W. Fleming, Wm. J. Quinn, Howard Tepe, H. A. Kitchen, H. W. Petrie and John H. Fleming, all of the Western Union.

PHILADELPHIA "DOT AND DASH" DINNER.—The "Dot and Dash" Club of Philadelphia will hold its mid-winter dinner on January 30, at the Colonnade Hotel, in that city. It is expected that several prominent telegraph officials will be present as guests of honor. The "Dot and Dash" Club was organized March 11, 1912, and includes in its mem-

bership the telegraph fraternity of Philadelphia. S. S. Garwood is president; A. S. Weir, vice-president; J. H. Wilson, treasurer; C. B. Wood, secretary; W. W. Donnelly, assistant secretary.

New York Telegraphers' Aid Society.

The quarterly statement of the New York Telegraphers' Aid Society, for the quarter ended December 6, is as follows:

Balance on hand September 6.....\$25,978.87
Receipts 1,693.50

Total\$27,672.37

DISBURSEMENTS.

Sick Benefits\$865.11
Death Benefits 200.00
Expenses 191.88

Balance on hand December 6... \$ 1,256.99
26,415.38

Total\$27,672.37

RELIEF FUND.

Balance on hand September 6 \$6,410.10
Receipts 192.36

Total\$6,602.46

Disbursements \$ 518.00
Balance on hand December 6 6,084.46

Total\$6,602.46

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 578 and 579 to meet the claims arising from the deaths of Henry D. Trout, at Camak, Ga.; William B. Montgomery, Kansas City, Mo.; Adrian M. Powell, Milledgeville, Ga.; Edward J. Schaedler, New York; Jasper M. Odell, New York; George E. Gilliland, Washington, D. C.; Charles M. Knapp, Philadelphia, Pa.; Thomas Bromley, St. Johns, Mich.; Charles R. Stough, Marshalsea, Pa.; Warren V. Duke, Evansville, Ind.; Edward O. Diercks, Brooklyn, N. Y.; Ernest Dunn, Waycross, Ga.; Henry C. Lockwood, Brooklyn, N. Y.; Benjamin F. Reilly, Oakland, Cal.; George A. Holle, Upper Montclair, N. J.

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.

PHILADELPHIA POSTAL.

Among recent visitors at this office were: C. A. Lane, superintendent construction, New York, and H. W. Hetzel, traveling auditor, New York.

Myer Auerbach, formerly of this office, has entered the moving-picture business. He is proprietor of the New Dazzleland Theatre, at 2940 Frankford avenue.

Sneak thieves recently entered the home of assistant wire chief C. S. Almes and made away with jewelry and cash.

The sympathy of the office is extended to chief clerk Logan in the loss of his brother, Mr. Hugh Logan, division operator of the Philadelphia Terminal division, Pennsylvania Railroad, who died suddenly on December 18 from heart failure. Mr. Logan commenced his telegraphic career as messenger in 1875, with the American District Telegraph Company.

SAN FRANCISCO WESTERN UNION.

Mr. H. H. Fisher and Mr. B. H. Heathcock, of Denver, Col., are recent additions to the printer mechanical force.

Mr. W. L. Glasheen, automatic chief operator, has just returned from Los Angeles, where he assisted in installing the Morkrum printer, which will be operated with Chicago.

We have commenced operating the Morkrum printer to New York, with excellent results.

Mr. S. B. Mills, night wire chief, was operated on recently at St. Francis Hospital, for an ulcer at the pit of the stomach. He will recover entirely.

Our overland wires are again sleeping peacefully beneath their blanket of snow, fifty inches having fallen at the Summit during the past two days.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office 253 Broadway (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 60c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 810, NEW YORK.

Telegraph and Telephone Age

No. 2.

NEW YORK, JANUARY 16, 1915.

Thirty-third Year.

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SOME POINTS ON ELECTRICITY.

Fundamental and Derived Units.

(Concluded.)

In our January 1 issue it was explained how electrostatic units were derived from the fundamental units, comprising the "C. G. S." system. The present instalment deals with the derivation of magnetic and electromagnetic units from the same system.

MAGNETIC UNITS.—All magnetic quantities, strength of poles, intensity of magnetization, etc., are expressed in terms of special units derived from the fundamental units of length, mass and time.

UNIT MAGNETIC POLE.—The unit magnetic pole is one of such a strength that, when placed at a distance of one centimeter (in air) from a similar pole of equal strength, repels it with a force of one dyne.

MAGNETIC POTENTIAL being measured by work done in moving a unit magnetic pole against the magnetic forces, the unit of magnetic potential is measured by the unit of work done on unit pole.

UNIT DIFFERENCE OF MAGNETIC POTENTIAL exists between two points when it requires the expenditure of one erg of work to bring a (N-seeking) unit magnetic pole from some point to the other against the magnetic forces. Magnetomotive force, or magnetizing power, is measured in the same units as is difference of magnetic potential.

INTENSITY OF MAGNETIC FIELD is measured by the force it exerts upon a unit magnetic pole: hence, unit intensity of field is that intensity of field which acts on a unit (N-seeking), pole with a force of one dyne.

MAGNETIC FLUX, or total induction of magnetic lines, is equal to intensity of field multiplied by area. Its unit is one magnetic line.

MAGNETIC RELUCTANCE is the ratio of magnetomotive force to magnetic flux. Unit reluctance will be such that unit magnetomotive force generates in it a flux of one line.

ELECTROMAGNETIC UNITS.

UNIT STRENGTH OF CURRENT.—A current has unit strength when one centimeter length of its circuit bent into an arc of one centimeter radius (so as to be always one centimeter away from the magnet-pole) exerts a force of one dyne on a unit magnet-pole placed at the centre.

UNIT OF DIFFERENCE OF POTENTIAL (or of electromotive force). Potential is work done on a unit of electricity; hence unit difference of potential exists between two points when it requires the expenditure of one erg of work to bring a unit of + electricity from one point to the other against the electric force. Also, unit electromotive force is generated by cutting one magnetic line per second.

UNIT OF RESISTANCE.—A conductor possesses unit resistance when unit difference of potential between its ends causes a current of unit strength to flow through it.

UNIT OF QUANTITY OF ELECTRICITY is that quantity which is conveyed by unit current in one second.

UNIT OF CAPACITY.—Unit capacity requires unit quantity to charge it to unit potential.

UNIT OF INDUCTION.—Unit induction is such that unit electromotive force is induced by the variation of the current at the rate of one unit per second.

PRACTICAL UNITS AND STANDARDS.

In practical work some of the foregoing units are inconveniently large and others inconveniently small, therefore more practical units have been chosen for them as follows:

RESISTANCE.—The ohm, 10^9 absolute units of resistance but actually represented by the resistance of a uniform column of mercury 106.3 centimeters long and 14.4521 grammes in mass, at 0° C. Such a column of mercury is called a "standard" ohm.

CURRENT.—The ampere (formerly called the "weber") = 10^{-1} absolute units; practically represented by the current which deposits silver at the rate of 0.001118 gramme per second.

ELECTROMOTIVE FORCE.—The volt = 10^8 absolute units; is that E. M. F. which, applied to one ohm, will produce in it a current of one ampere.

QUANTITY.—The coulomb = 10^{-1} absolute units of quantity, being the quantity of electricity conveyed by one ampere in one second.

CAPACITY.—The farad = 10^{-9} (or one-thousand-millionth) of absolute unit of capacity, being the

capacity of a condenser such as to be charged to a potential of one volt by one coulomb. The microfarad, or millionth part of one farad, = 10^{-10} absolute units.

WORK.—The joule = 10^7 absolute units of work (ergs); is represented by energy expended in one second by one ampere in one ohm.

POWER.—The watt = 10 absolute units of power (ergs per second); is the power of a current of one ampere flowing under a pressure of one volt. It is equal to one joule per second, and is approximately $\frac{1}{746}$ of one horse-power.

INDUCTION.—The henry = 10^9 absolute units of induction; is the induction in a circuit when the electromotive force induced in the circuit is one volt, while the inducing current varies at the rate of one ampere per second.

Inasmuch as quantities a million times as great as some of the foregoing and a million times as small as others have to be measured, the prefixes "mega" and "micro" are used to signify respectively "one million" and "one millionth part." Thus a megohm is a resistance of one million ohms and a microfarad a capacity of one millionth of a farad. Other prefixes in common use by electrical engineers are "kilo" for "one thousand" and "milli" for one thousandth part. Thus a kilowatt means 1,000 watts, and one milliampere is the thousandth part of one ampere.

Stock Quotations.

The New York Stock Exchange is now conducting business without any restrictions whatsoever, and trading is being carried on as freely as it was at the time the exchange was closed (July 30, 1914), on account of the European war. Following are the closing quotations of telegraph and telephone stocks on January 13:

American Telephone and Telegraph Co.	118 $\frac{3}{4}$
Mackay Companies	72 $\frac{3}{4}$
Mackay Companies, preferred	67
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2 $\frac{3}{4}$
Western Union Telegraph Co.	60

Telegraph and Telephone Patents.

ISSUED DECEMBER 22, 1914.

- 1,121,666. Automatic Telephone Exchange. To F. N. Reeves, Newark, N. J.
 1,121,739. Telephone-Toll Line System. To F. A. Lundquist, Chicago, Ill.
 1,121,823. Time-Announcing System. To M. F. Geer, Rochester, N. Y.
 1,121,953. Telephone Metering System. To E. Thomson, Swampscott, Mass.

ISSUED DECEMBER 29, 1914.

- 1,122,347. Attachment for Telephones. To Charles C. Wright, Camden, N. J.
 1,122,383. Working Submarine Cables. To John Gott, Brighton, England.
 1,122,615. Sender. To John A. Kropp, Newark, N. J.

- 1,122,626. Selector Switch. To James L. McQuarrie, Montclair, N. J.
 1,123,118. Signaling System. To Lee DeForest, New York, N. Y.
 1,123,119. Secrecy System for Wireless Communication. To Lee DeForest, New York.
 1,123,120. Arc Mechanism for Systems of Space Communications. To Lee DeForest, New York.

PERSONAL.

MR. SAMUEL HESSBERG, Albany, N. Y., member of the stock brokerage firm of J. S. Bache and Company, and a former telegrapher, has retired from business. Mr. Hessberg is a native of Albany, and was superintendent of telegraph for the New York Central Railroad west of Albany in 1881.

MR. W. P. WHEATLAND on January 1 retired from his position as superintendent of the Philadelphia Local Telegraph Company, after a service of fifty years at Third and Chestnut streets, first with the late Henry Bentley and then with the Philadelphia Local Telegraph Company from its organization in 1871. He was one of the directors, secretary-treasurer and finally superintendent. On New Year's eve the employes of the company presented him a beautiful loving cup to manifest their appreciation of him as their chief. He is succeeded by his nephew, Melville Wheatland, his able assistant for several years past. R. W. Morrozzi, for many years lineman for the company, was also retired on the same date and his fellow employes also presented him with a token.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

Recent executive office visitors: V. H. Borst, manager at Richmond, Va.; E. F. Butterfield of Brimfield, Mass., formerly cashier at New York; W. H. Pennell, cashier, Pittsburgh.

The office of traffic manager has been abolished and Mr. F. F. Norton has been assigned to duties in the operating department, Charles Shirley, assigned to duties in the office of vice-president W. I. Capen, and W. J. Mitchell has been assigned to duties in the auditing department.

MR. C. C. KELLER, of the printer staff, Cleveland, Ohio, has been transferred to the New York main office as attendant in the printer department.

This company expects to establish three branch offices in the leading three buildings in the Panama-Pacific International Exposition at San Francisco.

Managers have recently been appointed as follows: P. Seary, at Athol, Mass.; A. C. Downing, Gadsden, Ala.; G. W. Linton, New London, Ohio.

Mr. L. R. Freeland, for eighteen years identified with the Postal services at Binghamton, N. Y., some months ago found it necessary, on account of failing health, to sever his relations with the telegraph service and engage in farm work. His health has improved very much, owing to his open-air work and his friends expect him to soon be

able to resume his telegraph duties. Manager F. G. Wyman, of the Binghamton office, states that Mr. Freeland was an ardent and faithful employe and during the fourteen years he has been in charge there never was one complaint or error laid at his door.

Postal Tariff Book.

The 1915 tariff book of the Postal Telegraph-Cable Company, which is about ready for distribution, shows some important changes in make-up. The size of the book has been greatly enlarged, the new dimensions being 8 inches wide by 11 inches long. The old standard size was $5\frac{1}{2}$ inches by $7\frac{3}{4}$ inches. On account of the pages being wider the matter is printed in three columns instead of two, as heretofore, and since much more text appears on a page the book is somewhat thinner than its predecessors. This, however, is an advantage, as it facilitates handling. The general features of the old size have been preserved in the new; the money transfer service pages are printed on green paper; the cable service matter on pink, and the service rules on yellow. The new type is exceptionally clear, and the arrangement of the radio and cable tariff tables is so simple that desired rates can be ascertained with minimum trouble and loss of time. Altogether, the book is well gotten up and reflects much credit upon the ability of Mr. Isaac Smith, superintendent of tariffs.

Magnetic Club.

The annual meeting of the Magnetic Club was held at 253 Broadway, New York, on January 14. The report of secretary W. B. Dunn showed that ninety-six new members had been elected during the year 1914, making a total membership of 295, comprising 287 active and eight honorary members. The following officers were elected: President, Christopher F. Leonard; vice-presidents, Eugene P. Tully, Marston R. Cockey, John J. Whalen, Welcome I. Capen; secretary, William B. Dunn; treasurer, Joseph J. Cardona.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. A. R. BREWER, treasurer, was elected vice-president of the company by the Executive Committee of the Board of Directors, at the quarterly meeting held January 6. Mr. Lewis Dresdner was elected treasurer and J. W. Connolly assistant treasurer.

Mr. J. B. Van Every, vice-president of the company, accompanied by Mrs. Van Every, has gone to Florida for the winter months.

MR. A. WOODLE, of the office of the general manager, Eastern Division, New York, has been appointed district commercial superintendent of the seventh district, with headquarters at Buffalo, N. Y. This is a newly created district and includes all offices in Western New York from and including Syracuse, Ithaca and Elmira, on the east to the western state line.

MR. C. F. NEWSOM, division cable agent at Chicago, was a recent executive office visitor.

MR. C. H. MULFORD, manager at Memphis, Tenn., entertained fifty of his messengers at a Christmas dinner, December 24, 1914. He addressed them as "the future officials of the company," which pleased them very much. An electrically lighted Christmas tree and some excellent organ music were features of the occasion, and the boys had a royal good time. Each one of the boys was presented with a nice pair of woolen gloves with the compliments of the company as a Christmas gift. The boys were interested to know if Mr. Mulford's hospitality would be duplicated next Christmas.

Mr. W. L. Jacoby, vice-president of the American District Telegraph Company, New York, is making a business trip through the west and south in the interests of the service. He will return to his office about February 1.

THE MORSE ELECTRIC CLUB.—The annual meeting of the Morse Electric Club took place at 16 Dey street, New York, on January 13, and the old officers were re-elected. Mr. Belvidere Brooks is president, W. C. Merly, secretary, and R. J. Murphy, treasurer. It was decided to postpone the annual dinner, which usually takes place in February.

WESTERN UNION SOCIETY OF CONNECTICUT.—The Executive Committee of the Western Union Society of Connecticut, Bridgeport, Conn., at its regular meeting on December 22, voted its thanks to TELEGRAPH AND TELEPHONE AGE for the assistance rendered at the time of the society's organization last year.

A dinner will be tendered to Mr. William J. Quinn on his retirement from active service as chief of the time-keeping department with the Western Union Telegraph Company, in New York, at the Broadway Central Hotel on January 23. Mr. Quinn was identified with the service for over forty years and was extremely popular. Those desiring to attend the dinner should address Mr. R. J. Murphy, treasurer, 24 Walker street, New York. The price of the tickets is \$1.50 each.

BANQUET TO SUPERINTENDENT TERRY.—Mr. A. C. Terry, district commercial superintendent, Pittsburgh, Pa., was tendered a banquet by the members of the Commercial Efficiency Promoting Association of the third district, at the Fort Pitt Hotel, Pittsburgh, December 30, 1914. The programme included singing, orchestral music and a vaudeville performance. Mr. E. A. Baird, manager of the Pittsburgh office, acted as toastmaster. Mr. Terry responded to the toast, "Greeting to Our Guest." Remarks were also made by Mr. G. S. Walters. The officers of the association are: E. A. Baird, president; J. Diehl, vice-president; E. J. Lane, treasurer; H. O. Evans, secretary.

On the evening of January 5 a dinner and a loving cup were given to Mr. William Holmes, superintendent of tariffs, by a few of his official associates who had been in close business relations with him for the past thirty years. Mr. A. R. Brewer acted as chairman of the occasion. He read a letter from Mr. Newcomb Carlton, president of the company, in which he regretted that the thirty-year business acquaintanceship barred him from being in attendance. He wished, how-

ever, to place on record the esteem in which he held Mr. Holmes, and he hoped to be eligible for attendance at the next dinner given to that gentleman. He expressed many kindly sentiments towards Mr. Holmes and indicated that all the officials of the company regarded his judgment and opinion of great value. Besides Mr. Brewer and William Holmes there were present John C. Willever, Belvidere Brooks, Ashton G. Saylor, G. W. E. Atkins, Rush Taggart, G. H. Fearons, William H. Baker, Lewis Dresdner and Dr. W. Holmes.

MR. F. E. D'HUMY, of the engineering staff of this company, New York, is the author of an interesting and instructive article in the January number of *The Trend*, headed "Our Reply to Bernhardt." In his book, "Germany and the Next War," General Bernhardt bases many of his conclusions on the theory that war is a biological necessity. The fallacy of this theory Mr. d'Humy undertakes to prove in a scientific manner, his argument leading him to the conclusion that biology teaches that co-operation and harmony—not war—is her mission. "In tracing our biological journey," he says, "there is nowhere a lesson that teaches that war is a biological necessity. Instead, we find that harmony and co-operation is the foundation of life, and that without these attributes existence would end." The article is an able discussion of this profound subject and should be widely and carefully read.

A. R. Brewer, Vice-President Western Union Telegraph Company.

Mr. A. R. Brewer, who, as announced in another column in this issue, has been elected vice-president of the Western Union Telegraph Company, after having filled the position of treasurer since January 1, 1909. He was born on a farm in Hunterdon County, N. J., May 3, 1847, and has had a wide experience in telegraph affairs since he became an operator at Lewisburg, Pa., when a lad of sixteen years. There he studied stenography and this knowledge secured him a position in the executive offices of the Western Union Telegraph Company in New York. Mr. Brewer through his long and intimate association with executive affairs of the Western Union Company, having been its secretary for many years, is known either personally or by reputation to almost every telegrapher in the United States and is a lovable character. He is eminently fitted for the performance of the higher duties placed upon him, and his many friends wish him every success.

Lewis Dresdner, Treasurer Western Union Telegraph Company.

Mr. Lewis Dresdner, assistant treasurer, who has just been elected treasurer of the Western Union Telegraph Company to succeed Mr. A. R. Brewer, who becomes vice-president, has for many years been connected with the treasurer's office, starting in as a bookkeeper. He is a native of Germany,

where he was born on December 13, 1854. He became a messenger at 145 Broadway in 1873, and when he had a chance to advance he chose the clerical branch of the service rather than the operating branch. He received successive promotions, and in 1882 was placed in the treasurer's office, where he has since been, filling various positions until now he has reached the head of the financial department. Mr. Dresdner's many friends congratulate him upon his good fortune. His sterling character and high business ideals have always been recognized, and his latest appointment is a well-merited reward for faithfulness to trust.

J. W. Connolly, Assistant Treasurer Western Union Telegraph Company.

Mr. Joseph W. Connolly, the newly appointed assistant treasurer of the Western Union Telegraph Company, was born in Louisville, Ky., July 26, 1867. He entered the telegraph service as messenger for the Domestic Telegraph Company at 135 Broadway, New York, on May 21, 1881. When this company was absorbed by the Western Union Telegraph Company, Mr. Connolly was transferred to the 66 Gold street office of the Western Union and later to the 134 Pearl street branch. At the time of the strike in 1883, he transferred to the main office and served there as messenger until July 15, 1885, when he became attached to the treasurer's department as office boy. On May 20, 1889, Mr. Connolly became Gold and Stock collector and on August 1, 1891, was appointed cashier of the treasurer's department, since which time he has served in that capacity. He assumes the duties of assistant treasurer well equipped by experience backed by an irreproachable character.

THE CABLE.

NO WORLD NEW YEAR'S GREETINGS.—New Year's greetings from the United States to all the world did not circle the globe New Year's eve, as has been the custom for many years, because the land telegraph and cable systems have been disorganized by the war.

CODES.—The Merchants' Association of New York has appointed a telegraph and cable code committee to take care of the interests of the users of codes. It is the purpose of the committee to frame legislations to be presented at the next meeting of the International Telegraph Conference, which will take place in Paris when conditions become settled. The headquarters of the convention are at Berne, Switzerland.

COMMERCIAL CABLE COMPANY'S ANNIVERSARY.—In a card to its patrons, dated December 24, 1914, the Commercial Cable Company announces the thirtieth anniversary of its active existence. "From two transatlantic cables in 1884 and a small land telegraph system in the United States," the card states, "it has grown to a huge cable and telegraph system extending in unbroken continuity over two-thirds around the world."

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to January 13 as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6; Martinique-Guadeloupe, November 24; Mole St. Nicholas-Port au Prince, December 4; Cayenne-Salinas, December 14.

CANADIAN NOTES.

GREAT NORTH WESTERN APPOINTMENTS.—Mr. Geo. D. Perry, general manager, Great North Western Telegraph Company, Toronto, Ont., has issued a circular advising the appointment of district superintendents of the company, as follows: L. S. Humes, Montreal, Que., superintendent second district, comprising offices in New Brunswick, Quebec and eastern portion of Ontario; W. G. Barber, Toronto, Ont., superintendent third district, comprising offices in Ontario west of Kingston, and extending to Port Arthur, Ont.; J. Paddington, Winnipeg, Man., superintendent fourth district, comprising offices in western Ontario and Manitoba; G. H. Stead, Saskatoon, Sask., superintendent fifth district, comprising offices in Saskatchewan and Alberta.

Lawrence Longmoore, aged seventy-eight years, one of the oldest Canadian telegraphers, died at St. Lambert, Canada, on January 10. Mr. Longmoore retired from active telegraph service about twenty years ago. Fifty years ago Mr. Longmoore was night manager of the Montreal Telegraph Company at Montreal, and he practically lived in that city all his life. During his connection with the telegraph among his messenger boys were, W. J. Cochrane, who afterwards was elected mayor of Montreal, and Mr. James Kent, now manager of the Canadian Pacific Railway Company's Telegraph. He was the first operator to receive Associated Press at Montreal.

THE TELEPHONE.

MR. THEO. N. VAIL, president American Telephone and Telegraph Company, is making a short stay at Jekyll Island, Ga.

MUSIC BY TELEPHONE IN THE TRENCHES.—Telegraphers in the French army in the trenches at the front entertain themselves by placing a phonograph before a telephone receiver and distributing the music by telephone.

INDEPENDENT TELEPHONE CONVENTIONS.—The second annual convention of the Independent Telephone Association of America will be held at the Hotel Radisson, Minneapolis, Minn., January 19, 20 and 21, and the eighteenth annual convention of the National Independent Telephone Association will be held at the La Salle Hotel, Chicago, Ill., February 3, 4 and 5.

Review of Principal Articles in Contemporary Telephone Publications.

"Lest We Forget," is the title of a paper read by Mr. H. F. Thurber, vice-president of the Bell Telephone Company of Pennsylvania, before a recent meeting of the Philadelphia Telephone Society. Mr. Thurber discussed the progress of the telephone business, and took up the subjects of engineering, traffic developments, plant progress, the art of accounting, and the employee's benefit fund. Touching upon the commercial side of the work, "The commercial people," he said, "are interesting conversationalists and are not at all shy." This paper is printed in full in *The Telephone News* of December 15, 1914.

The telephone industry in 1914 is reviewed exhaustively by Mr. S. R. Edwards in *Telephony*, January 2. Mr. Edwards states there have been no particular events or occurrences during the year which will stand out as mile posts. Commissions have been exceedingly active in the direction of making valuations of telephone properties, in order to have a basis for establishing rates; a number of rulings have been made relative to physical connections; and there has been a revival of interest among independent companies, the tendency being to centralize management and conduct operations on a more efficient scale. Progress has been made in perfecting existing, rather than in bringing out new apparatus. There is a trend toward automatic equipment. During the year a new type of cable was developed, containing 2,400 wires, arranged to provide 1,200 metallic circuits. These cables can be placed in ducts three inches in diameter. References are made to the Boston, Washington underground cable, telephony in Europe, underground cable in England, the situation in continental Europe, and the trend of European engineering thought.

The Christmas number of *The Telephone Review*, of New York, has a handsome and artistically designed cover in colors, and is full of interesting matter. Among the principal articles is one on the Federal emergency revenue tax. The New York company made a device for receiving pennies for coin box telephones and special arrangements have been made for billing subscribers for the tax imposed on their messages, and new collecting routine and accounting systems have been put into practice. An interesting, and profusely illustrated article on "Historic Suffolk County, Long Island," makes attractive reading for the telephone people of New York and vicinity. Many buildings and points of interest are illustrated. The installation of an underground telephone cable across the Isthmus of Panama is described by Mr. E. W. Jaehne. The cable is run in a subway paralleling the railroad from Cristobal to Balboa Heights, a distance of forty-seven miles, with loops into Gatun and Pedro Miguel for testing purposes. The open wire pole line is being taken down.

Two dollars will bring **TELEGRAPH AND TELEPHONE AGE** to your address for one year.

RADIO-TELEGRAPHY.

Review of Wireless Telegraphy in 1914 and a Forecast for 1915.

BY E. J. NALLY, VICE-PRESIDENT AND GENERAL MANAGER, MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA, NEW YORK.

In the development of wireless telegraphy during the past year our attention has been particularly devoted to transoceanic work. The transatlantic high-power stations at New Brunswick, N. J., and Belmar, N. J., were completed and were being tested out when the European war interfered with the work, the English government having commanded the corresponding stations at Carnarvon and Towyn, Wales. The transpacific service was opened on September 24, and great success has been attained. We are maintaining uninterrupted communication with Honolulu.

The Marconi Company has been successful in its litigation against those who have infringed its patents; the courts having awarded the invention of the use of the adjustable inductance to Lodge, patents owned by the Marconi Company, and the tuning of the four circuits as commonly employed, to Marconi.

Another interesting development is that in the construction of small continuous wave generators used for short distance work, both for telegraphy and telephony. By this means the Marconi Company has been able to evolve a wireless telephone set which is being used for distances up to thirty miles, and it is being developed for even longer distances. The fact that these relays can be made to produce oscillations is an enormous step forward in the art and constitutes the greatest improvement made during the past year.

The successful operation of wireless by the Lackawanna Railroad Company during the severe storms of the last year has demonstrated the usefulness of wireless, and marks it as the connecting link between land telegraphy and telephony.

As to the coming year. In common with the rest of the world, we are hoping for the dawn of peace, upon the restoration of which progress depends. Work is progressing rapidly, and within a few months our high-power stations in Massachusetts—the transmitting station in Marion and the receiving station in Chatham—will be complete and ready for service with Norway, Russia and Northern Europe. The Japanese station, which is to work in connection with our transpacific system, will be ready the last of April and will thus complete the transpacific link. China is also planning high-power stations, and if the war does not prevent, the English government will complete the imperial chain of stations which will form the complete circuit of the world.

Summarizing, I would state that, in my opinion, the most important development is that concerning the high-power, long-distance work, the inauguration of the long-distance service by the Marconi Company which marked the starting point in the

development of commercial working through long distances over land and sea.

Radio Engineers.

The annual meeting of the Institute of Radio Engineers was held at Columbia University, New York, on January 6.

Mr. Roy A. Weagant, engineer of the Marconi Wireless Telegraph Company of America, read a paper on "The Design and Construction of Guy-Supported Towers for Radio Telegraphy," and Mr. Cyril F. Elwell, chief engineer of the Universal Radio Syndicate (Poulson system), of England, read one on "Wooden Lattice Masts."

Mr. Weagant described methods of determining the stresses in towers, and of designing the towers to meet them. Mr. Elwell's paper gave in detail the design, construction and guying of the lattice mast. The latter paper was illustrated.

MR. LEWIS MACCONNACH, for many years an executive clerk for the Postal Telegraph Cable Company, New York, has accepted the position of secretary to vice-president John Bottomley, of the Marconi Wireless Telegraph Company of America.

MR. C. H. WALTER, for several years an accountant in various departments of the Postal Telegraph Cable Company, New York, and at one time cashier for that company at Pittsburgh, Pa., has resigned to enter the service of the Marconi Wireless Telegraph Company of America.

SHIPWRECKED WIRELESS OPERATORS. — Paul Kreiger and William Miller, wireless operators living in New York, were shipwrecked recently off Shipwash Sands, Essex, England, while members of the crew of the Norwegian steamship "Obidense." They applied to and received from the American Consulate transportation back to the United States.

WIRELESS STATION GUARDED.—The Marconi trans-Atlantic station at Glace Bay is carefully guarded by the Dominion government. At the outbreak of hostilities, the German warship "Karlshruhe" was in that vicinity. Immediately the Canadian cruiser "Niobe" arrived and landed Maxims and heavy guns and searchlights. There are now several companies of militia encamped at the station in temporary barracks with block-houses loopholed and surrounded by barbed wire entanglements. Sentries guard all roads and employes cannot go in or out without passes.

THE MARCONI TELEGRAPH-CABLE COMPANY, in a circular, announces that its transpacific radio service is now in successful operation between San Francisco and Honolulu, Hawaii. The immediate result of this, the circular states, is a saving of nearly thirty per cent in cable tolls and the innovation of night and week-end letters at very low rates. The proposed transatlantic Marconi service having been temporarily delayed by the European war, an excellent transatlantic wireless service is offered by the Canadian Marconi Company's facilities

MARCONI RATE BOOK.—The Marconi Wireless Telegraph Company of America has issued its rate book for trans-Atlantic and trans-Pacific radio service. The service includes full rate Marconigrams; deferred half rate Marconigrams; Marconi Wireless lettergrams, and week-end lettergrams; also messages to and from steamers and ship to ship service. The book contains a map of the world showing the principal trans-oceanic wireless stations and coast stations of the world. The book is an attractive one and contains various items of interest to the telegraphing public. It is embellished with handsome pictures of the company's New York main office and of the Woolworth Building, in which the executive offices are located.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

The December, 1914, proceedings of the Institute of Radio Engineers, New York, contains a list of the officers, past-presidents and committees of the institute, and papers, as follows: "The 'Hytone' Radio Telegraph Transmitter," by Melville Eastham; "Radio Traffic," by David Sarnoff; "The Resistance of the Spark and Its Effect on the Oscillations of Electrical Oscillators," by John Stone. The papers are illustrated. The book also contains the index to volume 2 of the proceedings.

South American wireless stations are described in the December, 1914, number of *The Wireless Age*, of New York. Many interesting facts and figures are given showing what the South American republics are doing in wireless work. In Argentina there are now more than 120 stations, and in Brazil nearly 100. Uruguay has twenty-four stations and Paraguay is erecting ten.

"The Wireless Influence in the World War," is the title of a long article in *The Wireless Age* for December, 1914. It tells how the fate of the German cruiser "Emden" was sealed by an appeal for help for an island station, and how the recent naval engagement between the English and German warships off the Chilean coast was preceded by a portentous message, besides accounts of other wireless activities.

"Linking Norway with Massachusetts," is described and illustrated in *The Wireless Age*, of New York. The 30,000 volt generator of the Norwegian transmitting station at Naerbo will be driven by water power from the mountain streams. At the Marion, Mass., station a 60-cycle 2,400-volt current will be transformed to one of high frequency for trans-oceanic transmission. The condenser bank at Marion will consist of 390 large stoneware tanks, containing about forty tons of glass, and the aerials will be supported by fourteen steel masts, each 423 feet high. The Massachusetts equipments will be arranged for duplex working, and the transmitting and receiving units are to be located more than twenty-five miles apart.

John L. Hogan, jr., reviews in *The Electrical World* of January 2, the progress made in radio telegraphy and radio telephony in 1914. Marked advances in the technique of long distance radio telegraphy have been made and even in the less important instruments used normal and satisfactory progress in design has been shown. Nearly 1,000 lives were saved at sea from ten merchant vessels. Radio signaling to and from moving trains, to submarines and to air craft are referred to. The train installations which have been made, however, says the author, have not been operated continuously, perhaps since the expense of maintaining a trained telegrapher for each train more than offsets the convenience of such equipment. Long distance communication over seas, and the patent situation are also dwelt upon at considerable length. The *Electrical Review* and *Western Electrician* in reviewing progress in wireless telegraphy during the past year states that it is the opinion of radio authorities that the greatest improvement was the introduction of the "ultraudion," or oscillating audion. The detector renders signals as clear musical notes, the pitch of which can be varied to suit the needs of the receiving operator.

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.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Cincinnati, Ohio, 1915. Secretary, Clarence R. George, Houston, Tex.

WOMEN TELEGRAPHERS FOR ENGLISH EMERGENCY FIELD SERVICE.—Viscountess Castlereagh, colonel-in-chief of the English Women's Emergency Corps, has organized and is training a body of women in the use of the field telegraph. These women will act with the last line of reserves. Each woman must pass a physical examination, and in order to be eligible to the service they must be within the ages of eighteen and forty years.

MESSAGES IN OKLAHOMA.—The Oklahoma Corporation Commission has issued a general order to all telegraph companies in the state requiring that all messages properly filed for transmission must be accepted and sent at once. The order followed a hearing on a complaint by an intending passenger who attempted to notify the commission by telegraph of a railroad employee's negligence. The employee was also the telegraph operator and refused to accept the tendered message.

Mr. T. J. Howlett, of the Marconi Wireless Telegraph Company of America, New Brunswick, N. J., writes: "I thank you for renewing my subscription to *TELEGRAPH AND TELEPHONE AGE* for 1915, and for which I herewith enclose check for \$2.00. I appreciate it not only for its great value to the telegraph man, but because it keeps me in touch with many of my old and dear friends—the telegraph operators."

OBITUARY.

JOHN M. MEYERS, aged sixty years, a retired Western Union operator at Jackson, Mich., died at that place December 23.

E. A. REGESTIN, aged thirty-six years, general sales manager of the Standard Underground Cable Company, Pittsburgh, Pa., died at his home in Bellevue, Pa., December 31.

FREDERICK J. LOTS, aged forty years, manager of the American District Telegraph Company's office in Jersey City, N. J., shot and killed himself in New York, December 31, 1914.

CHARLES R. STOUGH, aged sixty-eight years, a well-known old time telegrapher, died in Pittsburgh, Pa., November 15. He was in the Western Union service from 1870 until about twelve years ago, when he was retired.

WILLIAM MOAKE, aged eighty-two years, one of the best-known telegraphers in the South, died in New Orleans, La., December 30, 1914. He was an army operator during the Civil War, and had lived in New Orleans since 1866.

JOSEPH HENDERSON, an old-time telegrapher, died in Portland, Ore., December 30, 1914. He was a native of Canada, and became an operator more than sixty years ago. He was manager of the Western Union Salt Lake City office at one time.

ELLIS I. WILSON, an old-time and military telegrapher, died at Little Rock, Ark., December 26. This makes the eighth death in the United States Military Telegraph Corps reported since September.

JACOB N. DONALDSON, seventy-nine years of age, formerly secretary and treasurer of the American District Telegraph Company, of Philadelphia, and one of the oldest members of the Union League, was found dead in bed January 6. Death was due to paralysis.

DOUGLAS REID, aged eighty-five years, brother of the late James D. Reid, the first superintendent of telegraph, died at River Falls, Wis., on December 31, 1914. Douglas Reid, who was a native of Edinburgh, Scotland, was an old time telegrapher. In the early days of the telegraph he was associated with Mr. Andrew Carnegie at Pittsburgh, Pa. For a long period previous to fifteen years ago, when he retired from active service, he was identified with railroad interests in Wisconsin and Minnesota.

F. E. JOHNSON, aged thirty-six, a United States signal corps operator at Donnelly's, Alaska, was frozen to death on December 23, 1914, on the trail near his post. He left Donnelly's lightly dressed, on horse-back, for a relief cabin on the military telegraph line, to install a stove. His body was found near a large rock, about which he had tramped down the snow in his efforts to keep warm. Apparently his horse went through an overflow and the rider became wet, started for safety and was overtaken by a snow storm. Mr. Johnson came from Meadow Valley, Wis.

EDWARDS SEWALL SANFORD, aged sixty-nine years, a member of the Society of the United States Military Telegraph Corps, died at his residence in South Orange, N. J., on December 28, 1914. Mr. Sanford was the only son of Brigadier-General Edwards S. Sanford, military supervisor of telegrams during the Civil War. General Sanford, at the outbreak of the Civil War, was president of the American Telegraph Company, and in the month of April, 1861, the lines of the American Telegraph Company were extended from their main office, 432 Pennsylvania avenue, Washington, D. C., to the War Department, Navy Yard, Arsenal, Chain-Bridge, and other outlying points. There was no appropriation to meet the expenses of a government telegraph service, and for six months or more General Sanford paid all the bills, aggregating thousands of dollars, for poles, wires, instruments, salaries of operators, etc. This was a generous and patriotic act on the part of General Sanford, which was gratefully acknowledged by President Lincoln and Secretary of War Cameron, and by the latter's successor, Stanton. The American Telegraph Company was, of course, reimbursed later through an appropriation by Congress. Edwards S. Sanford, jr., was never in the telegraph service proper, but during a large part of his business life was in the service of Adams Express Company, of which company his father was also president during the period of the Civil War. He had a most attractive personality, and was a universal favorite.

MRS. MARGARET HOWITT AHEARN, wife of Mr. T. Ahearn, of Ottawa, Ont., died at her home on January 3, of heart trouble after a long illness. With the passing of Mrs. Ahearn, not only Ottawa, but Canada at large has lost one of the most prominent and useful women in philanthropic and educational circles. She was one of the founders of the Victorian Order of Nurses; for some time president of the Women's Canadian Historical Society, being its honorary president at the time of her death; past president of the alumnae association of the Ottawa ladies' college; past president of the Local Council of Women; director of the Women's Art Association and active member of St. Andrew's Presbyterian church. Mrs. Ahearn was a great traveler, having been round the world more than once, and her impressions have been embodied in some interesting contributions to the press. She was an accepted authority on Canadian history, and her writings are regarded as valuable additions to historical literature. But though actively associated with all these organized institutions and organizations, Mrs. Ahearn's charity did not end there. She had a number of private avenues through which she expressed her real self, and there will be many little blessed with this world's goods in Ottawa who will miss the deceased greatly.

Mr. Ahearn, husband of the deceased, is a leading citizen of Ottawa, and was a prominent New York telegrapher in the early seventies. He has many friends in the United States, who extend their sympathy to him in his bereavement.

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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 and 1914 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, JANUARY 16, 1915.

Opportunities.

All that others can do for us is to give us opportunity. We must ever be prepared for the opportunity when it comes, and to go after it and find it when it does not come, or that opportunity is nothing to us. Life is a succession of opportunities; they are for good or for evil, as we make them.

Improvements in the Wheatstone System.

It is thirty-three years since the Wheatstone automatic system was introduced in this country, and while little has been written about it in late years, it, naturally, has undergone modification in a great many ways to suit changing conditions met with in practice. The system is essentially unchanged and is the same as when it first applied for United States citizenship, but it has, as do all aliens who come to these shores to find better conditions, become thoroughly Americanized—that means that it has become greatly improved. Mr. William Finn, of New York, a well-known telegraph engineer, who, it may be said, was brought up with the Wheatstone system, and probably knows more about it than any other American telegraph engineer, has

brought it up to date in description and illustration for the benefit of our readers, and begins the article in this issue.

This article will be welcomed by our readers as there has been a desire for many years to know more about the Wheatstone system. In it are revealed many developments of importance that will find general application, although it was the object to improve the Wheatstone that gave them birth.

Great inventions are not frequent but those that we have are being developed to the utmost and the best that is in them is being gradually brought to the surface and made available.

The Making and Laying of Submarine Telegraph Cables.

We conclude in this issue the article on "How Cables are Made, Laid, Operated and Repaired," which has been published in these columns in installments for many months. This contribution on the practice of modern cable telegraphy has met with a wide reception, because it has thrown light on a subject about which there has existed much ignorance. The article was written in a popular style, and was devoid of technicalities, the presence of which frequently defeat the aim of a contribution on a subject that is essentially technical. The true way to impart knowledge on a technical subject is to first present it in plain language so that the average reader can readily comprehend it. In this way the foundation is laid for a broader study of the subject if the reader is sufficiently interested to go further into it. The article referred to has served its purpose, as we have every reason to believe.

Federal Telephone Bill.

A bill to carry out postmaster-general Burleson's recommendation for taking over the telephone systems and lines of the country has been drafted by Representative D. J. Lewis, of Maryland, and has been introduced in the House of Representatives at Washington. The measure provides for the purchase by the government of all the telephone properties throughout the country in July, 1916.

The Lewis bill directs the Interstate Commerce Commission to ascertain and appraise the value of the telephone lines. The owners of telephone stocks, bonds and other securities will have the alternative of accepting cash or 3 per cent. government bonds, which are to be exempt from all taxes. If this alternative offer is declined or the appraisal is not finished by the time the government is to take possession of the properties, the owners of the lines are to receive 4 per cent. on their investments during the interval until the transfer is completed. In case stockholders are not satisfied with this arrangement or the valuation and tender of payment they will have the right to appeal to the courts for a determination of the value of their properties.

There are excepted from the application of the proposed measure all telegraph lines and farmers' telephone lines.

Recent Improvements and Developments in Wheatstone Working.

BY WILLIAM FINN, NEW YORK.

Since the publication in TELEGRAPH AGE some twenty years ago of the series of articles descriptive of the Wheatstone automatic system, quite a number of changes in apparatus equipment, and in the methods of operating that system, have been made in order to meet new requirements, and counteract, as far as possible, the detrimental effects of the ever increasing number and severity of disturbing influences to which the system has been subjected.

TROUBLES OF LOCAL ORIGIN. While by far the greatest proportion of these disturbing elements are derived from extraneous sources, not a few were found to be of entirely local origin, but had been generally regarded in those days of "big work-

the transmitting station at once became apparent, in that some of the injurious effects which had previously manifested themselves as the result of imperfect adjustments, or other irregularities of the transmitter, were rendered more or less innocuous by the change, while the removal of such "bias" troubles as originated with the transmitter, has been greatly facilitated thereby.

It was furthermore discovered that the balance at the distant station was less liable to be disturbed by the armature movements of the transmitting relay than by the corresponding movements of the Wheatstone transmitter lever, which, in passing between its battery posts, usually introduces a break, or opening in the direct circuit, of greater magnitude than is the case with the more closely adjusted points of the transmitting relay.

The beneficial effects at the receiving station may be chiefly ascribed to the great sensibility of the receiving relay, which makes it prompt to respond

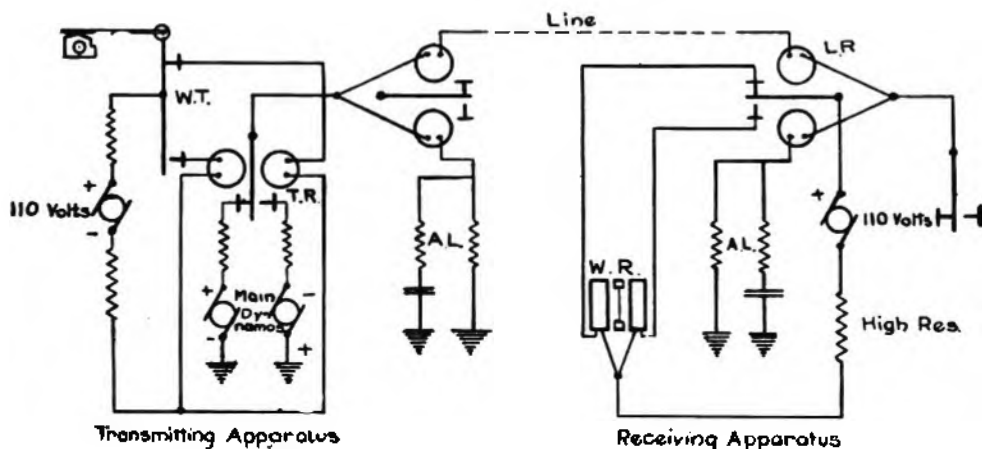


FIG. 1.—WHEATSTONE SYSTEM SHOWING IMPROVED LOCAL CIRCUIT ARRANGEMENT.

ing margins" as having little or no practical influence upon the working of the circuit.

When, however, the working efficiency became sensibly impaired, and the operating margins began taking on more and more of a downward tendency, these minor local troubles had to be reckoned with, the more especially as the printer system, then being introduced upon the Western Union lines, demanded a higher degree of apparatus efficiency than was required for the operation of the Wheatstone system.

LOCAL IMPROVEMENTS EFFECTED.—Having reference to some of the earlier improvements effected, it may be stated, that the old original method of transmitting signals directly into the main line from the Wheatstone transmitter, and of their direct reception upon the Wheatstone receiver at the other end of the line, has been abolished in favor of the arrangement shown in Fig. 1. By this arrangement, as will be observed, a transmitting relay (T.R.) is interposed between the Wheatstone transmitter (W.T.) and the main line, the signals from which, on reaching the opposite end of the line, must first pass through a main line relay (L.R.) before they can actuate the recording apparatus (W.R.) now removed to a local circuit.

The screening action of the intervening relay at

to the weak signaling impulses that would not satisfactorily actuate a less sensitive instrument. The relay can thus be operated in a main line circuit with more success than can the Wheatstone receiver, whose mechanical and electro-magnetic inertia represent retarding factors highly detrimental to fast working in a main line, but capable of being modified or fully compensated for when the receiver is transferred to a local circuit.

INTRODUCTION OF IMPEDING DEVICES.—The arrangement, as shown in Fig. 1, continued in force as the standard type of automatic circuit up to the time of the merging of the telegraph and telephone interests in 1910.

In order that full advantage might be taken of the facilities then afforded for utilizing the telephone lines for telegraph purposes, it was found necessary to insert impeding devices into many of the telegraph circuits, with the view of rounding off the signaling impulses to the wave-like form required to prevent interference with telephone operations.

An inductance device, known as the 5-U retardation coil, consisting essentially of a ring of iron wires surrounded by two windings differentially arranged, was found to be very effective in that particular connection, and has since been extensive-

ly employed in bridge duplex and quadruplex working, but which, on account of its high resistance and great retarding properties, together with the current loss incidental to bridge working, could only be applied to fast speed automatic circuits at considerable sacrifice to their normal rates of speed.

In the case of some automatically operated printer circuits, however, whose rates of working are limited by the mechanical inertia of the printing mechanism, it has been found possible to so apply the impedance principle (Fig. 2) as to modify the

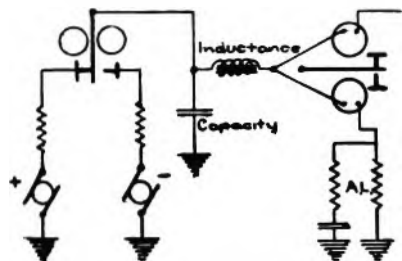


FIG. 2—APPLYING IMPEDANCE PRINCIPLE TO PLAIN DIFFERENTIAL WORKING

disturbing influences in neighboring lines without too seriously impairing the working efficiency of the printer circuits (a compromise rendered feasible only by reason of such speed restrictions); but where higher speeds are attainable, as in the Wheatstone system, for example, the deleterious effects of added impedance are much more pronounced.

THE VIBRATING RELAY.—All Wheatstone automatic and printer systems, regardless of their equipment or method of line working, continued to be operated under the local conditions substantially as shown in Fig. 1, until the advent of the vibrating relay with its new and novel local arrangements.

The installation of this relay, originally devised by Gulstad (a Danish cable engineer) for the improvement of submarine cable working, has considerably increased the efficiency and rate of speed on such of the Western Union automatic circuits as the principle has been applied to.

The vibrating relay now in use on those circuits only differs from the ordinary Wheatstone relay in that it is provided with an auxiliary winding, through the medium of which a local action is set up that causes the relay armature to vibrate between its contact points. The rate of vibration can be controlled (by the adjustment of certain auxiliary apparatus) so as to make it correspond with the rate at which signals are being emitted by the distant transmitter, that, in fact, being the particular function of the vibrating apparatus, and the principal object to be attained in first starting up a circuit equipped with this arrangement.

The union thus established between the moving parts of the transmitting and receiving appliances has a very important bearing upon the working of the circuit, inasmuch as the amount of energy required to move the relay armature between its contact points is now mainly derived from a local source. Hence, about the only work essentially required of the line current is to stop the local vibrations, and hold the relay armature against one or the

other of its contact points (according to the direction of the signaling current) for the particular period of time during which that current lasts.

PRINCIPLES INVOLVED.—The method whereby these local vibrations are produced and regulated will be understood by reference to Fig. 3, where the auxiliary winding is shown in two sections, one of which is represented by the coil on the right, and the other section by the coil on the left of the relay armature. A local split battery (LB) is connected with the middle point of the winding through one or other of the battery posts and the high resistance P, as indicated.

When the armature first makes contact with, say, its left-hand battery stop, a positive current starts out from the battery, and after traversing the resistance P, rushes first through the right-hand coil into the condenser C, thereby developing in the coil a magnetic polarity that has the effect of momentarily increasing the armature pressure already being exerted against its positive battery stop. As soon, however, as the condenser becomes fully charged—or filled up as it were—the flow of the current in that particular direction ceases, and now takes an opposite course to ground via the left-hand coil and resistance N. As a result thereof, magnetism is excited in the relay core of such polarity as to repel the armature and drive it in the direction of its

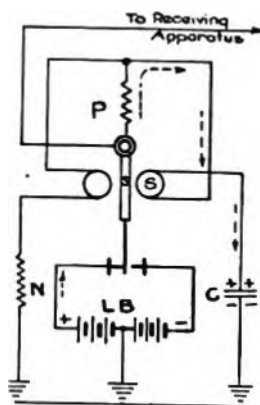


FIG. 3—LOCAL VIBRATING CIRCUIT ARRANGEMENT.

right hand, or negative battery post, a movement that is greatly facilitated by the condenser discharge which occurs at the breaking of battery contact and develops a momentary current that traverses both sections of the auxiliary winding. When the armature reaches its opposite, or negative battery stop, and reverses the current through condenser C, all the actions previously described as having taken place with the positive direction of current are also reversed, and the armature is now moved in the contrary direction, thus developing the vibratory action from which the relay takes its name.

(To be Continued.)

Mr. J. J. Flanagan, manager, Western Union Telegraph Company, Bangor, Me., writes: "I appreciate your courtesy in renewing my subscription for another year, and wish the AGE prosperity and an enlarged field of usefulness the coming twelve months."

Rules for the Wiring of Offices.

(Continued from page 13, January 1)

18. For intermediate offices into which more than two lines are looped, pin jack boards will be used. These boards will be furnished in twelve-line frames and thirty-five-line frames. The twelve-line frames can be fitted to carry switch and fuse equipment for from two to ten lines and two instrument sets or in other combinations up to their capacity. These frames attach to the wall. The porcelain bars are removable from the front. For a ten to twenty-line board two twelve-line frames may be used side by side. The thirty-five-line frame is built to stand upon the floor, is provided with a shelf for test instruments and with terminal bars and cross-connecting racks.

19. A cross-connecting rack made up of parallel lock-nut strips mounted in an asbestos-lined box (preferably metal) may be installed, where necessary, ahead of the switchboard, for the purpose of terminating and cross-connecting the wires entering the building.

SMALL TERMINAL AND SEMI-TERMINAL OFFICES.

20. Offices in which it is necessary to furnish current for line wires or repeaters, etc., are classed as small terminal offices, or semi-terminal offices if there is in addition a large number of wires which pass through the office without repeaters, battery, etc.

21. For such offices strap and disc units No. 153 in combination with or without No. 175 units are used, depending upon the switching requirements.

22. These boards will be mounted at the shop and shipped on standard size frames. The smallest of these frames has a capacity of six No. 153 units. The next standard frame has a capacity of twelve No. 153 units. Larger frames will be made specially.

23. Switchboards of the various types indicated will be provided in sizes desired, mounted complete with equipment as specified.

SWITCHBOARD AND INSTRUMENT WIRING.

24. All wires inside buildings must be neatly arranged and securely fastened in place in some convenient, workmanlike manner.

25. The wires must not come nearer than two inches to any electric light or power wire in the building, unless separated therefrom by some continuous and firmly fixed non-conductor creating a permanent separation; this non-conductor to be in addition to the regular insulation on the wire. The protector is relied upon to stop all dangerous currents. Porcelain tubing or approved conduit may be used for encasing wires where required.

26. A cross-connecting rack made up of parallel lock-nuts strips mounted in an asbestos lined box (preferably metal) may be installed where necessary ahead of the switchboard for the purpose of terminating and cross connecting the wires entering the building.

27. Wires and cables must be run in such a way as to give them protection from mechanical injury and from any damage from hot pipes, the hot sun, moisture, etc. Double-pointed tacks or staples

must not be used to fasten wires. Where single or paired wire must be supported by tacks, the single insulated head type must be used.

28. When the instrument equipment of an office consists of only a few Morse sets the wiring between the switchboard and the sets may be done with standard office wire. This wire must run in a neat and workmanlike manner and so located that horizontal wire will be carried at least five inches above the floor to avoid moisture from mops, etc. Where wires pass through the floor they must be encased in a protective pipe or tubing to a distance at least five inches above the floor. The pipe should fit snugly in the floor so that water will not run on the wires below.

29. Where operating tables are so located that wiring from the switchboard may be done without going under the floor, office wire may be used. If the wiring has to pass under the floor, cable, or wire in conduit must be used.

30. Interior office cable will be terminated under operating tables in standard iron table terminal boxes. Coils and table fuse blocks may also be located in these boxes.

31. Wooden strips for mounting fuse blocks, lock-nuts, etc., may be fastened to the back of the boxes. The boxes should be lined with thin sheet asbestos, using cold water paste as an adhesive. The asbestos should cover the wooden strips so as to expose no inflammable material. As an alternative, quarter-inch-thick-asbestos wood (transite) or its approved equivalent may be used as a backboard and the asbestos lining and wooden strips omitted.

32. Coil cabinets may also be located at the line switchboard or generator switchboard according to conditions.

33. Office cable consists of enameled wires with cotton insulation and a lead sheath overall and may be had in the following standard sizes, of length as required: thirteen pair, twenty-six pair and fifty-two pair.

34. In making terminals on this cable, the lead should be stripped back and the cotton insulation of the conductors well boiled out with beeswax to eliminate moisture. The beeswax is also used as a binder to keep the cotton covering from unravelling. After the wax on the conductors is dry the latter should be formed up for connection to the binding posts and covered with friction tape. This tape should be well coated with black asphaltum paint. The paint should cover the individual conductors as far as their insulation extends. Shellac must not be used under any circumstances for the final coating of office cable terminals as it would constitute a fire risk; the asphaltum paint is slow burning and tends to prevent the spread of fire.

(To be Continued.)

Mr. Sylvester S. Garwood, of Philadelphia, Pa., prominent in telegraph circles many years ago, now in other business, in renewing his subscription for another year, writes: "The AGE keeps me in touch with the news about my old friends in the telegraph and telephone business, and, to some small extent, with the very rapid progress made in the service in which I spent so many years and to which I am in sentiment so much attached."

How Cables are Made, Laid, Operated and Repaired.*

(Continued from page 15, January 1)

Cables are broken from various causes. Where they approach the shore they suffer from corrosion and chafe and anchors of vessels, and are occasionally broken by icebergs grounding on them and crushing them. During one repair made by the Commercial Cable Company's steamer "Mackay-Bennett" she counted as many as 100 icebergs, and to enable her to carry on her work had to tow an iceberg to sea to take it off the line of the cables.

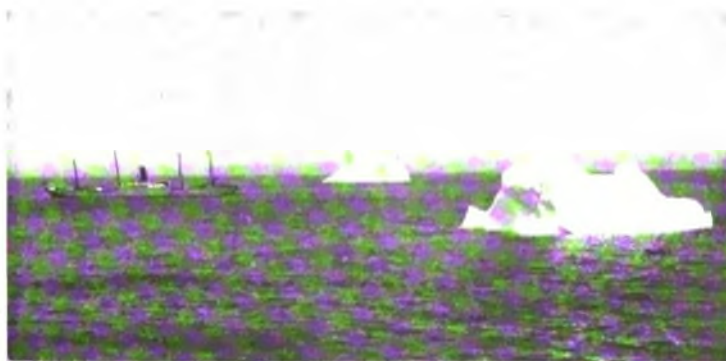
Cables have been also broken in the deeper waters of the Atlantic by submarine land slides, burying the cable for many miles. The Alaskan cable was broken by a whale, the decomposed carcass of which was found encircled by the cable when it was recovered during the repair. One of the cables in the Southern waters was interrupted by a shark's

or more at sea waiting for suitable weather conditions to carry on operations. The "Mackay-Bennett" has been at sea as long as ninety days making one repair, and during severe gales has been blown hundreds of miles away from the ground of operations.

NEW BOOK.

MODERN LAND AND SUBMARINE TELEGRAPHY. By George S. Macomber. 89 pages; 59 illustrations. American Technical Society, Chicago. Price, 75 cents.

In this volume the author has given a brief, up-to-date treatise on the electric telegraph, including the submarine cable, and the development of modern methods and equipment. He carries his subject from the simple key telegraph to the modern multiplex, the rapid chemical systems and the latest types of printers, and the illustrations are very



CABLESHIP PASSING ICEBERGS AT SEA.

tooth, which was found imbedded in the gutta-percha. The teredo, or borer worm, has also done considerable damage to submarine cables by boring through the gutta-percha insulation. But the greatest menace to the safety of submarine cables is the steam trawler. These boats operate in great numbers on the European coasts, particularly off the Irish coast. They drag the bottom of the ocean for fish down to depths of 200 fathoms or more with great iron-shod beams trailing along the bottom. They have destroyed hundreds of thousands of dollars' worth of cable property. During the year 1908 four out of five of the Commercial Cable Company's main cables were interrupted by trawlers. The company took the matter up vigorously with the British and American governments, which resulted in a conference being held in Lisbon, Portugal, to discuss the question of securing relief from these destructive operations. The British government finally appointed a commission to look into the cause of each interruption off the British coast, and to take whatever steps were possible to prevent unnecessary damage to the cables.

The operation of repairing deep-sea submarine cables is no child's play. It is work requiring sturdy, fearless manhood and skillful seamanship. Most of the breaks occur during seasons of the year when the weather conditions at sea are most severe. It is not uncommon for a cableship to spend a month

clear and helpful to an understanding of the various systems and apparatus described.

Among the contents may be mentioned the development of the electric telegraph and of the submarine telegraph; commercial development of the telegraph (including the Western Union and Postal companies, the systems now in use, etc.); modern Morse telegraphs; land line construction; ocean cable construction; telegraph equipment; printing telegraphs; automatic and high-speed telegraphs; submarine telegraphy, including descriptions of the various methods adopted for increasing speed. The Brown and Huertley relays are explained, also the Gott system of cable operation.

The author has succeeded very well, indeed, in covering so much ground in such a limited space; his explanations are confined to facts and, necessarily, he does not go into minute details. The descriptions, however, are ample enough to give one a general idea of the apparatus and methods, and are very timely, coming as they do when there is a wide demand for information on the rapidly expanding telegraph service. It is a valuable work of reference and a copy of it should be found in every telegraph library.

For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Are you a regular reader of TELEGRAPH AND TELEPHONE AGE?

*From *Postal Telegraph*.

NEW BOOKS.

SAMUEL F. B. MORSE: His Letters and Journals. Edited and Supplemented by his son, Edward Lind Morse. Two volumes. Vol. I, 440 pages; vol. II, 548 pages; illustrated. Houghton, Mifflin Company, Boston. Price, \$7.50 net.

This work, without doubt, is one of the most notable productions relating to the telegraph and will certainly find a prominent place in the literature on that subject.

The invention of the telegraph has been a widely discussed one and much controversy has been indulged in regarding the relations and claims of the principal persons concerned in the early development of the great invention. It may be reasonably assumed, therefore, that the light thrown upon the subject through these volumes will be of material aid in clarifying the atmosphere regarding these disputed points.

There are always at least two parties to a controversy, and it is not always that they both agree on essential points; so it has been with the telegraph. It is reasonable to suppose, however, that the author of this monumental work has placed before the world the true story from the Morse side, and, be it said, it will not likely be seriously challenged from any other, inasmuch as no fundamental facts are questioned. What "fundamental facts" are may, however, be questioned according to individual viewpoints, but, in the main, the story is entitled to general acceptance. This question, however, is not one for us to determine; the telegraph world can form its own opinions regarding these matters. We will confine ourselves to the books and try to tell our readers what they contain.

The first volume treats of Morse's early years, his art studies in this country and abroad, and his career as a painter. The second volume tells, in more detail than has ever been told before, the story of the events leading up to the invention of the electric telegraph, the actual invention, the legal and Congressional troubles resulting from it, and the final establishment of Morse's claim to the credit of the invention. Much of the material incorporated in the work has never been used before, and the illustrations are numerous and interesting.

Volume II covers the period from October 1, 1832, to April 16, 1872, during which time occurred Morse's struggles for recognition of his invention and his final success. The narrative is well composed by his son and is full of absorbing interest.

Regarding the originality of the invention Morse wrote to a friend in Albany, on August 27, 1837, as follows: "My telegraph, in all its essential points, is tested to my own satisfaction and that of the scientific gentlemen who have seen it; but the machinery (all which, from its peculiar character, I have been compelled to make myself) is imperfect, and before it can be perfected I have reason to fear that other nations will take the hint and rob me both of the credit and the profit. There are indications of this in the foreign journals lately received. I have a defender in the 'Journal of Commerce' (which I send you that you may know what is the progress of the matter), and doubtless other

journals of our country will not allow foreign nations to take credit of an invention of such vast importance as they assign to it, when they learn that it certainly belongs to America.

"There is not a thought in any of the foreign journals relative to the Telegraph which I had not expressed nearly five years ago, on my passage from France, to scientific friends; and when it is considered how quick a hint flies from mind to mind and is soon past all tracing back to the original suggester of the hint, it is certainly by no means improbable that the excitement on the subject in England has its origin from my giving the details of the plan of my Telegraph to some of the Englishmen or other fellow-passengers on board the ship, or to some of the many I have since made acquainted with it during the five years past."

"In this he was mistaken," says his son, "for the English telegraph of Cooke and Wheatstone was quite different in principle, using the deflection, by a current of electricity, of a delicately adjusted needle to point to the letters of the alphabet. While this was in use in England for a number of years, it was gradually superseded by the Morse telegraph, which proved its decided superiority. It is also worthy of note that in this letter, and in all future letters and articles he, with pardonable pride, uses a capital T in speaking of his Telegraph.

"I have shown conclusively," continues the historian, "that the idea of transmitting intelligence by electricity was original with Morse in that he was unaware, until some years after his first conception, that anyone else had ever thought of it. I have also shown that he, unaided by others, invented and made with his own hands a machine, rude though it may have been, which actually did transmit and record intelligence by means of the electric current, and in a manner entirely different from the method employed by others. But he had now come to a point where knowledge of what others had accomplished along the same line would greatly facilitate his labors, and when the assistance of one more skilled in mechanical construction was a great desideratum, and both of these essentials were at hand. It is quite possible that he might have succeeded in working out the problem absolutely unaided, just as a man might become a great painter without instruction, without a knowledge of the accumulated wisdom of those who preceded him, and without the assistance of the color-maker and the manufacturer of brushes and canvas. But the artist is none the less a genius because he listens to the counsels of his master, profits by the experience of others, and purchases his supplies instead of grinding his own colors and laboriously manufacturing his own canvas and brushes.

"The three men to whom Morse was most indebted for material assistance in his labors at this critical period were Professor Joseph Henry, Professor Leonard D. Gale and Alfred Vail, and it is my earnest desire to do full justice to all of them. Unfortunately, after the telegraph had become an assured success, and even down to the present day, the claims of Morse have been bitterly assailed, both by well-meaning persons and by the unscrupulous who sought to break down his patent rights;

and the names of these three men were freely used in the effort to prove that to one or all of them more credit was due than to Morse.

"Now, after the lapse of nearly three-quarters of a century, the verdict has been given in favor of Morse, his name alone is accepted as that of the Inventor of the Telegraph, and in this work it is my aim to prove that the judgment of posterity has not erred, but also to give full credit to those who aided him when he was most in need of assistance."

Mr. Morse refers to the work of Professors Henry and Gale in aid of his father's cause. "The third person who came to the assistance of Morse at this critical period," he continues, "was Alfred Vail.

"In the contract drawn up between them Vail bound himself to construct, at his own expense, a complete set of instruments; to defray the costs of securing patents in this country and abroad; and to devote his time to both these purposes. It was also agreed that each should at once communicate to the other any improvement or new invention bearing on the simplification or perfecting of the telegraph, and that such improvements or inventions should be held to be the property of each in the proportion in which they were to share in any pecuniary benefits which might accrue.

"As the only way in which Morse could, at that time, pay Vail for his services and for money advanced, he gave him a one-fourth interest in the invention in this country, and one-half in what might be obtained from Europe. This was, in the following March, changed to three-sixteenths in the United States and one-fourth in Europe.

"Morse had now secured two essentials most necessary to the rapid perfection of his invention, the means to purchase materials and an assistant more skilled than he in mechanical construction, and who was imbued with faith in the ultimate success of the enterprise. Now began the serious work of putting the invention into such a form that it could demonstrate to the skeptical its capability of performing what was then considered a miracle.

"It was rather unfortunate and curious, in view of Morse's love of simplicity, that he at first insisted on using the dots and dashes to indicate numbers only, the numbers to correspond to words in a specially prepared dictionary. His arguments in favor of this plan were specious, but the event has proved that his reasoning was faulty. His first idea was that the telegraph should belong to the Government; that intelligence sent should be secret by means of a kind of cipher; that it would take less time to send a number than each letter of each word, especially in the case of the longer words; and, finally, that although the labor in preparing a dictionary of all the most important words in the language and giving to each its number would be great, once done it would be done for all time.

"I say that this was unfortunate, because the fact that the telegraphic alphabet of dots and dashes was not used until after his association with Vail had lent strength to the claims on the part of Vail's family and friends that he was the inventor of it and not Morse. This claim has been so in-

sistently, and even bitterly, made, especially after Morse's death, that it gained wide credence and has even been incorporated in some encyclopedias and histories. Fortunately it can be easily disproved, and I am desirous of finally settling this vexed question, because I consider the conception of this simplest of all conventional alphabets one of the grandest of Morse's inventions, and one which has conferred great good upon mankind. It is used to convey intelligence not only by electricity, but in many other ways. Its cabalistic characters can be read by the eye, the ear and the touch.

"It is a matter of record that Vail himself never claimed in any of his letters or diaries (and these are voluminous) that he had anything to do with the devising of this conventional alphabet, even with the modification of the first form. On the other hand, in several letters to Morse, he refers to it as being Morse's. For instance, in a letter of April 20, 1848, he uses the words, 'your system of marking, lines and dots, which you have patented.' All the evidence brought forward by the advocates of Vail is purely hearsay; he is said to have said that he invented the alphabet."

The relations between Morse and Vail were not always harmonious, as is afterwards shown, but the slight differences were smoothed over and their joint work proceeded without friction. The story is a deeply interesting one and is well worth careful reading.

We have dwelt upon the Vail episode because it is the one the telegraph world has heard much of in late years, but it should not be assumed that an undue proportion of the book is given up to this subject. The complete story reflects every thought and event that came into the early life of the telegraph and is brought to a close with the following brief summary of Morse's work:

"In 1832, he conceived the idea of a true electric telegraph—a writing at a distance by means of the electro-magnet. The use of the electro-magnet for this purpose was original with him; it was entirely different from any form of telegraph devised by others, and he was not aware, at the time, that any other person had even combined the words 'electric' and 'telegraph.'

"The mechanism to produce the desired result, roughly drawn in the 1832 sketch-book, was elaborated and made by Morse alone, and produced actual results in 1835, 1836 and 1837. Still further perfected by him, with the legitimate assistance of others, it became the universal telegraph of to-day, holding its own and successfully contending with all other plans of telegraphs devised by others.

"He devised and perfected the dot-and-dash alphabet.

"In 1836, he discovered the principle of the relay.

"In 1838, he received a French patent for a system of railway telegraph, which also embodies the principle of the police and fire alarm telegraph. At the same time he suggested a practical form of military telegraph.

"In 1842, he laid the first subaqueous telegraph.

"In 1842, he discovered, with Dr. Fisher, the principle of duplex telegraphy, and he was also the first to experiment with wireless telegraphy."

High-Speed Printing Telegraph System.

In our issue of July 1 we printed a synopsis of the paper of Mr. Carl Kingsley on "A High-Speed Printing Telegraph System," which was read at the annual convention of the American Institute of Electrical Engineers, in Detroit, Mich., June 26.

In the discussion, Mr. C. R. Underhill referred to a printing telegraph system which he patented in 1904, but which had never been made public. This instrument was so designed that it would print in English characters on a tape, something like a stock ticker. "I had a great deal of difficulty," he said, "on account of certain letters in the Morse code, i. e., C, O, R, Y, Z. I had no difficulty in making it work on the Continental or Universal code.

"There is a point I wish to bring up in connection with the introduction of a machine of this character. The telegraph companies of the United States and Canada are very slow in adopting the Continental, or Universal code, although it is used abroad and in the wireless field. It has been shown that operators in the wireless field readily learn the Continental code, although accustomed to the Morse code, yet the telegraph companies will not adopt it. There seems to be some inertia there.

"My experience with the telegraph instrument I mentioned," he continued, "has, I think, an important bearing on the introduction of a machine of this kind. I took it before the high officials of one of the large telegraph companies. They received it very nicely and said it was a very ingenious device, etc., but they led me into the operating room and showed me a man sitting before a resonator, with a sounder in it, the man operating a typewriter and taking the matter down at the rate of about thirty-five words a minute. The official said, 'You watch that operator.' By chance the operator 'broke,' took the paper out of the typewriter, made a correction on it, put it back, and started typewriting again at the rate of about one hundred words a minute. During this interval he was storing the message in his head. The official said, 'You bring us a machine that will dispense with the operator, and we will put it in.'

Ralph W. Pope said he "first learned to operate the Hughes printing telegraph in 1858, and learned the Morse as a side issue and for amusement. What was amusement then became business thereafter, for the printing instruments were gradually discarded. In the days of the printers, the first being the House, followed by the Hughes, we were very careful about sending out good copy that was perfectly legible and could be read without difficulty by anyone. The House machine was inferior in this respect, for the reason that instead of printing direct from the type it made an impression through a carbon tape onto the paper, and the fine lines of the letters were somewhat blurred and the copy looked smutty, but still it was very good if the tape was kept in good order. The Hughes printer, which followed, printed directly from steel engraved letters, the same as the ordinary type used in printing a newspaper, while the House was

similar to the carbon tape on the typewriter. Business men did not like the tape, for the reason that it was not the proper kind of a document to file away, and when I was a private secretary and received these tape telegrams in the course of business, one of the jobs of the office boy was to tear the tape into pieces five or six inches long and paste them on a sheet, so that we could file them away.

"For more than forty years experimenting has been going on with systems of rapid telegraphy. That has always meant the preparation of the message in advance by perforating paper, and running it through rapidly, in order to get this high speed of 650 words a minute. That means that the sending matter must be divided up amongst a few 'punchers,' as they are called, whereas with the Kingsley instrument, when the message is ready for delivery, it has gone through no other process at the receiving end, and the tape is supposed to be ready to deliver. That has not been the case heretofore with these received messages—they had to be divided up and recopied, on the same principle that they were divided up for punching. While it is desirable, perhaps, to get this high rate of speed, there is another question to be considered, which was brought to my attention by Sir William Preece in April, 1907, when we discussed the Rowland printing telegraph. Sir William said that one of the difficulties they had with these fast systems in England was to get business enough to work the system up to its capacity. There were only a few through trunk lines between London and Liverpool, and London and Glasgow, perhaps, where they could work these fast systems economically, for the reason they would run out of business and would have to wait for more.

"I consider that telegraphy, when you recognize its value, is one of the cheapest things we have, but the average individual rarely sends a telegram on his private account. It is only the great business houses, especially brokerage houses in the large cities, which spend such large amounts in telegraphing. I have gone sometimes from one year's end to the other without sending a private telegram, but that is more especially the case since we have had the telephone, so that the cost of telegraphing is a very small item in the expenses of the average consumer.

"I have always maintained that telegraphing should not be cheapened. This also was an argument put forward by Mr. Swain, who was one of the officers of the first telegraph company in the country, I think, at Philadelphia, when he said they were making a mistake in trying to cheapen the work of the telegraph.

"Before typewriters were used it was considered necessary that every operator should write a clear hand, not necessarily handsome, but plain. It is now obligatory, in most offices, to use a typewriter for transcribing messages instead of longhand. So, we have seen an evolution, even in the simple Morse, first from the use of a metal type notched, for transmitting purposes, set up in a stick and run along, because the inventor thought the operator

could not make the signals plainly enough. Then we went to the key sending and received messages on the tape. Then the embossing register was discarded when the operators discovered they could read the signals by sound and do it much more quickly, and more accurately, and keep up with the sender. That is one thing you lose in any system of the kind under discussion, you lose that time which is required in punching the tape. In receiving by sound, ordinarily the operator is close up with the sounder; to be sure, as the previous speaker has said, they may lag behind for a dozen words, and catch up later—that is one of the peculiar features of Morse telegraphing, the ability of the operators to carry along, some of them twelve or twenty-five words, perhaps, behind the sounder and keep these words in memory, while they are turning their carbon sheets, or putting in fresh carbon sheets, and the various other details which are necessary. That is what I used to do when I had to wait on myself and was fixing up carbon sheets for three copies. While I was doing that, the sounder was going on, and when I began the next page I would be a dozen words behind and then would catch up, and be ready to change the next page.

"I was speaking of the evolution of the Morse simply by the practical experience and growing skill of the operators. I might say there was always a rivalry between the sending operator and the receiving operator, as to which could work the faster, whether the sending operator could send faster than the receiving operator could receive it, and it was about neck and neck until the typewriter operator arrived. When the typewriter came, the receiving operator had it all his own way, he could almost take a nap in between times, because he could take ten or fifteen words more per minute than the sending operator could send.

"What has happened now? The telegraph company has eliminated all of the conventional signals, formerly required in sending messages. They used to put 'ahr' for 'another,' and 'fm' for 'from' on our messages. Now, the company, to save time, has eliminated these things, and the receiving operator must be still more expert, because he has no breathing spell. As the operators found they could receive much faster with the typewriter, the company said, 'If you can receive so much better by typewriter, you must all do it.' So they all do it. The typewriter is in practically universal use today.

"We have seen that the receiving operator has more leeway with the use of the typewriter, but in press reports the Phillips code is used by the sender. The Phillips code is an authorized system of abbreviation. This does not apply to the ordinary messages, which are not allowed to be abbreviated. I will give this instance of one word—'scotus.' This means the Supreme Court of the United States. When a man receives the word 'scotus' over the wire, on his typewriter he must write out the words 'the Supreme Court of the United States.' That is rather an extreme in-

stance, but it is an example—'scotus' is made up of the initials of the words.

"A word about the present Morse alphabet. It is a very simple matter for an operator to send or receive by either code if he is familiar with them, so that it is simply a question first, of the Morse operator learning the Continental code, as it is called, which is a very simple matter. It is now required in the wireless service. It would probably only be necessary for the telegraph companies to say that after a certain date, the first of October, for instance, the Universal alphabet shall be used instead of the Morse. But the question of superiority is not quite settled. When the old Bain chemical telegraph, which was a rival of the Morse, was in operation, the Bain alphabet was used, which by many was considered superior to the Morse, and there were many operators, especially in New England, who knew both alphabets. The Bain code is now obsolete."

George S. Macomber said, in part: "All high-speed telegraph recorders may be divided into two general classes, electromagnetic and electrochemical. We have three sub-classes of electromagnetic recorders: (a) those operated by non-timed step-by-step mechanism, as in the case of the various 'tickers'; (b) those operated by synchronous motors, as in the case of the Hughes, the Phelps, the Baudot, and the Rowland printers, and (c) those operated by non-synchronous timed impulses, as in the case of the Morkrum printer, in which six electromagnets are successively and automatically operated at definite time intervals after the first or starting impulse is received, and in which the various letter combinations are determined by the arrival or absence of positive or negative current impulses at the receiver as each of the timed magnets respectively operates. We have two sub-classes of electrochemical telegraph recorders: (a) those using unidirectional current, as in the early Bain two-wire telegraph; and (b) those using both positive and negative line current impulses, as in the Foote and Randall and the Delany telegraphs.

"Mr. Kinsley's telegraph uses a perforated tape with five rows of perforations somewhat like that of the Pollak-Virag telegraph tape; a transmitter which sends both positive and negative current impulses over the line as did that of Foote and Randall; a two-wire transmission line as did the first Bain system; and a chemically prepared tape similar to that used by Bain and Delany, in a recorder so arranged as to make, electrochemically, successive lines so placed on the tape as to form or at least imitate type print.

"I wish," he said in conclusion, "to record a correction of the generally accepted notion that Alexander Bain was the first to produce a chemical telegraph recorder, for, as early as 1828, Harrison W. Dyer built an electrochemical telegraph recorder and operated it over a line several miles long."

Mr. Kinsley, in answering questions asked by the several speakers, said: "In regard to leakage

and difficulty of balancing, since there is no battery at the receiving end which takes part in the operation of the line current, the battery at the receiving end merely magnetizes the local circuit. In the sending end, is the only battery which takes part in the operation of the line. In instruments with a neutral relay, such as the Edison quadruplex, half a dozen different operations have to be gone through with in order to receive one signal.

There is nothing of that kind in connection with this instrument. There is merely a positive and negative to line from the transmitter, and it works one particular element, or in one case two elements, and tends to hold up the other one on the line, because these elements are in series with each other; consequently there is no difficulty—any line that is good enough to operate a polarized relay will operate this with current less than is necessary with the usual polarized relay, because the operating energy does not go over the line; the operating energy is supplied largely by the local circuit, and what goes over the line is merely enough to upset the balance between the local magnetic circuit and the tension on the spring."

Telegraph Oddities.

A telegraph operator residing near Scranton, Pa., who has a wireless station in his home says that while listening in recently he secured information that enabled him to obtain a position in the wireless service.

A telegraph operator who left the service two years ago because he could not see anything in it but hard work states that he has made a very successful farmer and has under cultivation on a farm which he bought in Texas 500 acres in broom corn, 1,800 acres in wheat and 300 acres in other crops. His grain crop alone amounts to 31,000 bushels.

An Oklahoma bull, run down by the "Shepherd of the Hills" in Arkansas, read as follows: "Can sell car of Missouri pickles and beans." It should have read: "pippins and bens." Had the combination read "pork and beans," there might have been some chance of letting it pass.

The operators on the Reading railroad system recently met at Reading, Pa., and passed resolutions favoring total prohibition and any or all legislation to do away with liquor.

A lady operator in a South Dakota town made her escape from a burning building in which the telegraph office was located by sliding down a cable from an upper story.

A daily newspaper in one of the Pennsylvania cities, in recording the opening of a new and up-to-date telegraph office, stated that the company was now ready to handle telegraph business by the bushel.

In an application for membership in the Old Time Telegraphers' and Historical Association by an old New York telegrapher, the following interesting paragraph occurs: "First employed as a messenger in July, 1884, when but eleven years old. I sold newspapers to buy a pair of long pants—"Kentucky Jeans," and was stood up against the

wall to see if I measured the height, assuring the management that I was fourteen years old. * * * Married, and am the father of ten children when but thirty-six years old—all living at present date. Lived in lower section of New York City all my life and hope to stay there for the rest of it."

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.

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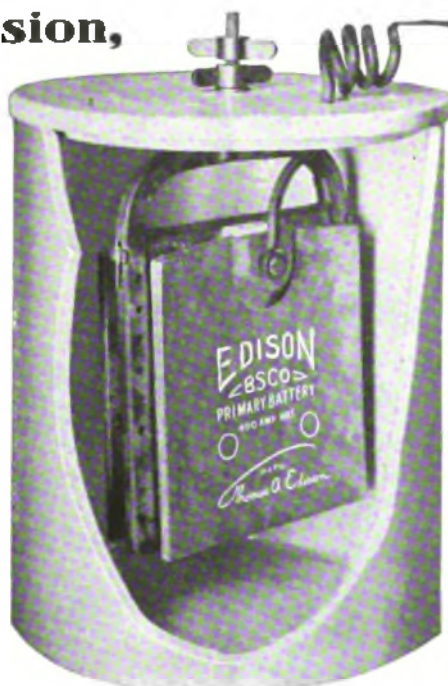
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THE RAILROAD.

Mr. G. A. Cellar, superintendent of telegraph of the Pennsylvania Railroad west of Pittsburgh, Pittsburgh, Pa., was a New York visitor on January 8.

Mr. Abraham T. Hardin, a former telegrapher, was recently appointed vice-president of the New York Central Railroad in charge of operating department, with headquarters at New York.

MR. P. E. CROWLEY, general manager of the New York Central and Hudson River Railroad Company, at New York, and a former messenger, operator and train dispatcher, has been appointed assistant vice-president of the operating department in charge of transportation and equipment maintenance of the New York Central Railroad, with headquarters at New York.

LOUD SPEAKING RECEIVERS ON THE ERIE.—Reference was made in our January 1 issue to the extension of telephone train dispatching on the Erie Railroad and the installation of loud-speaking receivers on the Niagara Falls branch. Mr. J. P. Kreiter, telephone supervisor for that road, states that two of the leading makes of loud-speaking receivers will be tested for three months each. If neither one meets the requirements of the service, the company will return to regular telephone equipment. The company will not use any selective ringing system on this circuit, as it is expected that the receiver will be loud enough for the operator or agent to hear it in any part of his office, when his station is called to come in on circuit. For instance, if Buffalo wishes to get in communication with Niagara Falls, he will say: "Niagara Falls—Buffalo;" when Niagara Falls station hears this he will answer by saying: "I, I—Niagara Falls," and conversation will begin.

National Joint Committee on Line Construction.

For the purpose of completing its organization and laying out its working programme, the National Joint Committee on Overhead and Underground Line Construction held a meeting at the headquarters of the American Institute of Electrical Engineers on December 16, 1914. According to present plans this committee will prepare specifications or suggested practices or perhaps recommend modifications of existing regulations relating to the following subjects:

- (1) Underground and undergrade crossings.
- (2) Crossings of electric wires over electric railway tracks.
- (3) Crossing of trolley contact wires.
- (4) Overhead crossings of wires or cables of telegraph, telephone, signal and other circuits of similar character over steam railroad rights of way, track, or lines of wire of the same classes.
- (5) Overhead crossings of electric light and power lines.
- (6) Parallel lines.

Specifications covering subject No. 4 already prepared by an earlier joint committee representing various interests are now being considered for adoption by the National Joint Committee. Subject No. 5 has been covered by the present standard

specifications, the edition adopted and published by the American Electric Railway Engineering Association being the latest revision. The other subjects are new, and specifications relating thereto will have to be prepared by the committee which desires to enlist the co-operation of all persons and associations interested in any subject pertaining to line construction, with the object of preventing duplication of work and insuring uniformity in the specifications adopted by the various associations, thereby avoiding all unnecessary conflicts, and it is the desire of the committee to be looked upon more or less as the court of last resort in the formulation and interpretations of specifications, and as such would like to receive the hearty support of all interests concerned.

The National Joint Committee is made up of official delegates and alternates from the following organizations:

American Railway Association, American Railway Engineering Association, Railway Signal Association, Association of Railway Telegraph Superintendents, National Electric Light Association, American Electric Railway Engineering Association, American Institute of Electrical Engineers, American Electric Railway Association, American Telephone and Telegraph Company, United States Bureau of Standards, Independent Telephone Association of America, Western Union Telegraph Company, Postal Telegraph-Cable Company.

Mr. Farley Osgood, Newark, N. J., is chairman, and Mr. G. W. Palmer, jr., Boston, is vice-chairman of the committee. The secretary is Mr. R. D. Coombs, No. 30 Church street, New York, and Mr. W. H. Feller, 759 Broad street, Newark, N. J., is assistant secretary.

Lackawanna's Hoboken Wireless Station and Tower.

The accompanying illustrations are made from photographs of the recently completed tower, and



FIG. 1.—LACKAWANNA WIRELESS OPERATING ROOM.

the wireless office of the Delaware, Lackawanna and Western Railroad at Hoboken, N. J. The tower is the most conspicuous object on the New

Jersey river front and attracts the attention of all passengers on passing ferry boats on the Hudson river. It has a height of 401 feet and is extremely simple in design, as may be seen from an inspection of the picture. The antenna extends from the top of the skeleton tower to the tower of the ferry

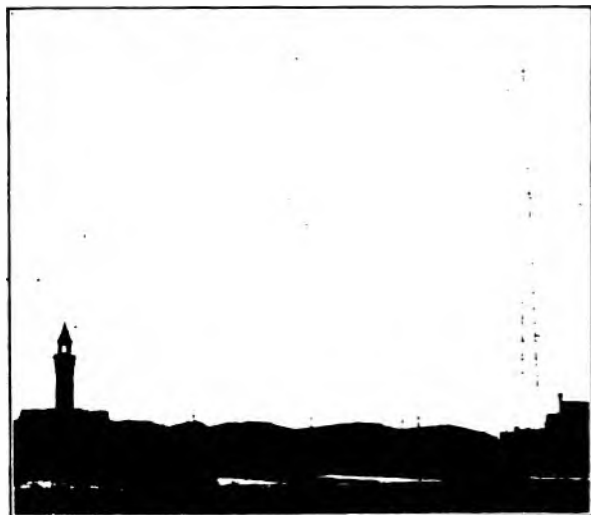


FIG. 2.—LACKAWANNA WIRELESS TOWER.

house, shown at the left, the distance between the two points being 600 feet.

The view of the interior of the operating room shows the completeness and substantial character of the equipment. The station has a fine kilowatt outfit, and a wave length of 2,800 meters.

The system is in thorough operating order and communication is had with Buffalo and Binghamton, N. Y., Scranton, Pa., and those express trains en route that are equipped with wireless apparatus.

Mr. L. B. Foley is superintendent of telegraph, telephone and wireless for the Lackawanna Railroad, and it was largely through his faith in the possibilities of wireless in railroad operation that this road has undertaken this pioneer work.

Earth Currents Mistaken for Induced Alternating Currents.

BY J. B. TAYLOR, SCHENECTADY, N. Y.

I read with much interest your report of Mr. Van Akin's paper before a recent meeting of railway telegraph superintendents on "Inductive Interferences on Railway Telephone Circuits."

The name Dolgeville, on page 671, December 16 issue, awakened recollections of a cold day spent some years back inspecting a telegraph line, but even this did not prepare me for reading my own name in the following paragraph, and since my name has here been taken in vain, perhaps you will be good enough to do what you can to correct the impression that I was unable to distinguish between direct disturbing earth current and induced alternating currents in a telegraph line.

It is not necessary to detail the local conditions and nature of trouble experienced, as I recollect

them substantially as given by Mr. Van Akin, except that the nearby transmission line which some persons thought made the trouble was 22,000 volts instead of 33,000 volts. This, however, is immaterial, as nothing coming from the transmission line was detected.

As my connection with the case began and ended eight years ago, I wish to depend as little as need

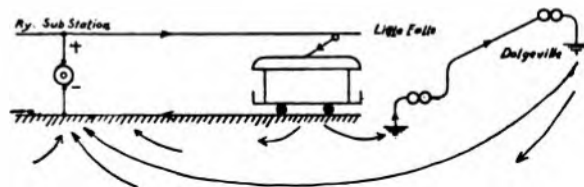


FIG. 1.

be on memory. In my file of similar tests and examinations, I have located a memorandum, dated November 15, 1906, which reads as follows:

"Went to Little Falls and Dolgeville on the 14th with Mr. J. H. Hess, district electrician of the Postal Company, from Albany.

"Telegraph line was open in so many places that we were unable to make practical tests on it between Little Falls and Dolgeville; but from voltmeter tests on other telegraph line, and from information as to the behavior of the line when it was in service, conclude that the trouble was due entirely to difference of potential between ground at Dolgeville and ground at Little Falls.

"The ground at Little Falls is on a water pipe in the office, very near the street railway car tracks, and the entire city of Little Falls is built on a rock; therefore, it is probable that the drop in rail return between Little Falls and the nearest substation is sufficient to give difference in potential in the order of ten, fifteen or twenty volts between the Little Falls ground and Dolgeville. It seems probable that grounding this line a mile or so from the Little Falls office will greatly reduce, if not entirely eliminate, the trouble.

"As the matter was left, Mr. Hess is to communicate with us further as soon as the breaks in the

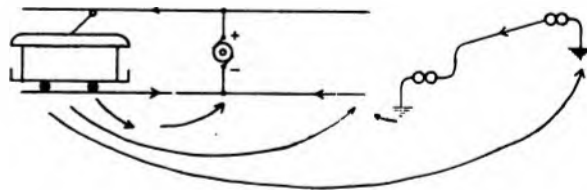


FIG. 2.

line are repaired, so that we may make measurements of potential difference between ground at Little Falls office and various points along the line, until we get outside of the city."

From this you will see that my diagnosis and recommendations based on observations and tests of November 14, 1906, have been checked and carried out independently at a later date by Mr. Van Akin.

There is nothing unusual in finding in cities where there are electric cars considerable difference of potential between central office grounds and grounds

made in the open country, though ordinarily these potential differences are small as compared to the working voltage of the telegraph lines. The Little Falls and Dolgeville line was short, so that the small telegraph battery voltage was at times neutralized and even reversed by the electric traction currents.

The change of voltage in steps which Mr. Van Akin noted corresponded to the notches on the electric car controller.

Mr. Van Akin says there is something yet to be explained in the fact that part of the time the earth currents opposed and at other times assisted the telegraph battery. The accompanying sketch giving relations of Little Falls, Dolgeville and the traction company's substation will explain this reversal.

When the car is at Little Falls, the resistance in the rails between there and the sub-station raises rail and nearby telegraph earth potential to a figure higher than the surrounding country. Fig. 1 shows this condition. When the car is the other side of substation, earth currents flow as indicated in Fig. 2, giving a current in the telegraphic line in the opposite direction, as indicated by the arrow.

MUNICIPAL ELECTRICIANS.

FIRE ALARM BOXES IN ST. LOUIS.—Fire Chief Henderson, of St. Louis, has issued a new rule requiring all firemen to memorize the location of the alarm boxes in their districts.

JERSEY CITY'S FIRE ALARM.—The present automatic fire alarm system in Jersey City, N. J., was installed in 1871 and has always performed the duties required of it, but as a safety precaution, an improved central office system has been urged for several years. No wires in the city are underground. The present system is now installed on the top floor of the fire department headquarters on Bay street in a building very unsuited for the purpose. The condition of the building is so precarious, however, at the present time that something must soon be done to replace it with a modern one. One plan is to construct a separate fireproof building on the hill and place in it a new, modern system that would meet present requirements and future growth.

Holiday Greetings.

Appreciative acknowledgment is made of holiday greetings received too late for inclusion in our January 1 issue from Clarence R. George, secretary, International Association Municipal Electricians, Houston, Tex.; Major John Eagan, San Francisco, Cal.; David Homer Bates, secretary, United States Military Telegraph Corps, New York; G. E. Clarke, superintendent, Marconi Wireless Company, London, England; Edwin F. Howell, secretary, Serial Building Loan and Savings Institution, New York; W. A. McAllister, superintendent, Central Cable Office, New York; C. F. Annett, Jerome, Idaho; J. B. Dillon, Western Union Telegraph Company, Dallas, Tex.; C. Vollersten, Western Union Telegraph Company, El Paso, Tex.; The National Executive Association of Irish Post Office Clerks, Dublin, Ireland; Henry W. Pope, secretary, Telephone Pioneers of America, New York.

GOLD AND STOCK LIFE MEETING.—The annual meeting of the Gold and Stock Life Insurance Association will be held at 16 Dey street, New York, on January 18, when amendments to the by-laws relating to dues will be acted upon. Mr. H. W. Dealy, 16 Dey street, is acting secretary of the association.

LONG-DISTANCE OPENING OF SAN DIEGO FAIR.—President Wilson opened the Panama-California Exposition in San Diego, Cal., at 3 a. m., January 1, Washington time, by closing a telegraph key. The time at San Diego was midnight, and the new year was ushered in by a blaze of light on the exposition grounds, as a result of President Wilson's manipulation of the key.

SERIAL MEETING AND ELECTION.—The annual meeting of the Serial Building Loan and Savings Institution will be held at 16 Dey street, New York, on January 19. Following are the nominees to be voted on: President, A. G. Saylor; vice-president, Thos. M. Brennan; secretary, E. F. Howell. Directors: A. G. Saylor, Thos. M. Brennan, G. W. Blanchard, Wm. J. Quinn, C. A. Kilfoyle, James F. McGuire, A. O. Wallis, Thos. E. Fleming, H. A. Konninger, M. J. O'Leary, Wm. B. Dunn, M. J. Kenna, F. D. Giles, Chas. G. Ross, Edwin F. Howell.

SIGNAL CORPS MEETING.—On December 23, 1914, Camp A. W. Greeley, No. 52, Chicago, Ill., elected the following officers for the year 1915: D. F. Delahunt, commander; A. P. Hyatt, senior vice-commander; J. A. Beckmeyer, junior vice-commander; Hugo Meisner, adjutant; A. L. Ewing, officer of the day; E. L. Perry, officer of the guard; L. J. Powers, quartermaster. Camp Greeley is a live camp recruited from telegraph and telephone operators, electricians and linemen, who have served in the Signal Corps in the Spanish-American and Philippine War.

In sending an order for four copies of *American Telegraphy and Encyclopedia of the Telegraph*, a well-known Western Union man in the South, writes: "Your book is by far the finest book I have ever seen for the rank and file of telegraphers. In fact, that 'American Telegraphy' has the Buckingham, Barclay and Murray systems so fully and clearly described, is greatly in its favor, since the Western Union is increasing so extensively the number of its printing circuits, especially also as the book is so up to date in its description of the latest quadruplex development, etc." This book is still the standard work on telegraph engineering in this country, embracing, as it does, Morse duplex, quadruplex printing telegraphy, fire alarm, burglar alarm telegraphy, etc. Sent to any part of the world on receipt of price, \$5 postpaid. Address, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. Allan Woodle, superintendent of the Western Union Telegraph Company at Buffalo, N. Y., in renewing his subscription for another year, writes: "I could hardly be happy without TELEGRAPH AND TELEPHONE AGE."

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.—Recent visitors, C. C. Adams, vice-president; H. W. Hetzel, traveling auditor; J. P. O'Donohue, division electrical engineer; D. H. Gage, jr., and K. L. Vernon, of the electrical engineering staff; Mr. Ralph Carr, repeater chief, New York; J. E. Zeher, manager Atlantic City, N. J.

Western wire chief F. P. McElroy has been appointed all night chief operator vice W. J. Poppert, transferred to other work; C. S. Almes, assistant wire and repeater chief, will take care of Mr. McElroy's former duties.

Chief operator E. W. Miller has been elected by the Finance Committee of the Mutual Investment Association to fill the vacancy caused by the resignation of Mr. J. A. McNichol.

CHICAGO NOTES.—A telegraph contest took place in the West Chicago Club, Chicago, on the evening of January 7. There were about 200 telegraphers present. The occasion was a club smoker, and the contests were for the benefit of charity.

H. W. Mayfield sent on a vibroplex to T. M. Terry, receiver. The old-time telegraphers were represented by Mr. David Anderson, who has seen forty-two years of service in Chicago, and E. G. Herrman, an operator for the past thirty-six years. Their record averaged seventy-two messages per hour. It was demonstrated that over 100 messages per hour could be sent by the speeding-up system, but with detrimental physical effects. Mr. Mayfield sent fifty-eight messages in thirty minutes. Mr. Terry received the messages.

ST. LOUIS A. T. AND T. NOTES.

The Bell Society of St. Louis, which was organized by American Telephone and Telegraph employees about ten years ago, has had a remarkable growth during the past three years, and now numbers over 700 members. The annual banquet was held December 17. The officers elected for 1915 were H. D. McBride, of the Southwestern Telegraph and Telephone Company, president; G. G. Sargent, of the American Telephone and Telegraph Company, vice-president, and Harry Lewis, of the Southwestern Telegraph and Telephone Company, secretary.

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.

Mr. Frank X. Powers, of the test room, has been transferred to the test room force at Little Rock, Ark.

The fourteen members of the St. Louis test room force have organized a "Morse Club," which meets twice a month for mutual improvement, and to dig up new facts and ideas in connection with duplex and test board work.

A son was born to Mr. M. R. Talley, of the test room force, on December 24. The hearty congratulations of his many friends were hardly over when we were called upon to extend our sincere sympathy on the death of his little daughter, Irene, aged six years, which occurred on January 4, after an illness of several weeks. The body was taken to Terre Haute, Ind., for burial. A peculiarly heart-breaking feature of the burial was that the bereaved mother was unable to be present at the last sad rites over her child.

SAN FRANCISCO WESTERN UNION.—The heavy Christmas eve business was handled in a splendid manner, being clear all around at 5:30 on Christmas morning. The automatics responded first-class, especially the Morkrum installations, whose performances were remarkable.

The Panama-Pacific International Exposition is nearly completed and will soon be closed to visitors, and the finishing touches put on for the grand opening on February 20.

Operators Van Hoff and Parsons were sent to Sacramento to help out during the session of the legislature.

A lineman recently cleared a cross near Niles, Calif., by removing a snake from across the wires.

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M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 3.

NEW YORK, FEBRUARY 1, 1915.

Thirty-third Year.

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SOME POINTS ON ELECTRICITY.

Resistance.

Resistance, in its broadest sense, means opposition to action, and action is a word of very wide meaning. Resistance, in the telegraphic sense, is the name given to that property of materials, by virtue of which they obstruct the flow of electricity through them. If the flow of electricity is thus hindered, what becomes of it? Where does it go? According to the law of conservation of energy, if electricity disappears in one form the part that is apparently lost appears in another form. Thus, when a current of electricity meets with resistance to its steady flow the energy of the current is frittered down into heat in proportion to the magnitude of obstruction to its passage.

Some may remark that a wire offering resistance does not appear to be warmer when a current is flowing than when there is no current. But, as a matter of fact, it is warmer, although our sense of touch is so blunt that we cannot distinguish the extremely slight differences in temperature. If, however, the resistance is abnormal, say, due to a short circuit, and a relay is in the short circuit, the coils of the relay will soon become warm or even hot. If the current is strong enough the insulation of the coils may become destroyed by the heat thus developed.

The resistance of a metal wire, if the wire be kept at an unvarying temperature, is the same whether a small or a large current be flowing through it. It is evident, therefore, that resistance is an inherent and invariable property of the metal.

What causes resistance in a substance is not

definitely known, but it is supposed to be some sort of molecular condition. This theory seems to be supported by the fact that pressure reduces resistance, for the probable reason that the molecules of the body are brought into closer union, and thus offer a greater number of points of contact for the freer passage of the electric current.

To illustrate the unchangeability of resistance of a wire, let us assume a wire of such a resistance that when an electromotive force of ten volts be applied to its terminals a current of two amperes will flow through it. Under these conditions the resistance of the wire will be five ohms. Now, if instead of ten volts we apply one volt we will find the current to be two-tenths of an ampere, instead of two amperes, as before, the ratio between the volts and amperes being five in both cases. We might alter the electromotive force indefinitely, yet the resistance (five ohms) would never change.

Electrical resistance is not the same in all materials. Silver offers the least resistance of the metals, and pure copper stands next. Copper is used as the standard of comparison in measuring the resistance of wires; iron wire having nearly six times the resistance of a copper wire of the same dimensions.

Resistances in a circuit may be of two kinds: (1) the resistance of the conductors themselves, and (2) the resistance due to imperfect contact at points, such as loose connections. The resistance offered by batteries must also be considered, and is due principally to the opposition to the flow of current presented by the liquid of the cells, which liquid is called the electrolyte. Among other and variable causes are changes in density of the electrolyte, and the wasting away of the zinc or other elements, and the consequent diminution of surface for the electrolyte to act upon.

The resistance of loose contacts is very harmful to telegraph circuits, but in telephony such unstable contacts fill a very important purpose. Imperfect electrical contact is the underlying principle of the telephone transmitter, and it is the variation of pressure at the points of contact in this instrument, caused by the sound waves produced by the voice, that varies the current by which the telephone receiver is operated.

Another application of loose contacts is found in the "coherer" in wireless telegraphy. This device, however, is obsolete now as a practical instrument, having been superseded by more sensitive means of transforming the energy of the electromagnetic waves into electromechanical energy. This is mentioned here as another instance of the utility of the variable resistance of loose electrical contacts and to show that what may appear to be an evil, under some circumstances, may be a blessing under others.

Since resistance is one of the things dealt in by telegraph engineers there must necessarily be a unit of measure for it, in order that they may know how much resistance they are handling at any given time. To say that such and such a wire has a resistance does not mean anything to a telegraph man, but when he is told that it has a resistance of 800 ohms, or whatever it may be, he understands that its resistance is 800 times that of a unit called an ohm, which was devised to measure resistances with. The standard ohm was described in this department in our January 16 issue.

Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on January 27:

American Telephone and Telegraph Co.	120 3/8
Mackay Companies	70
Mackay Companies, preferred	67 1/2
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2 1/2
Western Union Telegraph Co.	62 1/4

Telegraph and Telephone Patents.

ISSUED JANUARY 5.

- 1,123,339. Telephone Exchange System. To T. G. Martin, Chicago, Ill.
- 1,123,340. Telephone Exchange System. To F. R. McBerty.
- 1,123,476. Telephone System. To O. Brisbois, Chicago, Ill.
- 1,123,506. Telephone Exchange Apparatus and System. To J. Erickson, Chicago, Ill.
- 1,123,614. Automatic Fire-Alarm. To A. L. Stewart, L. O. Hawkins and A. E. Mosher, Madera, Pa.
- 1,123,654. Telephone Receiver Attachment. To G. J. Arfsten, Denver, Colo.
- 1,123,734. Telephone Call Recorder. To J. R. Guthrie, Perth Road, Ont., Can.
- 1,123,826. Telephone System. To H. G. Webster, Chicago, Ill.
- 1,123,909. Telephone Sheath. To O. W. Mes-simer, New York.
- 1,123,910. Interference Preventer for Use in Wireless Telegraph Systems. To T. B. Miller and A. H. Cox, Seattle, Wash.
- 1,123,979. Telephone Attachment for Cars. To M. J. Bartol, Beaverdale, Pa.
- 1,124,119. Telegraph Instrument. To H. A. Emrick, Casey, Ill.

ISSUED JANUARY 12.

- 1,124,314. Automatic Telephone Exchange Sys-tem. To F. R. McBerty.
- 1,124,401. Telephone Receiver. To H. C. Egerton.
- 1,124,410. Fire-Alarm. To F. Franek, Chug-water, Wyo.
- 1,124,413. Transmitter. To H. Gernsback, New York.
- 1,124,488. Semi - Mechanical Telephone Ex-change System. To F. R. McBerty.

- 1,124,598. Telegraphy. To P. B. Delany, New York.
- 1,124,608. Automatic Telephone System. To G. Grabe, Berlin, Germany.
- 1,124,680. Selective Signaling Device. To J. A. Wotton.
- 1,124,704. Electric Typewriting Telegraph Ap-paratus. To G. C. Clark.
- 1,124,799. Signaling System. To C. H. Pool, Birmingham, N. Y.
- 1,124,904. Artificial Line. To R. S. Hoyt.

PERSONAL.

MR. JAMES MERRIHEW, of New York, formerly general superintendent of the Southern Division, Western Union Telegraph Company, has gone to Cseppa Island, Fla., where he will remain until June.

MESSRS. FUSAWAKA ONO and Y. YONEZAWA, electrical engineers, Department of Communications, Tokyo, Japan, are in New York, studying the tele-graph and the telephone. They will remain in the United States about three months and will visit other telegraph and telephone centers.

DR. EDWARD WESTON, president of the Weston Electrical Instrument Company, Newark, N. J., was presented with the Sir William Henry Perkins gold medal for distinguished services in applied chemistry, at a meeting of the Chemists' Club, in New York, on January 22.

LUCIEN J. IRWIN, aged forty-eight years, presi-dent of the Louisville, Henderson and St. Louis Railroad, who died in Louisville, Ky., December 31, 1914, was a former telegrapher in Memphis, Tenn., and was well known there. He entered the railroad traffic department and his rise was rapid.

MR. JEREMY G. CASE, an old-time telegraph offi-cial, now living in practical retirement at Brook Farm, Kirkville, N. Y., is an occasional New York City visitor. Mr. Case was born in 1845. He en-tered the service of the Independent Telegraph Com-pany in New York in 1864. Mr. J. J. Speed, well known in telegraph circles at that time, was president of the company. Mr. Case has held very prominent positions with telegraph companies, hav-ing been, at one time or another, manager, super-intendent, secretary and treasurer, of various tele-graph interests. He organized the Bankers' and Merchants' Telegraph Company thirty years ago. He also assisted in the organization of the Commer-cial Telegram Company of New York, a stock ticker service, as well as the city messenger com-pany. Mr. Case many years ago severed his rela-tions with the telegraph, to devote his entire time to the wholesale coal business, with which he is at present identified. When Mr. Case organized the Bankers' and Merchants' Telegraph Company, those identified with him in an official capacity were: A. M. Dimock, president; G. S. Mott, general man-ager; J. G. Smith, assistant general manager, Mr. Case holding the positions of secretary and treasurer.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. EDWARD REYNOLDS, vice-president and general manager, left New York January 21 on a trip of inspection through the West and Southwest, and will be absent four or five weeks. He will go as far as Florida and Oklahoma.

MR. C. F. LEONARD, superintendent, New York, has returned from a trip of several days through his district.

SUPERINTENDENT E. KIMMEY is on a trip of inspection through his district.

MR. J. J. WHALEN, manager of the operating department at 253 Broadway, New York, left New York on January 18 on an inspection trip which will take him as far as the Pacific Coast. He will visit the operating departments in the large cities and will be gone about two months. Mr. D. F. Mallen is acting manager during Mr. Whalen's absence.

MR. G. E. YOUNG has been appointed manager at Ellensburg, Pa.

MR. E. Y. OUDERKIRK, manager of the Wheeling, W. Va., office, was in New York last week on his vacation. He made it the occasion to call on old friends and executive officers of the company, as well as paying a visit to Hartford, Conn., the home of his wife.

THE MUTUAL INVESTMENT ASSOCIATION of New York has been reorganized under the banking laws and its title changed to "Mutual Investment Credit Union." The new organization is now an incorporated stock company, and will begin business under the new order of things on February 1. At the recent annual meeting officers were elected as follows: President, Edward Reynolds; vice-president, W. I. Capen; secretary and treasurer, F. J. Kernan. The operations of the association will be conducted entirely for the benefit of Postal employees.

THE DAVENPORT, IOWA, office of this company will move into new quarters about February 15.

IMPROVING OFFICES.—The Augusta, Ga., office is being thoroughly modernized, and the operating department at San Francisco, Cal., is being improved.

THE BRIDGEPORT, CONN., OFFICE of this company will be moved into new and larger quarters at 143 Fairfield Avenue on March 1. The new office is being fitted out in the best and up-to-date manner. Mr. S. H. Flint is manager.

A Handsome New Postal Office in New York.

The Postal Telegraph-Cable Company's new office in the Wall Street district, New York, located on the main floor of the Commercial Cable Building, 20 Broad Street, is considered to be the most beautifully appointed telegraph office in this country; indeed, it is claimed that there are few, if any, telegraph offices in the world as handsomely and conveniently equipped as this one, the latest of the Postal's artistic New York offices.

The corridor side of the office, which is sixty feet in length, has at the front a forty-two-inch Mexican marble partition, upon which is mounted plate-glass panels framed in antique bronze, and containing bronze grill work windows for cashier and receiver. On the inside of the partition mahogany-finished counters, extending the full length of the office, are arranged for sitting position clerical use.

The tile flooring is fitted with removable top wiring ducts, which extend from the terminal frames in the rear of the main switchboard to the various operating tables. The switchboard is a massive 140-loop affair, finished in mahogany and mounted between marble pillars extending to the ceiling, in the rear of the office. The ceiling through the center of the office is supported by three large marble pillars. The general illumination of the office is provided by eight 250-watt semi-indirect all-glass lighting fixtures, each suspended from the ceiling by three brass chains.

The manager's office is furnished with mahogany desks and is enclosed by a railing corresponding in design and finish with the office fixtures. Mahogany desks have also been provided for the chief operator and chief clerk.

The sixty short wires which supply telegraph service to as many financial houses in the Wall Street district are connected into one of the new concentration type switchboards, which was developed by the company's engineers, along lines suggested by manager J. J. Whalen, of the main office.

In the rear of the office is located the pneumatic tube station, from which underground tubes radiate to the Cotton Exchange, the Produce Exchange, the sugar district office at the corner of Wall and Front Streets, the Commercial Cable office, and to the main office at 253 Broadway. The terminal equipment of the tubes is the latest product of the Needham factory and is thoroughly modern in design and arrangement. Two new "pressure-vacuum" steam-driven blowers have been installed to take care of the increasing volume of tube traffic. Two rooms back of the office have been comfortably furnished as rest rooms and locker space for employees.

The floor occupied by this office was formerly occupied by the Commercial Cable Company as its main cable operating room, which was moved to the thirteenth floor of the same building last year.

The plans for the new office, approved by vice-president and general manager Edward Reynolds and superintendent C. F. Leonard, were prepared by division engineer J. P. O'Donohue, the work being supervised by Mr. D. McNicol, of the engineer's office.

Mr. S. E. Ostrom is manager of the office, and Mr. J. J. Donohue, chief operator.

Monopolistic, Is It?*

"The firm conviction of the department is here reiterated that telegraph and telephone service is inevitably monopolistic, and when operated under private control does not render the maximum of

*From the *Postal Telegraph*.

public service at the minimum cost to the whole people."—*From the annual report of postmaster-general Burleson.*

The above is cool, to say the least. If there ever was competition in any line of business it is in the telegraph business in the United States to-day. The Postal and the Western Union are competing keenly, even savagely. The character of the service, and the rapidity of the service of the Postal Company, have never been equaled anywhere at any time in any country. Under these circumstances the above statement of the postmaster-general sounds like a joke. The *New York Sun* summed it up in its issue of December 15, 1914, as follows:

"Despite the 'conviction of the department,' the evidence is all the other way. State-owned telegraph and telephone systems are a proven failure in every European country, especially in England and France. They are everywhere more expensive than in this country. The service is slow and bad. The employees are in many cases overworked, underpaid and discontented. A year or two ago they all went on strike in France, where the telephone subscribers are always on strike. Shortly before the war broke out there was an agitation in England for living pay and fair treatment; the public are always on strike against oppressive regulations and bad service. In Italy a few months ago the telegraph and telephone operatives, like the State-owned railway servants, were riotously on strike. Public wire ownership has been most extensively tried and invariably with the worst possible results. In this country it would unquestionably cost millions more and couldn't be more satisfactory than the present admirable and cheap telegraph and telephone services."

[To the foregoing we may add that the telegraph in this or any other country is not, and never will be, used by the "whole people." The telegraph is a business man's institution and is a great convenience and necessity to this class, but the business interests which are benefited by the telegraph comprise less than five per cent. of the "whole people"; the other ninety-five per cent rarely use the telegraph and then only in emergencies. In England and other countries where the governments control and operate the telegraph less than seven per cent. of the people use it, and this proportion, as in this country, is made up of business concerns. No greater blunder could ever be made in this country than by the government taking over the control of the telegraph and the telephone and shouldering upon the entire people the enormous costs thereof, and all for the benefit of five per cent. of the people. As we have already pointed out, those who use the telegraph in this country are not complaining of the service or the rates and have no desire that the government should do this work for them. The agitation comes entirely from political sources. The experience of other countries with their government telegraph and telephone services is enough to disgust the people of this country, and no greater service could be rendered to our people than by persistently presenting the facts. They must be saved from this threatened telegraph and telephone suicide.]

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MESSRS. NEWCOMB CARLTON, president; L. McKisick, assistant to the president; J. C. Willever, general commercial manager; G. M. Yorke, general superintendent of plant, and W. N. Fashbaugh, general superintendent of traffic, will leave New York January 31 on a trip of inspection through the Western, Southern and Gulf Divisions, to be absent three weeks. Stops will be made at Cleveland, Toledo, Detroit, Indianapolis, Terre Haute, Chicago, St. Paul, Minneapolis, Des Moines, Davenport, Kansas City, St. Louis, Cincinnati, in the Western Division, and Chattanooga, Memphis, New Orleans, Atlanta, Jacksonville, Savannah, Charleston and Richmond in the Southern and Gulf Divisions. Mr. W. C. Merly accompanies the party as secretary.

MR. LOUIS CASPER, of the general traffic department, addressed the student body of the High School of Commerce, New York, Friday, January 15. He is also scheduled to speak at the Curtis High School, New Brighton, Staten Island, February 19, and at the Julia Richman High School, Manhattan, April 9. The subjects of his addresses relate to the operation and organization of the telegraph in America.

MR. THOMAS E. FLEMING, of the office of the commercial general manager, has returned from a three weeks' business trip through the southern and gulf divisions.

MR. A. G. WESSON, of the Rochester, N. Y., office of this company, on January 8 gave a lecture entitled, "The Story of the Telegraph," before the students of the Rochester Business Institute. He was assisted by Mr. F. S. Lewis, who handled the stereopticon.

MR. B. F. RAGSDALE, assistant district commercial superintendent, Atlanta, Ga., delivered an illustrated lecture on "The Story of the Telegraph" to the employees at Atlanta on the evening of January 23. Mr. Ragsdale was assisted by Mr. T. D. Quinn, of the division traffic superintendent's office, who operated the lantern.

MR. W. L. ADAMSON, formerly manager at Washington, Ind., has been appointed manager at Bedford, Ind., vice Mr. R. G. Kittle. Mr. Adamson is succeeded at Washington by Mr. D. O. Long, of Goshen. Mr. D. Alwine is acting temporarily as manager at Goshen.

MR. GEORGE E. LAWTON, better known as "Old Farmer" Lawton, assistant manager of the Denver office of the Western Union Telegraph Company, who retired on January 1, as announced in our issue of that date, received messages and letters from friends in all parts of the country, wishing him much happiness and contentment. Among them were missives from Mr. W. J. Lloyd, general manager at Denver, Mr. J. B. Van Every, of New York, former vice-president, now retired, and others. The employees of the Denver office presented Mr. Lawton with a chest of silver and the Press Club gave him some very complimentary

notices. Mr. Lawton is now going to take life easy and get all the good out of it he can.

MR. F. O. NOURSE, well known in telegraph circles throughout the country, has been appointed manager of the Palm Beach, Fla., office for the season.

MR. E. T. MOORE has been appointed district commercial manager, with headquarters at Mobile, Ala.

HUGH A. MOODY, aged fifty-six, tube chief of the main office at 24 Walker street, New York, died of pneumonia on January 27. Mr. Moody was one of the best-known men in the telegraph service in New York, and his sudden death was a great shock to his numerous friends.

RAPID WORK.—Messrs. H. O. Turner and J. R. Linton, of the Atlanta, Ga., office, on January 7 handled 1,858 messages between that city and Jacksonville, Fla. During the first five hours an average speed of 111 messages an hour was maintained.

THE TARIFF BOOK for 1915 has just been issued in an enlarged form, and is one of the most complete publications of its kind ever produced. The new size, eight inches wide by eleven inches long, has been adopted to conform with the standard of the various public-utility commissions, and it gives much more space for the display of the vast amount of information given in the book. The text matter is printed in a very neat, clear-faced type, which relieves the eye of strain in looking up the names of offices and other information. There are four columns to the page, against two in the former books, and a valuable addition is an alphabetical list of principal foreign places, showing the countries in which they are located, for reference in determining cable rates. There are nearly 9,000 of these names. The contents of the book include Western Union and connecting line offices, rules, press rates and rules, government messages, cable rules and rates, deferred cable services, wireless telegraph—trans-ocean and to ships at sea—tables of tolls for day and night letters and day and night messages. The book contains 321 pages, and represents a vast amount of labor in its preparation.

MISS JANE H. SHAW, aged eighty years, for over fifty years a Western Union telegraph operator at Bath, Me., died January 15.

JAMES MCFARLAND, of Tacoma, Wash., a pioneer lineman in the Northwest in the service of the Western Union Telegraph Company at that point for thirty-five years, died January 11. He built the first telegraph line from Puget Sound to British Columbia, between Tacoma and Portland, and the first lines radiating out of Portland. He was a native of Maine, and was well and favorably known on the Pacific Coast.

Morse Electric Club.

At the annual meeting of the Morse Electric Club, held in New York, January 13, Secretary W. C. Merly was instructed to send an application blank to each member, with the request that he

endeavor to secure a new member, which he has done. A number of the officials of the Western Union Telegraph Company who attended suggested that the scope of the club should be enlarged and that efforts should be made to bring into its fold a larger number of the company's employees, with a view to creating among them a spirit of closer social relationship. It has been decided to abandon the winter dinner, but plans are under consideration for an entertainment and dinner, to be held probably in the spring. In the meantime, everyone is urged to co-operate in an effort to secure as many new members as possible. The board of directors has voted to remit the \$1.00 admission fee in the case of all applications for membership made subsequent to January 13, the date of the annual meeting.

Western Union Educational Society Organized.

An adjourned meeting of the Western Union Educational Society was held in the schoolroom, 24 Walker Street, on Saturday, January 16, Mr. J. P. Edwards presiding.

The secretary reported twenty new members, and the addition of sixty-five books to the library. The books were from Mr. A. R. Brewer, vice-president of the Western Union Company; Mr. Rush Taggart, general counsel; Mr. A. M. Lewis, and the New York Public Library.

Mr. S. B. Haig was elected first president of the new organization by a unanimous and enthusiastic vote. Mr. Haig was formerly president of a similar society, and it was considered a very fortunate circumstance that he should consent to give his time and attention to the Educational Society during its first year. Perhaps the most significant remark of the new president, upon taking office, was that the officials of the company were deeply interested in the entire movement, and would soon be found taking a decidedly helpful attitude. Mr. J. P. Edwards was elected first vice-president, and Mr. C. C. Lever second vice-president. Mr. J. F. McGuire was elected a member of the ways and means committee, and a constitution was read and adopted.

The ruling body of the new organization is an executive committee, with full authority, which is made up of the following members: Messrs. S. B. Haig, J. P. Edwards, C. C. Lever, E. T. Burrill and J. F. McGuire.

New bookcases are being installed to meet the requirements of the growing library. The books are being catalogued and indexed and courses of study are being planned, which may include lectures by experts from the different departments, if present plans materialize.

Mr. F. A. Hoag is secretary.

Mr. A. Woodie, District Commercial Superintendent at Buffalo.

Mr. Allan Woodie, whose appointment as district commercial superintendent at Buffalo, N. Y., was announced in our January 16 issue, was born

in Monroe, Wis., and is forty-six years of age. After leaving high school he took up telegraphy, and at the age of eighteen he entered the railway telegraph service, but soon abandoned that and went with the Western Union at Kansas City. He later was employed at Dallas and other Texas cities, and, in 1893, went to Boston for the same company as operator. Being an expert telegrapher, and among the first in Boston to adopt a type-writer, he was assigned to press duty and remained until 1899, when he was appointed manager of the Newport, R. I., office. Three years later he



A. WOODLE, BUFFALO, N. Y.

was transferred to Portland, Me., as manager, and, in 1905, he returned to Boston to accept the position of assistant superintendent of the American District Telegraph Company. On September 26, 1906, he was appointed manager of the Boston Western Union office, and, in April, 1911, became district commercial manager, with headquarters at New Haven, Conn. From New Haven he was transferred to Syracuse, N. Y., to fill a like position, and, in 1912, was transferred to the office of the general manager of the Eastern Division in New York, which position he held at the time of his latest appointment to head the newly created seventh district, with headquarters at Buffalo, N. Y.

THE CABLE.

ROBERT C. SMITH, aged fifty-four, general superintendent of the Anglo-American Telegraph Company, died at St. John's, N. F., on November 25, 1914.

MR. C. J. HOYT, for many years chief operator of the Western Union Telegraph Company's cable station at North Sydney, N. S., Canada, until last July, when he was appointed acting manager of the office, has been made permanent manager of that station.

THE COMMERCIAL CABLE COMPANY has issued its book of Cable rates for 1915. Besides rates to all the principal points in the world, it contains

maps showing the Commercial system and those of connecting companies throughout the world.

RATES TO HAWAII REDUCED.—The Commercial Cable Company on January 20 reduced its rate on ordinary cablegrams from New York to Honolulu, Hawaii, to thirty-seven cents per word, and to sixteen cents per word for press cablegrams. To other Hawaiian islands the rate is fifty-two cents per word.

ECHO OF THE "EMDEN" RAID.—It is stated that the party from the German cruiser "Emden" which raided the cable station at Cocos Island last November robbed the cable staff of private property to the value of \$800.

CODE CABLEGRAMS may now be sent to Great Britain, France, Tunis and Algiers in the following codes: A. B. C., fifth edition; Bentley's Complete Phrase Code, but not including the separate oil and mining supplements; Broomhall's Imperial Combination Code, but not including the special rubber edition; Lieber's; Meyer's Atlantic Cotton Code, thirty-ninth edition; Scott's, tenth edition, and Western Union. In addition to this list the A. Z. Code may be used to France, Tunis and Algiers. The A. B. C., fifth edition; Lieber's; Scott's, tenth edition, and Western Union codes may be used to British territories, other than Great Britain and Ireland. All messages are still subject to censorship and at sender's risk.

War of Cable Rates.

On January 20 the Commercial Cable Company announced a reduction of rates to Cuba from New York for deferred plain language cablegrams, for delivery within twenty-four hours, to eight cents per word, and to places in Cuba beyond Havana to twelve cents per word. On January 23 the company announced a further immediate reduction on the same class of cablegrams to five cents per word for Havana business, and nine cents to places in Cuba beyond Havana.

The announcement of the first reduction was followed by the Western Union Telegraph Company introducing a similar service and reducing its rates for cable letters from \$1.00 to 75 cents per message of fifteen words. The later cut of the Commercial Cable Company followed.

Reductions in quick succession have since been made by both companies, the Commercial rate now being four cents per word for deferred plain language cablegrams to Havana, and eight cents to all other places in Cuba, and the Western Union rate, five cents a word for deferred plain language messages to Havana, and nine cents to other Cuban points. The latter company announces the suspension of the thirteen-word minimum in its cable-letter service between New York and Cuba.

The Retirement of Oscar Moll.

Mr. Oscar Moll, director of the German Atlantic Cable Company at Cologne, Germany, retired from the service at the end of 1914, after forty-six years of successful work in cable telegraphy. He was

born at Berlin, in 1850, and, in 1867, he joined the Electric and International Telegraph Company of London, and, two years later, the Indo and European Telegraph Company as clerk in charge of the London station. On the formation of the Direct United States Cable Company in 1874, Mr. Moll occupied the position of assistant to the manager and became manager in 1888. In 1889 he undertook the management of the Deutsch-Atlantische Telegraphengesellschaft of Cologne. For the last fifteen years Mr. Moll has been director of the company and his broad knowledge of cable matters and his great abilities contributed considerably to the rapid development of this concern. Mr. Moll took part in the International Telegraph Conferences at Budapest, for the Direct United States Cable Company, and at London and Lisbon for the Deutsch-Atlantische Telegraphengesellschaft, where he made many friends. He has published several books on telegraphy, viz.: "Atlantic Telegraph Cables," "Mercator's Telegraph Code," "European Health and Pleasure Resorts," "Die Unterseekabel in Wort und Bild," etc.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to January 26 as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6; Mole St. Nicholas-Port au Prince, December 4; Paramaribo-Cayenne, January 22.

CANADIAN NOTES.

MR. H. HULATT, commercial and traffic superintendent and superintendent of time service, Grand Trunk Pacific Telegraph Company, Grand Trunk Pacific Railway, Winnipeg, Man., was a recent New York business visitor.

MR. FRANK E. CAMP, inspector of the Canadian Pacific Railway Company's Telegraph, Nelson, B. C., is now located at Brandon, Man., in the same service. Mr. Camp is the son of Mr. William J. Camp, assistant manager of the Canadian Pacific Railway Company's Telegraph at Montreal.

THE TELEPHONE.

PRESIDENT B. E. SUNNY, of the Chicago Telephone Company, gave a Christmas luncheon to 110 officials of the Chicago Telephone Company at the Hotel La Salle, on December 24, 1914. A toast was drunk to the 7,000 telephone operators in Chicago.

EARNING'S REPORT.—The gross earnings of the Bell Telephone System in the United States for the eleven months ending November 30, 1914, were \$206,710,452, as compared with \$197,452,138 during the same period of 1913; expenses, \$152,-

884,148, as compared with \$143,593,986 in 1913, and net earnings, \$53,826,304, and \$53,858,152 in 1913. After deducting interest, the net profits were \$36,484,737, as compared with \$38,654,953 in 1913.

THE BOSTON PLANT CHAPTER, Telephone and Telegraph Society of New England, had a supper at Copley Hall, on the evening of January 21. Mr. E. K. Hall, vice-president of the New England Telephone and Telegraph Company, addressed the society on "Some Mistaken Impressions About Our Company." There was excellent music and the affair was greatly enjoyed by all present, the attendance including several officials of the New England Company. Mr. Gordon S. Wallace is secretary of the chapter.

Telephone Engineering.

Professor George S. Macomber, of Cornell University, Ithaca, N. Y., read an interesting paper, entitled "The Application of Science to Telephone Engineering," before the engineering section of the American Association for the Advancement of Science, at the Philadelphia convention, December 31, 1914. The paper dealt with the following subjects: The chronological development of the telephone engineer; the popular fallacy regarding telephone engineering; the general problem of the telephone engineer; the object of a telephone company; typical examples of telephone engineering problems; a common problem-development study; telephone transmission problems; special studies, and the subdivisions of telephone engineers.

Review of Principal Articles in Contemporary Telephone Publications.

In the first issue of the new year *Telephony* began the publication of a "Home Study Course for Telephone Men." It will be a complete presentation of the principles underlying modern telephony in all its branches, and will be arranged systematically, so that regular reading and faithful study will qualify ambitious men for higher positions. The course is prepared under the supervision of Stanley R. Edwards, editor of *Telephony*. The first chapter deals with the elements of telephony. * * * In the same journal J. Brooks gives some interesting news items from England and the Continent, telling the method of procedure in obtaining telephone service in London and the system of charges; the use of the field telephone in the war, and running telephone cable on a battlefield. Mr. Brooks states that the London telephone service has been wonderfully improved by the exigencies of the war. * * * "Rebuilding of Rural Telephone Lines" is the title of a contribution from E. E. Kain, who gives a great deal of practical information on the subject in the same issue of *Telephony*. * * * The Thermophone, a non-magnetic telephone instrument, is also described and illustrated in the same number. * * * The adoption of automatic telephone apparatus by the Tri-state Telephone and Telegraph Company in St. Paul and Minneapolis, Minn., is also referred to. The contract calls for 35,700 lines as an initial installation.

"Running a War by Telephone" is the title of an interesting article in the January *Transmitter*. The article describes the extent to which the telephone is employed by the Germans in the war, and is accompanied by several excellent illustrations, showing how the telephone is used in the trenches and elsewhere on the field of operations. * * * In the same journal, Mr. R. H. Boggs, traffic engineer, New York Telephone Company, gives some points of interest in traffic work. He emphasizes the importance of justice and fairness to all employees.

Mr. A. McBirney, assistant engineer Panama-Pacific International Exposition, describes in *The Pacific Telephone Magazine* for December, 1914, the telephone system for the exposition. The telephone cables are run in the same conduit as the light and power cables, the conduit being of special design. The total amount of duct laid for light, power and telephone requirements is 424,000 lineal feet (36,000 trench feet), and the average cost was nineteen cents per duct foot. The trunk line connecting the Pacific Telephone and Telegraph Company's system with the exposition exchange has a capacity of 1,200 pairs. The telephone company will supply the exposition with operators. The San Diego Exposition is also referred to in *The Pacific Telephone Magazine*. This exposition was formally opened at midnight December 31, by President Wilson closing a circuit at Washington. There are 600 telephone stations for exhibitors and concessions. Underground cable has been laid throughout the grounds.

The Telephone Department of the Massachusetts Public Service Commission is described and illustrated in *Telephony* for January 16, by H. S. Knowlton. The organization of the telegraph and telephone bureau, the duties of the inspectors, the scope of the work and the results of the first year's administration are described.

The importance of a well-planned and well-constructed storehouse for telephone supplies is pointed out in an interesting and well-illustrated article by E. Ebenbach in the January 15 *Telephone News*. "Our storehouse," he says, "is a temporary abode for material and supplies, and should contain nothing but good, current, salable or usable items." Model storehouses at Reading, Greensburg and Harrisburg, Pa., are illustrated in detail.

GREETINGS FROM FAR-OFF LANDS.—Among the belated Christmas and New Year's greetings received by TELEGRAPH AND TELEPHONE AGE is one from Mr. H. P. Trainor, government telegraph and telephone engineer at Bloemfontein, South Africa, and one from Mr. S. Inada, engineer's section, Department of Communications, Tokyo, Japan.

Two dollars per year for TELEGRAPH AND TELEPHONE AGE, is a wise and profitable investment for telegraph and telephone employees.

RADIO-TELEGRAPHY.

MR. GEORGE S. DE SOUSA, traffic manager, Marconi Wireless Telegraph Company of America, sailed from New York for Galveston, Tex., on January 27 on a combined business and pleasure trip, and expects to return about the middle of February. He is accompanied by Mrs. De Sousa.

SIASCONSET WIRELESS STATION REOPENED.—The government has permitted the Marconi Wireless Telegraph Company of America to reopen its station at Siasconset, Mass. This station was closed on September 25, 1914, by order of the President, as announced in our October 1, 1914, issue.

SHELLING THE ENEMY BY AID OF WIRELESS.—In the shelling of the German forts at Tsing-tao, China, by Japanese battleships, wireless played an important part. As soon as a shell landed the accuracy of the aim was telephoned to the naval wireless station at Sesheco and from there the information was relayed to the warships.

CENSORSHIP RELAXED.—At a recent conference between the officials of the Navy Department and the Marconi Wireless Telegraph Company, the government restrictions against coded wireless messages between the United States and the Hawaiian Islands were removed, placing that service on the same basis as cable and wireless service on the Atlantic. The authorized codes are Western Union, Lieber's, A B C (5th Edition), Bentley's, Broomhall's, Atlantic Cotton and Scott's.

QUICK WIRELESS SERVICE.—On the last trip of the Cunard steamer "Franconia," when the boat was sixty miles off New York, a passenger sent a marconigram via the Western Union to San Diego, Cal., prepaying the reply. The message was sent through the Marconi station at Sea Gate and, to the astonishment of the passenger, the reply was delivered to him in fifty-five minutes. This is probably a record-breaker on sending a wireless message from a ship at sea across the continent and delivering reply on board ship.

THE TUCKERTON WIRELESS STATION.—A petition has been filed in the New Jersey Court of Chancery at Trenton by the Compagnie Universelle de Télégraphie et de Telephonie Sans Fil, of Paris, France, against the United States Service Corporation, the Hochfrequenz-Maschinen Aktiengesellschaft für Drahtlose Telegraphie, Rudolph Goldschmidt, of Charlottenburg, Prussia, and Emil F. Mayer, of Tuckerton, N. J., to determine the question whether the Tuckerton station belongs to the French or the German corporation. The French company submits that the German firm is now in control of the station, but that a contract was entered into some months ago for the sale of the plant and all patent rights for use in any part of the world except the German Empire. The French company serves notice not only that it is seeking to obtain the property, but that it will expect to receive the money that has been collected by the United States Government from the time the navy was placed in charge to enforce American neutrality.

The Radio Operator Problem.

In a paper read before the Institute of Radio Engineers, New York, May 20, 1914, Mr. V. Ford Greaves, radio engineer, Department of Commerce, said that three of the most important phases of the operator problem were proficiency in the use of the code, skill in the care and adjustment of apparatus, and reliability in an emergency. Speed in operating, he said, was somewhat of a talent.

He stated that he was a strong champion of the American Morse code for radio work, although he was compelled to bow to the overwhelming majority in favor of the Continental Morse. "The necessity for a universal radio code," he said, "was apparent to all."

As a whole, Mr. Greaves said, the American Morse is about 16.7 per cent faster than Continental for the same degree of skill. In ordinary use it is probably about 20 per cent faster.

Experience has shown that skilled land line operators make the best radio operators, even when compelled to use the Continental code. Operators at shore stations are usually required to be familiar with both codes, so as to operate both the radio apparatus and the land line connection. It is found that the land line operator acquires skill in the use of the Continental code as used in radio-telegraphy much more readily than the radio operator can pick up the use of the sounder.

With a view to uniformity and consistency at the several examining offices, the Bureau of Navigation has adopted an automatic machine sender called the Omnigraph. The signals are cut on dials and the spacing is theoretically correct. Some operators have objected to being examined by means of the Omnigraph, stating that, whereas they could receive twenty words a minute if the sending were by hand, they could not copy signals from the Omnigraph at that speed. After tests, the Bureau of Navigation is satisfied that the Omnigraph, or a similar machine, is very satisfactory, and is fair to all as a means of conducting the code test.

The rates of compensation for radio operators of the navy, the American Marconi Company and the Tropical Radio Telegraph Company (United Fruit Company), and the graded scales of promotion were compared.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

"Punta Arenas and its New Wireless Station" is the title of an article in the January *Wireless World* (London), by Hilton Keith. The town and its surroundings are described. On account of its geographical position, the town enjoys almost constant daylight during the summer and a correspondingly long period of darkness in the winter. The wireless station was erected by the Marconi Wireless Telegraph Company, Ltd., for the Chilean Government, to carry on a regular service with a similar station now being erected at Puerto Montt. The latter station is a great distance to the North from Punta Arenas and is in direct connection with the rest of Chile by rail and land telegraphs. The station includes two transmitting equipments,

one of 100 kw. and one of 5 kw. Power is obtained from a Diesel oil engine of 270 horsepower. The generator is direct coupled to the engine and delivers 140 kw. at from 200 to 360 volts. Energy is stored in an accumulator battery of nearly 2,000 ampere-hours capacity. Two wave-lengths are provided, 5,000 and 3,000 meters. The article is well illustrated.

Wireless telegraph in the war, both on land and sea, is briefly reviewed in the *Wireless World* (London) for January. The equipment for the German "Zeppelins" is described and an illustration is given of a portable wireless station employed in the German army. A map shows a chain of air-ship wireless stations along the German frontier.

Wireless in the Philippines is described in the December, 1914, number of *The Wireless Age* (New York). Stations were erected by the United States Signal Corps at Jolo, Malabang and Zamboanga as early as 1905. They were at first employed solely for military purposes, but, when hostilities with the natives were ended, the stations were turned over to the Bureau of Posts of the Philippine Islands, and are now operated for commercial purposes. They have proved more successful than the wire telegraph, which is always a prey to the destructive typhoon and tropical rain storms. The apparatus at the Malabang station is installed on the top floor of a small shack made of nipa grass and bamboo, supported on piles. The lattice tower is 130 feet high. The Zamboanga station is the most powerful and works continuously from daylight to sundown. The power is obtained from a 6-kw. generator, driven by a 10-hp. gasoline engine. The tower is constructed of wooden beams and is 175 feet high. Heavy static and lightning prevent the stations from working after sundown. Native operators are employed, under the supervision of white men.

TELEGRAPHERS AS FARMERS.—Almost every week we are in receipt of letters informing us that the writers had decided to give up the telegraph and engage in farming. There seems to be a steady exodus from the telegraph office to the farm. Most of those who have decided to engage in agricultural pursuits have done well. A few have scored failures and have returned to the telegraph key.

A GROWING DEPARTMENT OF THE TELEGRAPH.—The head of one of the departments of a telegraph company, speaking of the developments of the telegraph service, stated that his own department had grown from a single man affair, thirty years ago, to a well-organized bureau, consisting of over fifty men. He, no doubt, purposely failed to add that he was the head of the error and complaint bureau.

Mr. H. L. Stewart, of Amarillo, Tex., in renewing his subscription, says: "The AGE is certainly a great help. It keeps me in touch with the latest developments in telegraph and telephone work and I would not be without it for twice the price of a subscription."

Mr. J. M. Carnahan's Connection with the Custer Massacre.

The *New York Herald* of January 3 published the following interesting story of Mr. John M. Carnahan, of the Western Union Telegraph Company at Missoula, Mont.:

"When the news of the Custer massacre was told to the world in 1876 it was sent by John M. Carnahan, then manager and operator in the Western Union office in Bismarck, Dakota. On January 2, after active service of more than fifty years, Mr. Carnahan retired from work and entered upon the enjoyment of a pension granted to him by the telegraph company which he had served so long.

"Mr. Carnahan began his career as a telegrapher in 1861. That was the beginning of the civil war and during the four years of that conflict he was close to the border between the North and the South.

"In the fall of 1872 the Northern Pacific Railway line had been completed as far west as Bismarck, N. D., Mr. Carnahan was asked to go to Bismarck and manage that office, and in the spring of 1873 he went there and the big chapter in the story of his eventful life began. For it was while he was at Bismarck that he sent to the world the account of the Custer massacre on the Little Big Horn, in July, 1876. There have been a good many claimants for this honor, but the official records establish the fact that it was John Carnahan's key that clicked off the news which told the world of that terrible slaughter.

"Fort Abraham Lincoln, the post of the Seventh Cavalry and the headquarters of Brigadier-General Custer, was at Bismarck. Mr. Carnahan won Brigadier-General Custer's friendship and he became the personal friend of the officers at Lincoln. And so it was that he and the post surgeon rode out from the old garrison with the Custer expedition when it started in June, 1876, to punish the Sioux. The surgeon and the operator made the first twelve miles with the Seventh Cavalry. Then they turned back with the last despatches which Brigadier-General Custer sent.

"No word came back to Bismarck from the Seventh Cavalry and its commander. But that occasioned no surprise. Expeditions of that sort were a common occurrence in those days. Men at headquarters did not expect to hear anything of the Seventh Cavalry until it should ride back to its post, dusty and ragged, but with the usual report that the Indians had been forced once more to be good.

"It was on the night of July 5 when the steamboat 'Far West' came down the river to Bismarck. The 'Far West' brought the wounded of Reno's command and the official despatches which told of the complete annihilation of the Custer command.

"On the morning of July 6 Mr. Carnahan found on his desk in the telegraph office a carpet bag filled with official despatches. There was an immense lot of them. He 'flashed' the news to the East, and then settled down to the transmission of the official story to the Department of War in

Washington. It was eight o'clock on the morning of July 6 when he began his tremendous task. Not until five o'clock the following morning—twenty-one hours—did he leave his instruments. Then for three hours he slept the sleep of utter exhaustion. He returned to his work, and for twenty hours he sat at his key. It was four o'clock the next morning when he checked off the signature of the last despatch in that old carpet bag. He had sent 80,000 words in the two shifts.

"For two days the Eastern newspapers had been clamoring for news, and there was no one to send it. Mr. Carnahan could not leave his official work and there was no other telegraph operator within two hundred miles.

To the *Herald*, the *Chicago Inter-Ocean* and the *St. Paul Pioneer Press* he sent as much of the news as he had strength to prepare. And that was the way the news of the Custer battle was sent out.

"That was the big news article in the career of John Carnahan. But in the professional secrets of fifty-three years at a telegraph key there must be many incidents stored up which would startle the world if they were told. There were many thrilling messages passing during the early years of his service at the key—the years when he was on the border between North and South in the civil war.

"Mr. Carnahan is the man who handled the official correspondence between President Grant and Brigadier-General Custer at Bismarck which preceded the Big Horn expedition and which has always supposed to have caused the resentment which drove Brigadier-General Custer to recklessness on that fatal ride."

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, electro-magnetism, 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.

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SOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, FEBRUARY 1, 1915.

Happiness.

All men strive to attain happiness, although their conceptions of it differ. Happiness is the greatest paradox in Nature. It can grow in any soil and live under any conditions. It defies environment; it comes from within. It consists not of having, but of being; not of possessing, but of enjoying.

The New York-San Francisco Telephone Line.

The completion of the New York-San Francisco telephone line, which was celebrated on January 25, marks the achievement of a prodigious and unique undertaking that will long stand as the most prominent mile post in telephone development in this or any country. Indeed it does not appear at this time that any more mile posts can be added to the glory of American enterprise, because the continent has been practically conquered, telephonically speaking. It is now possible to talk between New York and San Francisco, and what the next step in long-distance telephony will be it is impossible to predict, unless communication under the Atlantic and Pacific oceans be undertaken. It is not a wild flight of imagination to suppose such a thing possible, for who dares say that anything is impossible in the realm of science? Theoretically, a cable can

be constructed that will carry the voice across the oceans, and, judging from the results in the extension of land line telephony, there does not seem to be any doubt that it would be a practical success as well. This, however, is not so much an engineering problem as it is a financial and commercial proposition.

The telephone officials and engineers concerned in this latest and greatest achievement are certainly entitled to much praise for what they have accomplished for the American people, and it is a matter of justifiable pride to know that American telephone enterprise leads the world.

Operators Under Government Ownership Conditions.

There is a certain class of operators who labor under the impression that working for the government as telegraphers would be much pleasanter, in every way, than working for a private corporation. Their views of government service are rather roseate and certainly superficial. They dream of short hours and liberal pay, and think that with Uncle Sam back of them they would lead a life of ease and contentment. We fear, however, that the reality would upset their expectations, and that, after a short experience, they would find Uncle Sam to be a rather unsympathetic employer.

We would call the attention of these enthusiasts to a few facts that they would run up against if the government ran the telegraphs and telephones of this country. They would be underpaid, compared with what they receive now for their services; they could not receive any more remuneration for their work in government employ than the fixed legal rate, because it is not an easy matter to secure additional appropriation for such a purpose; there would be no reward for faithful service, because Uncle Sam does not recognize individuals, but only the masses; the individual, however ambitious he might be, would be submerged, and his identity would be lost completely, his spirit would soon be broken, and he would drift into the current of hopeless indifference which characterizes the thousands and thousands of subordinate employes in other branches of government service. Every operator would become a machine, and there would be not the slightest encouragement or incentive to do his best.

Representative David J. Lewis, of Maryland, the author and champion of the government ownership bill, made some pertinent and interesting statements at the first session of the investigation by the Federal commission on industrial relations into the great philanthropic foundations and the causes of industrial unrest. In reply to the question as to what the government would do should the employes of a "postalized" telegraph service demand action upon certain things collectively, said: "There would be no need for them to act collectively. The purposes of the government are ethical. There is no need of underpaying as sometimes develops in privately owned and managed corporations. Unions have no purposes among government employes, as they do among employes of private-owned corporations."

The experience in other countries where the government controls the telegraph and telephone is quite the reverse. In these there exists great bitterness of feeling on the part of the operators and other employes in the subordinate ranks. In England, before the war began, there was agitation for living pay and fair treatment. Overwork, underpay, and general discontent are common complaints in England, France, Italy and other countries, and yet, notwithstanding these well-known facts, it seems incredible that there could be any operator in this country who thinks that the height of happiness would be attained by operators if the American government controlled the telegraph and the telephone. It would be a sad day for our operators, indeed, should such a thing come to pass. They should make it their personal duty to consider the question on all sides and not commit themselves to such a folly as espousing the government ownership doctrine.

Thirsting for Wireless Knowledge.

Naturally Mr. William Marconi, like all other inventors of note, receives many foolish letters from illiterate and crack-brained individuals. The following, addressed to Mr. Marconi, but which never reached his hands for obvious reasons, are given in *The Wireless Age*, of New York.

"Dear Sir:—As a verry important inquiry i beg for the liberty of asking you for a little information regarding your wireless telegraph system.

"Can your system of wireless be used for taking a persons record. Operators receiving the minde thoughts and general personality of a person conected. Can or is it used in the Medium-Clairvoyant business operator receiving the minde thoughts of one person and giving them to another both parties conected by curant. Voices given threw vibrating voice sound, etc.

"Will you please give me names and adresses of all parties having your wireless telegraph system installed in New York City, and oblige."

"Dear Sir:—I am a Christian, trying to make science fit itself into religion. Did I not read from your pen, that your invention was the instrument that gathered up words, and that words floated, upon the air for an indefinite length of time? If there is any foundation for this question, in anything that you have ever said, will you please tell me in a personal letter, how long you think words will float on the air and can yet be gathered up? You will very greatly oblige."

"Dear Sir:—Please, I am very anxious to know how the Marconi Sisteam Wireless Telegram it is operate, if is operate under the superficial of the grown; or upper the superficial of the grown.

"Yours respectfully curious."

We are in receipt of a renewal of the subscription of Mr. Nathaniel Hucker, of the Postal Telegraph-Cable Company, Buffalo, N. Y., for another twelve months. This veteran telegraph man entered the service at Buffalo in 1847, and has seen the business develop in that city from a one-man affair to the present gigantic proportions.

Reid Memorial.

The Reid monument has now been completed in its place at the head of the grave of James D. Reid, in Mount Hope Cemetery, at Rochester, N. Y.

It has been suggested that the monument be formally unveiled during the convention of the Association of Railway Telegraph Superintendents, which is to be held in Rochester next June. The trustees will act on the matter in the near future, and will probably approve the suggestion.

Mrs. Anna Reid Bendit (Mr. Reid's only daughter) died on December 24, at her home in Edinburgh, Scotland, but no particulars in regard to her death have yet been received.

The trustees and other friends of Mr. Reid had hoped that Mrs. Bendit would be able to be present at the unveiling of the monument. In this connection, the letter written by her, in response to a request for her formal consent to the erection of the monument on the cemetery lot, is of interest.

"6 West Savile Road, Edinburgh,

April 6th, 1914.

"Dear Sir: Your letter of the 26th [March], informing me of the contemplated memorial to my beloved father, is before me. With a deep sense of grateful emotion I learn of this tribute to his memory, and hasten to give my appreciative consent to the monument being erected upon our lot in Mt. Hope Cemetery. Also the tree to which you refer and which was planted by me, may be removed at your discretion. I will gladly give its place to something more fitting, but please observe that none of the graves be disturbed.

"I send herewith a letter to the superintendent of Mt. Hope, which may be required.

"While thanking you and all others who have so loyally interested themselves in the monument, will you kindly inform me the date of the unveiling of the monument.

"With grateful regards, I remain,

"Sincerely yours,

(Signed) "ANNA REID BENDIT.

"Chas. P. Bruch, Esq.,

253 Broadway,

New York City, N. Y.,

U. S. A."

Mr. Reid's only brother, Douglas Reid, died at River Falls, Wis., on December 31, 1914, as announced in our January 16 issue, so that Mr. Reid's only surviving near relatives are his sister-in-law, Mrs. Douglas Reid, of River Falls, Wis., and her four sons.

THE DOT AND DASH CLUB of Philadelphia will give its third annual dinner at the Colonnade Hotel in that city on January 30. It is expected that many prominent old-time telegraphers will be present. Mr. S. S. Garwood, a well-known old-timer, is president of the club.

ANNUAL MEETING OF THE T. & T. L. I. A.—The annual meeting of the Telegraph and Telephone Life Insurance Association will be held at No. 195 Broadway, New York, on Wednesday, March 17, at 4 p. m.

Opening of the New York-San Francisco Telephone Line.

The completion of the transcontinental telephone line (between New York and San Francisco) was celebrated in the afternoon and evening of January 25. At New York there was a notable gathering of prominent telephone and telegraph men, engineers and professional men, in the offices of President Theo. N. Vail, on the fifteenth floor, 15 Dey Street, and at San Francisco there was also a distinguished audience, including Mayor James Rolph, jr., of San Francisco; President Moore, of the Panama-Pacific Exposition, and several prominent telegraph and telephone men, including Mr. Thomas A. Watson and Mr. Thomas B. Doolittle, telephone pioneers. The circuit included a connection with President Wilson, at Washington, and President Theo. N. Vail, at Jekyl Island, both of whom participated in the ceremonies.

On the platform at New York were seated Dr. Alexander Graham Bell, Mayor John Purroy



OPENING OF NEW YORK-SAN FRANCISCO TELEPHONE LINE.

Left to right—J. J. Carty, Hon. George McAneny, U. N. Bethell, Dr. Alexander Graham Bell, Mayor John Purroy Mitchel, C. E. Yost, Hon. W. A. Prendergast.

Mitchel, of New York; Hon. George McAneny, president of the New York Board of Aldermen; Hon. Wm. A. Prendergast, comptroller of the City of New York; U. N. Bethell, senior vice-president, American Telephone and Telegraph Company; J. J. Carty, chief engineer, American Telephone and Telegraph Company, and Casper E. Yost, president, Nebraska Telephone Company, Omaha, Neb.

Mr. Union N. Bethell presided, and opened the ceremonies by making a short address, in which he gave some facts and statistics regarding the development of the telephone since its invention.

At 4:30 o'clock the signal was given and the line was cut through to San Francisco. Dr. Bell immediately picked up the telephone in front of him and held a conversation with Mr. Thomas A. Watson, Dr. Bell's earliest associate in the invention of the telephone, who was at the San Francisco end.

After a short talk over a modern telephone Dr. Bell picked up an exact duplicate of the telephone made for him by Mr. Watson in 1875. Dr. Bell talked through this and Mr. Watson stated that he heard the voice perfectly. This instrument was

a clumsy-looking affair compared with the present-day transmitter, but it did the work. During the conversation with Dr. Bell, Mr. Watson turned away from his telephone to tell the San Francisco audience what Dr. Bell had said. The applause which followed was heard quite distinctly in New York.

President Theo. N. Vail, at Jekyl Island, was an interested listener to the conversation between Dr. Bell and Mr. Watson. He then interrupted to extend his congratulations to both men, and they, in turn, congratulated Mr. Vail on his successful administration of the telephone company's affairs.

After this, conversations were held by President Wilson, at the White House in Washington, with President Moore, of the Panama-Pacific Exposition, and Mr. Watson, at San Francisco; Mayor Mitchel, of New York, with Mayor James Rolph, jr., of San Francisco; J. J. Carty with Thomas B. Doolittle, the well-known telephone pioneer, and others. President Wilson said: "I want to say to you, Mr. Watson, that I consider it an honor to be able to express my admiration for the inventive genius and scientific knowledge that have made this possible, and my pride that this vital cord should have been stretched across America, as a sample of our energy and our enterprise. I want to convey to you my personal congratulations, sir."

"I thank you from the bottom of my heart, Mr. President," replied Mr. Watson. "I consider it a great honor to talk across the continent for the first time with the President of the United States."

Dr. Bell and President Wilson were then introduced by wire.

"I am glad to have the opportunity of talking to you, Mr. President, over the first transcontinental telephone line," said Dr. Bell.

"I am very much obliged to you," said Mr. Wilson. "I want to congratulate you very warmly on this notable consummation of your long labors and remarkable achievements. I think this will be remembered as a memorable day. I convey to you my warm congratulations."

Dr. Bell thanked the President, but said that the telephone system of the United States was the product of a great many minds and not of one alone, in answer to which the President said: "But there has been one leading mind."

Mr. Wilson and Mr. Vail then exchanged greetings, and after that everyone invited to the celebration had an opportunity to talk and hear across the continent, a distance of over 3,400 miles.

The articulation on this long circuit was remarkably clear, and there was little or no difficulty in hearing every word that was spoken at either end. In many cases the characteristics of the speaker's voice could be readily distinguished. The test was, in all respects, a pronounced and unqualified success, and Mr. John J. Carty, the chief engineer of the company, received the congratulations of all present on the culmination of his work of years to bring telephone conversation across the continent to a practical realization.

Among those present at New York, in addition to those already mentioned, were Messrs. Newcomb

Carlton, president, Western Union Telegraph Company; Clarence H. Mackay, president, Postal Telegraph-Cable Company; B. E. Sunny, president, Chicago Telephone Company; W. T. Gentry, president, Southern Bell Telephone and Telegraph Company, Atlanta, Ga.; H. J. Pettengill, president, Southwestern Bell Telephone System, St. Louis, Mo.; H. B. Thayer, vice-president, American Telephone and Telegraph Company; Gerard Swope and C. E. Scribner, vice-president and chief engineer, respectively, Western Electric Company, New York; F. H. Bethell, vice-president, New York Telephone Company; Hudson Maxim, the inventor, and many other prominent telephone people, besides several leading men in financial, political and professional circles, making a total of over one hundred.

Telephoning in England.

The Boston *Globe* records the following experience of a man in England who wanted to talk to Sir Edward Shackleton:

The London telephone is a nuisance. In the small tragedy which had crept into my life that morning I had sought to talk with Sir Edward Shackleton. The girl at the exchange gave me the wrong number, so that I jiggled the thing on the telephone instrument, and a sweet, cultured voice asked:

"Are you there?"

I said that I was, and we had a little chat. In New York a hurried but courteous operator would have popped: "Number?"

But this young English operator had all the time in the world. Perhaps I had been her first caller that morning. So she explained that she was tremendously sorry that I had been given the wrong number, and asked if I would kindly wait until she tried the right one.

Then she reported—I could almost see the scarlet blushes mantling her fair young cheek—that Shackleton didn't answer. But she didn't say it that way. I haven't space to tell just how she did say it.

"Then," I asked, "how am I to get my three pennies back?"

I had been operating through a drop-a-penny device, which required me first to drop a penny, and then turn a wheel until an irritating buzzing ceased, and then listen until the girl said, "Thank you," and then say, "Thank you," and then drop another penny, and so on, until the bill was paid.

The girl was just embarrassed to death. She said there wasn't any way for me to get my three pennies back. No provision had been made against such a desire on my part. But she would let me trade it out. I could have a sixpenny call if I wanted one.

But I couldn't think of any sixpenny acquaintance. So I finally said: "Let me talk to the Prime Minister." But she wouldn't. She called the "head" of the department, who tried to assure me that Mr. Asquith would not come to the telephone. And when I refused to compromise on any lesser government official—when I wouldn't even hold converse with one of Asquith's secretaries—they

just went away and left me there in the telephone booth.

It was a cold morning, and I didn't mind particularly, but my legs finally got so tired I had to give it up.

Until a short time ago, if you put in a long-distance call you had to pay for it whether you got your number or not. You still have to pay if you do not get your man, but three months ago you were assessed for the complete failure of the system. The theory is that you had put the telephone company to a great and undeserved inconvenience, and if you were a true sportsman would be glad to settle.

New Book.

AUTOMATIC TELEPHONY. By Arthur Bessey Smith and Wilson Lee Campbell, 406 pages, 6x9, illustrated. McGraw-Hill Book Company, New York. Price, \$4.00, net.

This is the first complete treatise devoted exclusively to automatic and semi-automatic telephony, and covers every phase of the subject as practiced in this country and abroad. It is a very comprehensive work, and as it is a careful combination of theory and practice the book will be useful to telephone engineers and students alike. This volume was produced to meet the general demand among telephone engineers for a more extensive knowledge of automatic telephony, which has been rapidly introduced in various foreign countries and, to some extent, in this country in late years. The authors are well known in the telephone field and are abundantly fitted to handle the subject intelligently. Much depends upon the first treatment of a new art, for if it is not presented properly to the interested public it is doomed to failure. But in this case the treatment has been masterly and successful.

An idea of the scope of the book may be obtained from a glance at the list of contents, covering sixteen chapters, as follows:

I—Trunking; II—Automatic Electric Company's switchboard apparatus; III—Subscribers' station equipment for use with Automatic Electric Company's two-wire systems; IV—Measured service equipment; V—Automatic system of the American Automatic Telephone Company; VI—Siemens and Halske system; VII—The Lorimer system; VIII—Automatic traffic distributor equipment; IX—Automatic district stations; X—Clement automanual system; XI—The system of the Western Electric Company; XII—Long distance, suburban and rural line equipment; XIII—Cutovers and interconnections of manual and automatic offices; XIV—Power plant, supervisory and testing equipment, and circuits; XV—Traffic; XVI—Development studies.

This book is for sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Every progressive telegrapher reads TELEGRAPH AND TELEPHONE AGE, because it is indispensable to him. Subscription price, \$2.00 per year.

Testimonial Dinner to Mr. W. J. Quinn.

Mr. W. J. Quinn, who has recently retired as chief of the time-keeping department of the Western Union Telegraph Company at New York, was tendered a testimonial dinner at the Broadway Central Hotel, New York, on the night of January 23. There were over 150 persons present, and letters of regret at their inability to attend were read from President Newcomb Carlton; John C. Willever, general commercial superintendent; Herbert Smith, division traffic supervisor, and J. B. Taltavall, publisher of TELEGRAPH AND TELEPHONE AGE.

Remarks suitable to the occasion were made by A. R. Brewer, vice-president, Western Union Telegraph Company; M. J. O'Leary, secretary, Telegraph and Telephone Life Insurance Association; E. F. Howell, secretary, Serial Building Loan and Savings Institution; Gardner Irving, president, Gold and Stock Life Insurance Association; T. M. Frennan, chief clerk, main operating department; P. J. Tierney, of the Central Cable office, and E. P. Griffith, superintendent of telegraph, Erie Railroad.

The ladies of the main operating department at 24 Walker Street sent a letter, testifying to their high regard for the guest of the evening.

All the addresses were highly eulogistic of Mr. Quinn as a man and his fidelity to the company, for which he had faithfully served for over forty years.

Mr. O'Leary told of his intimate relations with Mr. Quinn as the leading spirit of the Aid Society, and of his gentle character. Mr. Howell caused a roar of laughter when he said that he had been in contact with Irishmen all his life, but Mr. Quinn was the only one that always wanted to avoid a "scrap." Mr. Gardner Irving spoke feelingly of Mr. Quinn, telling how the latter had helped many young men along by kindly advice and interest in their moral welfare. Mr. Griffith spoke in a reminiscent mood and referred, in a humorous way, to the procession of operators and other employes, headed by Mr. Quinn, when the Western Union moved from 145 to 195 Broadway.

At the conclusion of the speaking, Mr. Quinn was presented with a handsome autograph album, signed by all those present.

The evening was enlivened by excellent instrumental music and the singing of popular airs, solos and of a quartette. It was a delightful gathering, and everyone present entered into the spirit of the occasion. The affair was well planned and carried out, Mr. Conrad A. Meyer being chairman of the committee. Hon. Walter C. Burton, a well-known old-time telegrapher, made an excellent toastmaster. In his introductory remarks he referred to the fact that many of those present who were still in active service were among those whose biographies and portraits appeared in "Telegraphers of To-day," which was published over twenty years ago.

Those present were:

M. F. Bartow, S. S. Barrett, R. W. Bassett, Jas. Bateman, C. A. Bauer, J. W. Behre, J. A. Berry, F. R. Bishop, J. H. Bligh, M. W. Bowman, T. M. Brennan, A. R. Brewer, M. J. Brooks, Thos. Burke, E. T. Burrill, Hon. W. C. Burton.

Jos. Cahill, E. J. Campbell, J. T. Carberry, W. J. Carroll, P. J. Casey, M. S. Cavanagh, T. F. Clark, P. F. Coggins.

J. B. Davis, Wm. H. Davis, Jos. Dion, L. Dresdner, M. J. Durivan.

G. L. Ellard.

A. M. Fancell, S. S. Ferris, L. Fiedeldey, F. I. Fitch, J. H. Fleming, F. W. Flood, Wm. Franklin, P. H. Freyer.

W. L. Geehr, Michael Genoino, J. J. Gerrity, Nat Giffen, F. D. Giles, D. Gilvey, M. Goldklank, M. Green, E. P. Griffith, F. W. Griffith, P. E. Grogan, Jos. Gschwind, J. H. Gugish.

A. J. Ham, Thos. H. Hamilton, N. B. Hall, M. J. Hayden, H. M. Heffner, J. R. Heidemark, A. J. Heldman, Michael Hoey, Geo. Hohnhorst, S. H. Holland, J. F. E. Hopkins, E. F. Howell, J. H. Hutchinson.

G. Irving.

R. Jablin, G. E. Jubitz.

J. N. Kelly, M. J. Kenna, J. J. Kihm, C. A. Kilfoyle, J. B. Korndorfer.

J. Larkin, A. Lennig, C. C. Lever, A. M. Lewis, E. J. Liston.

R. J. Marrin, W. H. Mathews, J. N. Matier, G. H. Messner, C. A. Meyer, P. W. Miller, J. Morrison, H. P. Moser, J. T. Mulhall, E. J. Murphy, R. F. Murphy, R. J. Murphy, W. A. McAllister, T. A. McCammon, C. B. McCann, W. H. McCormick, Jos. McCusker, J. P. McGovern, J. F. McGuire, R. T. McNamara, A. A. McNeill.

T. C. Nettles, F. J. Nilan, F. J. Nurnberg.

M. J. O'Leary, C. E. Orr.

Thos. Pakenham, H. S. Pearce, J. Piccolo, C. S. Pike, G. A. Plantz, D. M. Polak, M. S. Polak, W. W. Price, P. O. Purcell.

W. J. Quigley, Wm. J. Quinn.

W. E. Rath, M. W. Rayens, B. H. Reynolds, C. D. Reed, J. V. Riddick, L. J. Robinson.

W. J. Schade, F. J. Scherrer, Geo. Seaman, M. D. Shaffer, J. P. Shannon, F. J. Sheridan, D. T. Sheridan, Wm. Sherman, T. G. Singleton, C. J. Skidmore, Thos. Skidmore, L. Smearer, T. J. Smith, G. F. Stainton, M. L. St. John, Frank Spree, Thos. Sullivan, P. J. Sullivan, Jno. Sullivan, F. H. Stuchbury.

T. R. Taltavall, Howard Tepe, P. J. Tierney, R. H. Tucker.

Jno. Veitch.

A. Waldron, A. Waring, J. C. Watts, H. Weidler, Jos. Wenderoth, O. L. Whiteneck.

J. L. Young.

THE HUGHES INDUCTION BALANCE is being successfully applied for the location of bullets and shell fragments in wounded soldiers in the European war. The Hughes induction balance consists essentially of two pairs of coils, respectively primary and secondary windings. The coils of each pair are equal in magnetic effect, and in making up the balance they are paired as primary and secondary, the primaries and secondaries being respectively connected in series, but constituting separate and independent circuits.

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(Continued from page 47, January 1.)

While I was stationed at Father Point, France and Italy were at war with Austria, and events big with consequence followed closely upon the heels of each other throughout that eventful season. The news brought out weekly by the steamers was therefore of exceptional and special interest. Many of the educated French Canadians who resided at Rimouski, invariably drove down to the Point when a steamer arrived, to hear the latest news from the seat of war. These people were, as indeed were all the French Canadians, intensely French in their sympathies, and as I read to them the fall of Magenta, and, later, of Solferino, before the French arms, their excitement knew no bounds. They were pugnaciously positive that the late Marshal McMahon and General Canrobert were the greatest military geniuses the world had ever produced.

The outgoing ocean steamer discharged her pilot at Father Point, and the boat which went out to bring him ashore carried with it the news box containing the latest news from this country up to 7 p. m., which included everything of interest that had transpired since the sailing of the steamer from Quebec in the morning. This news was prepared in New York, and was telegraphed direct from that place to Father Point. It was placed by me in the news box and addressed to the agent of the Associated Press in Liverpool for distribution in the old country. As the season advanced into the autumn the weather was sometimes extremely boisterous, and boarding the steamer was attended with great difficulty and danger. Those living along the sea coast know that to board one of these steamers in a howling gale and rough sea, accompanied by a cold, pelting rain or blinding snow storm, is a very hazardous undertaking. Once or twice I was afraid the steamer would pass out without the news box, carrying her pilot with her; but our boatmen were not easily daunted, and after getting away from their wives and children, who on such occasions did their utmost to prevail upon them to remain at home, they determinedly set out to "do or die." I was always greatly relieved when these brave fellows returned in safety after such perilous expeditions. Father Point is nearly 200 nautical miles below Quebec, and the run between the two places occupied anywhere from twelve to sixteen hours, according to the tide and weather. The names of the Allan mail steamers at that time were the "Indian," "North American," "Nova Scotian," "Anglo-Saxon," "North Briton" and "Hungarian." All these vessels went out of commission many years ago.

The Allans built a lighthouse at Father Point at their own expense, for the benefit of their steamship service, but as it proved to be a real benefit to the entire shipping of the river, the government took it off the Allans' hands and paid them for their outlay. I had charge of this lighthouse. The light was a red, stationary one, with thirty-eight lamps.

We burned seal oil, and assuredly the perfume it exhaled was not that of attar of roses. The lamps required cleaning, trimming and replenishing every day, and as the villainous oil smoked badly and blackened the lamp chimneys, this was no easy task. It was also necessary that some one should keep watch on the lamps all night. The man I engaged for this job proved to be unsteady, and for five or six weeks I had to perform all the work about the lighthouse myself, including the night vigil. This was a most weird and wearisome watch. The lighthouse was situated on the extreme end of the point, a long distance from any dwelling. It was octagonal in shape, three stories high. I'll never forget the long, dreary nights I spent in this lonesome house on a lonesome spot. The moaning of the sea, the screaming of a sea-bird, or the human-like cry of a seal sent a timorous, eerie shiver down a fellow's spinal column that took all the heroics out of him; and the fact that a poor unknown sailor had been washed ashore from a recent wreck, and was buried in the sand right alongside the lighthouse—burial in the Catholic cemetery at Rimouski having been refused him by the church—did not tend to allay this feeling. I finally secured a steady, respectable old man, named John Ross, to look after the lights. As his name would indicate, he was of Scotch descent; but was born down among the Frenchmen, and could not speak one solitary word of English. In the course of the summer we moved the telegraph instruments from Pilot Chouinard's house to the lighthouse, where I had good office accommodation.

The shooting around Father Point in the fall of the year was excellent. Plover and wild duck were abundant along the shores and in the bays, and partridge and rabbit were plentiful in the woods.

Whales could be seen frequently passing up and down the river quite close to shore. I don't know to what species they belonged, but they were huge animals. Their spouting apparatus seemed to be modelled on a powerful plan, for they could, and did, with apparent ease, throw a good-sized stream of water a long distance straight up into the air. After this interesting object lesson in piscatorial hydraulics they would disappear under water, coming up again a few minutes later, forty or fifty yards further on, to repeat the operation.

Late in the fall, when the ice had become pretty solid, seals could be seen floating past on good-sized cakes of ice, the heat of their bodies having melted a sort of bed or basin in which they lay. Codfish were caught off the point in large quantities. I tried my hand at this sport (?) several times, but found it very uninviting. We started out in a good-sized boat at 4 a. m., and after rowing into the river about a mile, cast our lines in, say, sixty feet of water. We baited with herring, using very large hooks and a line about the thickness of a clothes line. It was difficult to tell when we had a bite, so little ado did the fish make on taking the hook, but we hauled in our line whenever we felt the least movement at the far end, and invariably found we had hooked a cod. By seven or eight o'clock we had a boat load and rowed for shore. The natives cured large quantities of these fish for winter use.

The telegraph was new to the people of this, then far-off country, and "Maitre le Telegraphe" was a person of much consequence. All classes seemed to agree that he was a notch or two above the ordinary run of people. I opened an office at Rimouski, which is six miles from Father Point, and, as the ocean steamers arrived but once a week, I spent three or four days of each week at Rimouski, preparing Dr. Gauvreau to take charge of the office. He proved an apt pupil, and in the course of time became a very good operator. The Rimouski people, to show their appreciation of the company having opened an office in that town, and in some way to recognize my services, held a little *conversazione* at the house of Dr. Gauvreau. Some of the best people of the place were present, and there was much music and speechifying. One of the speakers referred to the load of gratitude they, as a community, were under to the Montreal Telegraph Company, and to me personally as its representative; and wishing to emphasize the significance of the gathering, said that all the gentlemen who were present were professional men—lawyers, doctors, advocates, etc.—and with inimitable French politeness, while remarking on my youth (I was then twenty years of age) and ability to read by sound, intimated that I was not only a professional man, but a "brilliant scientific prodigee." Of course, this was laying it on pretty thick, but I bore it all with quiet resignation, and never let on. I wonder if, after an experience of fifty-five years of the telegraph, these people still hold the operator in the same high esteem.

Father Point, on account of its double connection with the ocean steamers and the Associated Press, had already acquired quite a reputation both in Canada and the States.

I found the French Canadians to be a happy, hospitable, and, in their own way, industrious people, scrupulously clean in their domestic arrangements and exceedingly kind to strangers. Frivolous, and fond of music and dancing, most of them could play the fiddle, and those who could not could lift a tune brim full of dancing time, to which anyone gifted with the "poetry-of-motion" maneuvers could easily keep step.

But besides being given to music and dancing, the French Canadians are given to having large families. The fishing may not always be good, the farm crops often poor, and money scarce, but a large crop of children can always be depended upon in every well-regulated family. Prof. Goldwin Smith attributes the extraordinary fecundity of the Irish people to the "philo-progenitive potatoe," but as the French Canadians are not particularly partial to that excellent esculent, the reason of their being so *proliquis* in the way of children is probably because they are built that way.

In 1866 the efforts of Cyrus Field and his coadjutors were crowned with success and the Atlantic cable established as a fixed fact. Father Point, from this time, after having occupied for about eight years a most important position as a news point, was shorn of its glory.

The old place has been much in the public eye lately owing to its proximity to the scene of the

terrible disaster which befell the ocean liner "Empress of Ireland" in May last.

To revert to my stay in Chicago: It might be of interest to mention that in 1854, sixty years ago, I copied a comprehensive synopsis of the presidential message of Franklin Pierce. This was probably the first time such a feat had been attempted in Chicago. The message began to come in between 7 and 8 p. m., and I wrestled with it until away on, long past the "wee sma' hour ayont the twal." The message was sent from Cleveland and reached Chicago through a button repeater at Detroit. (Automatic repeaters had not been invented.) Milwaukee got it simultaneously with us through a repeater at Chicago. Neither Chicago nor Milwaukee could break and, consequently, owing to certain unavoidable causes, bits of the message, here and there, were lost, but these flaws did not, in the least, detract from the usefulness or value of the service. Mr. Fred H. Tubbs, for many years superintendent of the Western Union Telegraph Company at Chicago, now retired, was the sending operator at Cleveland. It almost unnerved me when I heard that he was to manipulate the key at Cleveland, as he was known to be a very rapid sender. In the racy vernacular of the gay and festive Knights of the Key an operator competent to copy Tubbs's sending was "no slouch." I shall never forget the feeling of relief I experienced when the trying ordeal ended, and along came the signature to the document—Franklin Pierce. At this time extra payment for working overtime was a thing unheard of. Manager John Draper, however, complimented me on my good work and presented me with a valuable silver pencil case, which was provided with a seal made from a rare stone at one end. Sealing wax and wafers were almost universally used for sealing letters in those primitive days. Printers' paste, or a solution of gum-arabic, applied with a camel's hair brush, were used in the office for sealing the envelopes covering messages. Gummed envelopes, such as are used nowadays, were a luxury as yet unknown. I made but one copy of the president's message and I believe the Chicago *Tribune* got it.

Horace White, a genial young newspaper man, was a frequent visitor. He held an important position on one of the few Chicago papers, and was in some way connected with the handling of press news. In the early days the business relations between the press and the telegraph were intimate, reciprocal and friendly in the extreme. Mr. White, as a news gatherer, was probably the first man in the west to discover that the two giant forces, the telegraph and press, were destined to go hand in hand in the march of civilization.

(To be Continued.)

Mr. David Adams, manager, Great North Western Telegraph Company, London, Ont., Canada, writes: "You were a wise man in renewing my subscription for the AGE for 1915. It is like meeting an old friend every time I get it."

A subscription to TELEGRAPH AND TELEPHONE AGE is an excellent investment for every progressive telegrapher.

Houlder Hudgins, Former Telegrapher, Now a Famous Restaurateur.

Mr. Houlder Hudgins, a former telegrapher and newspaper correspondent, and now head of the firm of Hudgins and Dumas, commissary contractors to the United States Government at Ellis Island, New York Harbor, has had a versatile and interesting career. Like many other former telegraphers who have become famous in other lines of work, Mr. Hudgins always has his wits about him, and is equal to any necessity that may arise. He did some excellent telegraph and newspaper work in Atlantic City and other places several years ago, and during the Spanish-American War performed some daring feats in order to obtain news of important happenings.

Mr. Hudgins was born on Free Welcome plantation, Gloucester County, Va., on April 24, 1868, and began his telegraphic career as a messenger for the American District Telegraph Company in Baltimore, Md., in 1882. He became successively, office sergant, night manager, day manager, burglar alarm inspector under Mr. J. B. Yeakle, then district manager of the company, now superintendent of fire telegraph in Baltimore. He next became private operator to the president of the Baltimore and Ohio Telegraph Company in Baltimore, and later entered the Western Union main office at Philadelphia, afterwards becoming manager for the same company at Atlantic City, N. J. His experience in these various positions led him into newspaper work and he represented the *St. Louis Republic* in New York for ten years. From this newspaper he went to the *New York Herald* as reporter during the Spanish-American War and was for a time on the local staff. Mr. Hudgins next entered the restaurant business as commissary contractor on Ellis Island, New York Harbor, and later engaged in the same line of work for the Nevada Consolidated Copper Company at Ely, Nev. This was in 1905-1907. While in Ely he became proprietor and editor of the *White Pine News* of Ely. In 1910 he returned to Ellis Island and is still there, where it is said that he feeds more people than does any other man in the United States.

It is a dull day when he does not prepare 7,000 meals, and he has provided as high as 21,000 meals in one day. In six years he served more than 20,000,000 meals. It is difficult to realize what these figures mean in terms of beef, bread, coffee and other food supplies.

Mr. Hudgins, it should be stated, always proved to be an expert in every enterprise he undertook, and it may be truly said that few men exhibit so great a degree of versatility combined with thoroughness as he has. As an operator he established a sending record in 1891 which, Mr. Hudgins states, has never been equalled. He sent 22,487 words of miscellaneous news matter over the *St. Louis Republic* leased wire from New York, I. N. Sharpnack being the receiving operator at St. Louis.

Mr. Hudgins is one of the founders of the Correspondent's Club of New York, and a member of several other organizations of like character.

An Interesting Reminiscence.

Mr. Sidney B. Gifford, for forty years superintendent of the Western Union Telegraph Company at Syracuse, N. Y., who retired from active service ten years ago, sends us the following interesting historical reminiscence:

"I have been much interested in the reminiscences by Messrs. H. H. Ward, W. D. Schram, R. F. Laddon and others, recently published in *TELEGRAPH AND TELEPHONE AGE*, and have been able to recall many names, facts and incidents mentioned. I know from experience that telegraph operators in the early days, as Mr. Ward states, were privileged persons, and favored with free admission to theatres, etc., and free transportation on railroads and steamboats.

"In 1853 the railroad between New York and Buffalo (now the New York Central), built by local companies, was still operated in sections, with separate train conductors for each. I enclose a pass issued October 14, 1853, by Frank H. Palmer, superintendent of the telegraph, and which I used between New York and Syracuse without trouble and without railroad endorsement. It is not probable that formal railroad passes were issued much before this date.

"In 1853 the New York, Albany and Buffalo Telegraph Company tried the experiment of working the line in two divisions for a while, all business passing Utica being relayed at that office. Frank H. Palmer and Otis E. Wood were the superintendents of the eastern and western divisions, respectively."

[The pass referred to by Mr. Gifford is a very common looking affair, compared with the more elaborately designed passes of the present day, and is more suppliant than mandatory. It reads "please pass S. B. Gifford (operator) on telegraph account to Syracuse and back." It is dated "New York, Oct. 14th, 1853."

Mr. Gifford sends us another interesting document, which reads as follows:

"New York, April 4, 1853.

"I do hereby agree to pay Sidney Gifford the sum of five hundred dollars per year payable monthly for his services as operator on the New York and Sandy Hook line of telegraph. Services to commence on the 18th inst.

(Signed.) "D. O. GRIFFIN, Supt."]

AGAINST GOVERNMENT OWNERSHIP.—Mr. F. G. R. Gordon, a labor representative, delivered an address before the National Civic Federation in New York on December 14, 1914, in which he made a strong argument against government ownership of telegraph and telephone lines. "Public-owned telegraphs and telephones," he said, "are everywhere characterized by wretched service, low wages to employes, used by but a small percentage of the population and large annual deficits."

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THE RAILROAD.

MR. G. O. PERKINS, superintendent of telegraph, Chicago Great Western Railroad Company, Chicago, Ill., has been appointed signal engineer of that road, in addition to his present duties, with the title of superintendent of telegraph and signals.

MR. CHARLES SELDEN, superintendent of telegraph, Baltimore and Ohio Railroad, Baltimore, Md., who is spending the winter in Los Angeles, Cal., with his family, expects to return to his office about April 1. Mr. Selden took his family to California on account of Mrs. Selden's health, which, he reports, is steadily improving. He states that "loafing is not what it is cracked up to be," and is anxious to get back into harness.

RAILWAY TELEGRAPH SUPERINTENDENTS.—The minutes of the meeting of the Eastern Division of the Association of Railway Telegraph Superintendents, held in New York, November 11, 1914, have been issued. It makes a pamphlet of fifty-two pages of solid and valuable reading matter.

Electric Automatic Locomotive Control.

A practical test is being made on the Long Island Railroad of the electric automatic system of locomotive control invented by Mr. A. J. Casale, New York, and it is stated the results have been very satisfactory. All of the operating apparatus and the batteries are located on the locomotive, and entirely off the right of way.

The apparatus consists of two contact-making shoes fastened to an iron bar on the forward part of the locomotive, one on each side. The shaft carrying these shoes is insulated from the locomotive frame. There are ten batteries, three solenoid coils and three relays. The first relay is operated in case of a break in the wiring or an obstruction on the track, such as a broken rail or a collapsed bridge. The second relay operates a small whistle in the cab, which warns the engine driver that the block ahead is occupied. The third relay stops the engine by directing a stream of air against one piston, which closes the throttle, thus shutting off the steam, and a second piston closes the emergency brake gradually.

The track apparatus on each block comprises two contact rails and wiring. The apparatus in the cab is manipulated when the shoes touch these rails and when the track is clear. The voltage in the track line is cut down by a forty-ohm resistance across the main rails. The wiring is carried on poles or in conduits. When the shoes first touch the contact rails the first solenoid is energized. This opens the circuit of the first relay, preventing it from stopping the train. When the shoes have mounted the contact rail two contacts on the shoes close. These contacts lead up into the cab to the first relay. If there is no trouble or danger the circuit remains open, as there is insufficient current to operate the relays, due to the resistance. If, on the other hand, the wiring should be broken or the circuit open in any other manner, such as damaged right of way, the circuit of the first relay

is not opened by its solenoid, so that the closed contacts on the shoes complete an electric circuit which operates the first relay, and a valve in the air line is opened, admitting air into cylinders, equipped with the pistons, which close first the throttle and then the emergency brake.

The whistle in the cab is operated when a train is on the next block, because the resistance of the electric circuit is reduced on account of the current passing through the axle of the second locomotive instead of through the resistance.

The third solenoid and relay operate when the two trains are near enough to cut out practically all resistance in the electric circuit. The solenoids are designed to operate at certain voltages—for instance, the first at five volts, the second at ten volts and the third at fifteen volts. The voltage is dependent upon the resistance of the circuit, which grows less as two trains approach each other.

When a train which should stop at a certain station runs by, it can be stopped by the station master, who throws a small switch in his office, thus short circuiting a set of contact rails placed at a certain distance beyond the station.

In the event of a contact switch being open against a locomotive the latter is stopped, because the opening of the switch is short circuited by the contact rails placed at a certain distance in front of it.

This system is said to work well in conjunction with the block system.

Mr. Casale, the inventor, was formerly a telegrapher, and his system seems to have met all of the exacting requirements of practical railway operation. His headquarters are at 140 West Forty-second Street, New York.

Chief Dispatchers as Superintendents.

A correspondent in the *Railway Age Gazette* makes a strong plea for more recognition of chief dispatchers when a division superintendent is to be appointed. The chief dispatcher, the writer states, is the best informed man as to actual operating conditions. "A chief requisite in a superintendent," he continues, "is ability to build up and maintain a good organization. Another is to be able to figure out the every-day operating expenses and analyze the items. Who on the staff would be better qualified to do this than the chief dispatcher? His long association right by the side of the superintendent gives him a training and knowledge to fit him to handle the situation alone. In handling the men and dealing with the demands of the labor organizations, who is better adapted to the task than the chief dispatcher? His long experience along that line has been greater than that of the average man on the road. His experiences as a telegraph operator, agent, clerk and trick dispatcher have given him an inside view of supervision which cannot be obtained from any other source.

"After a man has mastered the telegraphic education and has reached the position of chief dispatcher, and has served in that capacity for five or six years, and sees no chance of advancement, he naturally loses the ambition kindled in him years

before, and concludes very likely to try some other avenue of employment. He may take a small agency on the road, a position as truck dispatcher, or may leave the railroad business entirely. But, in that case, has not the railroad lost many years of valuable experience which could be utilized to good effect? When a chief dispatcher is promoted it inspires the entire rank of telegraphers and clerical force with new energy. The failures made by promoted chief dispatchers are few and far between. All they want is a chance to demonstrate their ability."

MUNICIPAL ELECTRICIANS.

MR. JOHN E. ROGERS, chief operator of the fire-alarm telegraph at Manchester, N. H., has been appointed superintendent of the same service, and Mr. A. W. Tucker has been appointed telegraph operator. Mr. Percy L. Nute, driver of a fire truck, has been attached to the telegraph service.

INDUSTRIAL.

ROEBLING WIRE PLANT DAMAGED BY FIRE.—Fire on the night of January 18 damaged the plant of the John A. Roebling's Sons Company at Trenton, N. J., to the extent of about \$1,500,000. One of the buildings destroyed was the insulated wire mill which had been running day and night. Fifteen houses were also burned.

ELECTRICAL SUPPLY YEAR BOOK.—The Western Electric Company has just issued its electrical supply year book for 1915, which is a volume of 1,216 pages and very fully illustrated. It covers every instrument and appliance used in the electric arts and trades, and each article is briefly described and the price given. The adoption of uniform list prices will enable the trade to determine at a glance approximate costs on any one of the many thousands of articles listed. It simplifies the complicated method of quoting prices and estimating costs. An idea of the number of articles listed may be had from the fact that the alphabetical index covers thirteen pages of two columns each, and the vast amount of collateral information makes the book one of great value for general reference. At the back of the book many valuable formulas, tables, etc., are given, for which every electrical engineer finds frequent use. The volume is substantially bound in cloth, and is one of the most comprehensive of its kind ever produced.

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.

The San Francisco Tournament.

The question of differentiating machine sending from hand sending at the San Francisco telegraph tournament in May is exciting a great deal of interest, and letters received by TELEGRAPH AND TELEPHONE AGE indicate wide differences of opinion in regard to the matter.

In our issue for January 1 letters on the subject were printed from Messrs. W. M. Gibson, the present holder of the Carnegie medal; G. W. Conkling, and C. C. Adams. Mr. Roscoe Johnson, of the United Press, Chicago, writes as follows:

"Machine senders should not be allowed to compete with hand transmitters in any of the classes. My idea is, that to give both sides a square deal, two divisions should be arranged—one exclusively for the machine, and the other for the hand senders. There are enough on each side to go around. When it comes to determining the 'champion,' let the man who has the most points take the 'big cake.'

"To-day, the really fast wires, both long and short, are manipulated by machine senders. Would it be fair to eliminate this majority from the championship? If the machine man isn't given a show for the championship, I'm afraid the tournament will excite but little interest other than among the hand senders. The man who can telegraph the fastest is the real champion."

Mr. Thomas J. Dunn, of New York, inventor of the Dunduplex sending machine, believes that machine senders should be admitted to the competition on the ground that the hand records of ten years ago are not a fair comparison of present-day telegraphers' ability. He claims that just as much skill is required in operating a sending machine as is necessary in manipulating the old Morse key, while the machine sender will show a fifty per cent increase in speed, with a forty per cent decrease in effort.

Mr. E. E. Bruckner, the well-known telegraph expert, Chicago, Ill., writes: "About hand senders versus the wig-wag in the San Francisco tournament, I fail to see the objection raised to this. We compete with each other in practical work, and there should be no distinction made in a tournament, if the latter purports to be practical.

"I agree with Mr. Conkling that if a machine sender should make 'st' for 'v,' or vice versa, he should get an error. The man who sends 'st' for 'v' in press work, although readily interpreted, is not such a man as to inspire confidence in his receivers and would provoke endless breaking in commercial work. Give him an error. The hand senders will expect to get an error for signals of that character. The principal danger in a competition of this sort lies in the possible over-zealousness of some of the judges to encourage Morse sending by means of the wig-wag, and so to do, may award the prize to anyone who makes a perceptible effort to send good signals on the bug."

Those wishing information from the committee having the tournament in charge should address Mr. E. Cox, Postal Telegraph-Cable Company, San Francisco.

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 meant by the specific inductive capacity of dielectric material? (Page 100.)

What is the specific inductive capacity of paraffine, of shellac and of glass?

What dielectric is taken as representing unity inductive capacity?

Upon what does the capacity of a condenser depend, that is, the amount of charge it will hold?

What is the unit of quantity of electricity and what is the unit for capacity of a condenser?

What instrument can be used to compare condenser charges and capacities? (Page 101)

What are the relations between condenser charge and capacity?

How can the capacities of two condensers be compared?

What is the effect upon the dielectric of a condenser of the opposite charges on the condenser plates?

Is there any leakage in a condenser?

Why cannot a condenser hold its charge indefinitely?

What causes the dielectric of a condenser to break down, and what is the result of such a breakdown?

When a condenser is discharged do the particles of the dielectric (except air) at once resume their normal position?

What do we learn from the fact that we get a succession of gradually diminishing clicks on charging or discharging a condenser through a head telephone by tapping the condenser?

In what respect do the two sides of a telephone, or metallic telegraph circuit, resemble a condenser? (Page 102.)

Does condenser action enter into the principle of open wire tests?

If a condenser is connected in series in a direct current circuit, in what manner is the circuit affected?

What action takes place when a condenser is connected in series to the two sides of a short open line?

Does a condenser allow an alternating current to flow through it? (Page 105.)

What is the effect of connecting a condenser in series with a pulsating ringing current? (Page 106.)

What is the CR law as applied to telegraphic and telephonic transmission? (Page 110.)

How are transmission losses determined, and upon what factors do they depend?

What is the effect of inserting inductance on both sides of a condenser? (Page 112.)

Can the speed of an electric current be reduced below that of the normal? (Page 113.)

How great a reduction in speed has been recorded experimentally?

What is the "reflection loss," and what is the cause of it?

Answer the nine questions on page 114.

(To be Continued.)

The Military Pension Bill.

Colonel William Bender Wilson, Holmesburg, Pa., president of the Society of the United States Military Telegraph Corps, in a letter to the members of the society in regard to the status of the bill now before Congress to pension military telegraphers, says:

"It is no longer a question of adequate support but an insurmountable condition which confronts us. There is no doubt about the committee being favorable to the bill nor of its willingness to report it out if conditions are favorable to its consideration on the floor and passage. However, the conditions are not favorable and I fear we must face another disappointment of an early realization of our hopes.

"The financial situation created by the European war has made it necessary for Congress to move with unusual caution in acting on any bills involving the appropriation of money, particularly those not incident to the maintenance of government. Those that do pertain to such maintenance are being pruned down to a minimum consistent with safety and efficiency. The prearranged programme for the legislation to be enacted at the present session has been upset and the conditions prevailing in the country have made it compulsory on the members individually and the committees generally to confine their attention to measures of national moment. It is national necessity, not theoretical economy, that governs the situation.

"Toward the close of the last session it was tentatively agreed to pass at the session a general pension bill in which the military telegraphers pensionable status would be provided for. This purpose has been postponed on account of mentioned conditions. If conditions become normal, I believe that such a bill will be passed perhaps in the first session of the next Congress recently elected. If our present bill was favorably reported out now and given a place on the calendar there would be no opportunity for calling it up for action except by unanimous consent, which it is impossible to obtain.

"While I am disappointed I am not discouraged. I have already arranged with Mr. Keating, of Colorado, to look after our interests in the next House. He is heartily and enthusiastically sympathetic and will make our cause his own. 'It is a long way to Tipperary,' but we'll get there."

Every progressive telegrapher reads TELEGRAPH AND TELEPHONE AGE, because it is indispensable to him. Subscription price, \$2.00 per year.

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NO SUCH THOROUGH TREATMENT of the subject of the telegraph, clearly explaining the equipment of a modern telegraph office, has ever before been accomplished.

IN ADDITION TO A VAST AMOUNT of other material, it contains the most valuable part of the matter appertaining to electricity, storage batteries, the duplex, the quadruplex, Wheatstone system, the principal types of repeaters and other telegraph apparatus that Mr. Jones has written during his fifteen years' identification with this Journal.

THIS WORK COVERS the entire field of a practical telegraph course, and the subjects are treated with a conviction and simplicity wholly free from entangling technicalities, such as to render the volume highly instructive, of delight and absorbing interest.

A STRONG AND VALUABLE FEATURE of the book lies in the diagrams, clearly drawn and of large size, which show the apparatus of the systems of both the WESTERN UNION TELEGRAPH COMPANY and of the POSTAL TELEGRAPH-CABLE COMPANY brought up to date. Each apparatus described, in addition to the theoretical illustration, are accompanied by a diagram of an "actual binding post connection," taken from the blue print, something that all linemen especially will thoroughly appreciate.

THE TELEPHONE AND SIMULTANEOUS TELEPHONY AND TELEGRAPHY, the Telautograph, the Selector, the Ticker Service, the Time Service, and, in fact, every telegraph apparatus and system, are explained in a particularly clear manner—just the thing for those possessing no knowledge whatever of the subjects.

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Annual Meeting of Gold and Stock Life Insurance Association.

The thirty-seventh annual meeting of the Gold and Stock Life Insurance Association was held at 16 Dey street, New York, January 18.

In his annual report President Gardner Irving stated that the year 1914 was one of the most eventful in the history of the Association. "Not since the year 1883, when the membership was comparatively small," he said, "has the percentage of deaths been so large, and not since 1887 has the number admitted to membership been so great as during the year just passed.

"While we have reason to be proud of our record of over \$176,000 paid to beneficiaries," Mr. Irving continued, "we must not let that achievement obliterate the responsibility that lies before us, but rather let it be an inspiration for the accomplishment of greater good."

Mr. Irving expressed the thanks of the association to the collectors and friends for their efforts which resulted in the large increase in membership; and spoke feelingly of the retirement of Mr. W. J. Dealy as secretary of the association. "For the first time in many years," he said, "we are meeting here to-night without the active personal co-operation of a man who has, for thirty years, or more, been the bone and sinew of the Gold and Stock Life Insurance Association, who gave it life when it was in sore distress, who nursed it carefully that it might fulfill its mission and who was entering in his efforts to do good to his fellows. I refer to a man whose name we revere, Mr. W. J. Dealy, our former secretary, who, because of ill-health, wishes to relinquish further official activities. God bless him."

The amendment to increase the dues of certain classes of the membership as a means of strengthening the association was adopted.

The report of Mr. H. W. Dealy, acting secretary, showed that 188 new members had been admitted during the year. After making deductions on account of deaths, etc., the total membership at date is 1,296. Twenty-eight members died during the year.

The report of the treasurer, Mr. Lewis Dresdner, showed the following results:

Balance on hand, December 31, 1913...\$18,002.29
Receipts during 1914..... 9,280.51

\$27,282.80

Disbursements, including death claims... 11,432.38

Balance\$15,850.42

The following officers were elected: Gardner Irving, president; C. Shirley, vice-president; H. W. Dealy, secretary; Lewis Dresdner, treasurer

Executive committee: M. M. Giffen, H. S. Smith, A. J. Driver, T. A. McCammon, H. M. Heffner, Auditor, M. J. O'Leary.

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Serial Building Loan and Savings Institution.

The annual report of the Serial Building Loan and Savings Institution shows that the resources of this institution have reached a total of \$876,000, being an increase for the year 1914 of \$144,000.

The sixtieth semi-annual statement of the Association for the period ended December 31, 1914, shows the following results:

ASSETS.

Cash in bank.....	\$ 31,047.26
Mortgages	804,982.81
Loan on shares.....	10,714.28
Real estate	13,301.84
Land contracts	11,213.93
Advances	4,820.18
Furniture	400.00
	\$876,480.30

LIABILITIES.

Members installments	\$173,549.56
Members savings	267,212.22
Income certificates	304,012.87
Juvenile savings	1,398.44
Due on loans	27,110.00
Borrowed money	10,000.00
Due on mortgages.....	31,700.00
Undivided earnings.....	37,662.08
Payments on loan account.....	23,835.13
	\$876,480.30

The following officers were elected: President, A. G. Saylor; vice-president, Thos. M. Brennan; secretary, E. F. Howell. Directors: A. G. Saylor, Thos. M. Brennan, G. W. Blanchard, Wm. J. Quinn, C. A. Kilfoyle, James F. McGuire, A. O. Wallis, Thos. E. Fleming, H. A. Konninger, M. J. O'Leary, Wm. B. Dunn, M. J. Kenna, F. D. Giles, Chas. G. Ross, Edwin F. Howell.

This financial organization of the telegraphers of New York has now been in operation for thirty years, and has always been in the front rank of these peoples' mortgage banks. The savings deposited with it are all invested in first mortgages, which are the safest of all securities. The Serial makes a specialty of small mortgages on homes, and many telegraphers in New York are living in their own homes, which they never could have done but for the assistance rendered to them by this society.

The association is incorporated under the banking laws of New York, and is supervised by the superintendent of banks.

WAR OPERATIONS BY TELEGRAPH.—For three days the operations of the British army in Flanders were directed by telegraph from the home of Sir John French, near Hyde Park, London, during the General's recent visit there.

LARGEST WEEKLY ISSUE OF PATENTS.—The largest number of patents issued in one week by the United States Patent Office was 971, on December 29, 1914.

OBITUARY.

EDWARD C. KEELER, previous to 1883 identified with the Western Union operating department in New York, and who went to Oregon in that year, where he became well known as an efficient telegrapher, died at San Diego, Cal., on January 10. Mr. Keeler for the past three years had been engaged in outside business in that city.

Bound and Unbound Volumes of Telegraph and Telephone Age for the Years 1913 and 1914 For Sale.

Bound volumes of TELEGRAPH AND TELEPHONE AGE for 1914 can now be had at \$3.50 per copy, sent by express, charges collect. Unbound copies for the entire year 1914 can also be had at a cost of \$2.00, carrying charges prepaid. This affords an opportunity to secure a complete record of telegraphic and telephonic events for the year, besides descriptions of new inventions, articles by well-known writers and other matter of general interest to the telegraph and telephone worlds.

Bound volumes, price \$3.50, and unbound volumes, price \$2.00, for the year 1913 are also in stock and for sale.

Address and remit to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MORSE RECORDS.—There seems to be quite a demand for the Morse double records for talking machines. These fine specimens of perfect Morse are used in many offices as examples for young operators to imitate. Some of these records show how to send messages correctly, and the quality of the Morse, together with the punctuation and the method of transmitting messages, make the disks worth many times the price charged for them. These double records can fit any make of talking machine. They can be obtained from TELEGRAPH AND TELEPHONE AGE at \$1.00 each.

Mr. D. B. Van Every, manager of the Los Angeles District Telegraph Company, Los Angeles, Cal., writes: "I would dislike very much to miss a single copy of TELEGRAPH AND TELEPHONE AGE and I thank you for keeping me in good standing."

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.

THE ELECTRICAL AID SOCIETY of Philadelphia held its regular meeting on Friday evening, January 15. The following officers were re-elected: 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: E. T. Aitken, A. S. Weir, John A. Chapman, F. E. Maize; trustees, G. J. Wells, Thomas Fee, R. H. Conway. Extensive changes and amendments were made to the constitution and by-laws of the society. The reports for the past year showed that the society is in a sound condition, notwithstanding the fact that over \$6,400 were paid out in benefits during the past year.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 586. to meet the claims arising from the deaths of Mary A. Hanson, at Chicago, Ill.; J. J. Fowler, at New Orleans, La.; J. T. Ford, at Salt Lake City, Utah; D. E. Mason, at Montpelier, Vt.; Nettie B. Smith, at Atlanta, Ga.; T. Discon, at New Orleans, La.; A. S. Adams, at Washington, D. C.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

Mr. Frank J. Connolly, loop chief, nights, has resigned.

PHILADELPHIA POSTAL.

Mr. E. Reynolds, vice-president and general manager, was a recent visitor at this office.

The sympathy of the entire office was extended to chief operator E. W. Miller on the recent death of his baby son, Richard, January 18.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

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M. J. O'LEARY, Sec'y, P. O. Box 610, NEW YORK.

Telegraph and Telephone Age

No. 4.

NEW YORK, FEBRUARY 16, 1915.

Thirty-third Year.

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SOME POINTS ON ELECTRICITY.

Effects of Heat on Resistance.

In this department, in the February 1 issue, it was pointed out that the resistance of a wire remained constant so long as its temperature is maintained unchanged. In practice, however, it is not possible nor essential to keep wires out of doors or instrument coils at a constant temperature; the electric current itself generates heat, and the variations in atmospheric temperature are beyond our control. Their effects, however, can be accurately measured in the laboratory and allowed for in practice when necessary.

Heat affects the resistance of all conducting substances, but not all in the same degree. The general rule is that increase of heat increases the resistance of metals and decreases that of carbon and liquids, and vice versa, decrease of heat decreases resistance in metals and increases resistance in carbon and liquids.

With simple metals, such as silver, copper or iron, the increase of temperature is approximately uniform at about 0.4 per cent for every rise of one degree centigrade, while with alloys it varies widely. The resistance of German silver increases only about 0.04 per cent, and that of platinum 0.02 for each degree. German silver and platinum are employed in making standard resistance coils, used in making measurements. The slight variation in their temperature, due to the heating effects of the current, is not sufficient to introduce serious error in the results.

The percentage of increase in resistance in some of the metals mostly employed in telegraph and telephone construction between 0° and a 70° Fahrenheit, according to one authority, is as follows: Iron, 8 per cent; copper, 6.1 per cent, and platinum, 6 per cent. The difference in the measured resistance of an iron line wire may vary as much as 13 per cent between the extremes of summer and winter temperatures in the northern portions of the United States.

The fact that wires work perceptibly better in cold weather than in warm is due to the decrease in resistance.

It is logical to assume that if resistance decreases with decrease in temperature there must be a degree of temperature where resistance will disappear and the material become a perfect conductor. Laboratory experiments tend to show that this is the case, and that the corresponding temperature would be what scientists call "the absolute zero of temperature," i. e., (-273° centigrade).

The resistance of batteries is affected by changes in temperature, and the sulphate of copper cell is most affected in this way. The resistance of a cell of battery increases with decrease in temperature, and decreases as the temperature increases. An experiment showed that when the temperature of a Daniell cell was raised from freezing to the boiling point of water the resistance of the cell decreased from 2.12 to 0.66 ohms.

In telegraphy and telephony it is desirable to transform as much of the original current into useful work as possible, and as little into heat, but in other electrical applications the reverse is the desideratum, that is, to get as much heat as possible out of the current. Examples of the latter are found in electric heaters, electric flat-irons, welding machines, etc. In devices of this kind all of the heating effects are concentrated in a small area and no other work is required to be performed. Heat is produced in these by the insertion of high resistance in the circuit at the point where the heat is required, and the greater the heat desired the greater must be the current.

In electric heating devices the resisting material is usually made up of spiral coils of high resistance wire, while in electric welding machines the resistance is highly concentrated, that is, it must be of very short length. The current must be sufficient to overcome the resistance, and in doing this great heat is developed. Heat created in this way is very intense, and very few materials are able to withstand the effects of such high temperature.

The formula for ascertaining the amount of heat in watts that can be developed by a given current is to multiply the square of the current by the resistance of the circuit. It follows from this that the greater the resistance the greater will be the heat.

Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on February 10:

American Telephone and Telegraph Co.	120 5/8
Mackay Companies	70
Mackay Companies, preferred	67
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2 1/2
Western Union Telegraph Co.	63 3/8

Telegraph and Telephone Patents.

ISSUED JANUARY 19.

1,125,487. Combined Railway Electric-Traction, Telegraph and Signal System. To A. V. T. Day, New York.

1,125,489. Electromagnet Structure. To W. W. Dean, Elyria, Ohio.

1,125,490. Electrical Signaling. To W. W. Dean, Elyria, Ohio.

1,125,491. Protective Device. To W. W. Dean, Elyria, Ohio.

1,125,492. Signaling Device for Polystation Circuits. To W. W. Dean, Elyria, Ohio.

1,125,493; 1,125,494; 1,125,495. Harmonic Signaling Device for Telephone Systems. To W. W. Dean, Elyria, Ohio.

1,125,496. Wireless-Telephone Transmitting System. To L. De Forest, New York.

1,125,579. Telephone-Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,125,614. Telephone Attachment. To J. Whitaker, Philadelphia, Pa.

1,125,764. Telephone Transmitter. To C. C. Terhune, Platte, S. D.

1,125,823. Telephone. F. Q. Dutton, Philadelphia, Pa.

1,125,832. Telephone Repeater System. To J. W. Fry, Seattle, Wash.

ISSUED JANUARY 26.

1,125,947. Indicator for Party-Line Telephones. To E. Bowman, Elmwood, Ont., Canada.

1,125,954. Telephone-Exchange System. To S. H. Browne, Pittsburgh, Pa.

1,126,046. Telephone System. To F. R. McBerty, New Rochelle, N. Y.

1,126,047. Telephone Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,126,048. Telephone Switching Apparatus. To F. R. McBerty, New Rochelle, N. Y.

1,126,173. Telephone-Exchange System. To J. L. Wright, Cleveland, Ohio.

1,126,339. Printing Telegraph System and Alphabet. To C. G. Ashley and J. B. Crippen, Chicago, Ill.

1,126,641. Method of Electric Signaling. To C. Kinsley, Chicago, Ill.

1,126,642. System of Telegraphic Communication. To C. Kinsley, Chicago, Ill.

A manager recently telegraphed to his superintendent as follows: "I cannot afford to have appendicitis, but I have got it just the same. Am off to the hospital to be operated on."

PERSONAL.

CAPTAIN SAMUEL H. BECKWITH, of Utica, N. Y., who was General Grant's cipher operator during the Civil War, has been admitted to the soldiers' home at Hampton Roads, Va. He has been in ill health and receiving hospital treatment lately.

MR. F. ONO, electrical engineer, department of communications, Tokyo, Japan, who has been in the United States for some time studying the telegraph and telephone services, sailed from New York for England February 13. He recently made visits to Boston and Washington.

MR. W. H. FLANN has been appointed superintendent of telegraph for the New York Transit Company, Northern Pipe Line Company, The Buckeye Pipe Line Company, and Indiana Pipe Line Company, formerly subsidiaries of the Standard Oil Company. Mr. Flann succeeds F. G. Boyer, whose death was announced in our January 1, issue. His headquarters are at Oil City, Pa.

MR. THOMAS A. EDISON was the guest of honor at the annual banquet of the Edison Club in Orange, N. J., on January 30. The programme included the following toast: "If Mr. Edison were a king we could not invest the words 'his majesty' with half the reverence we put into that homely phrase 'the old man.' Although he is younger than any of us, his achievements seem to make him centuries old and we call him 'the old man' because he is too big to be called Mr. Edison. Unconscious of his own gigantic mental stature, he stands forth above all men of all times, an intellectual giant, making pigmies of us all. Here's to the youngest old man, the squarest, the most patient and forgiving, the bravest and gamest of all."

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. E. REYNOLDS, vice-president and general manager, who is on a trip of inspection through the south and southwest, was met in Louisville, Ky., by Mr. H. A. Tuttle, president of the North American Telegraph Company, Minneapolis, Minn., on January 25. Mr. Tuttle returned to Minneapolis directly after the meeting. Mr. Reynolds is accompanied by the various superintendents within the limits of their respective districts, and has so far met Messrs. A. B. Richards, Kansas City, Mo.; W. C. Daviet, Louisville, Ky., and F. W. Sprong, Cleveland, Ohio.

MR. CHARLES C. ADAMS, vice-president, spent some time this month in Washington, D. C., and Chicago, Ill., on company business.

MR. J. F. SKIRROW, associate electrical engineer, New York, spent two days recently visiting Philadelphia, Baltimore and Washington on company business.

MR. A. K. AKERS, manager of the Asheville, N. C., office has been transferred to the managership of the Richmond, Va., office, and Mr. V. H. Borst, former manager at Richmond, has been assigned to the Asheville managership.

THE LONG BRANCH, N. J., office of the company will move to the Seiler Building on Third Avenue about April 1. Mr. J. R. Sutton is manager.

MR. D. G. McINTOSH, manager of the North American Telegraph Company at Minneapolis, Minn., is in Miami, Fla., and Nassau, Bahamas, enjoying a vacation.

MANAGERS have recently been appointed as follows: D. F. Moss, Portsmouth, Ohio; Miss F. E. Brundage, Norwalk, Conn.; A. M. Whitehurst, Greenville, N. C.; Miss H. F. Eason, Henderson, N. C.

THE RECENT STORMS in the west caused much damage to the lines of this company along the shores of Lake Erie, from Erie, Pa., to Toledo, Ohio, and around Milwaukee, Wis., the loss was especially severe.

TELEGRAPH AND TELEPHONE ACCOUNTING.—The School of Commerce, Accounts and Finance of the University of Denver is giving a course in public-service accounting, and lectures are being given by the auditors of the various public-service corporations and other large concerns, including the Postal Telegraph-Cable Company and the Mountain States Telephone and Telegraph Company. Mr. W. C. Black, superintendent of the Postal Telegraph-Cable Company lectured on telegraph accounting, on the evening of January 26, and on February 15 Mr. Roderick Reid, general auditor of the Mountain States Telephone and Telegraph Company, Denver, will lecture on telephone accounting.

JOHN H. HOYT, aged sixty-five years, manager at Norwalk, Conn., died in that city January 23.

Western Union Telegraph Company. EXECUTIVE OFFICES.

PRESIDENT NEWCOMB CARLTON, together with the executive officials, who is making an extended trip of inspection through the western and southern divisions, visited Jacksonville, St. Augustine, Savannah and Charleston, and will reach New York on or before February 20.

MR. B. BROOKS, vice-president of the company, left New York on February 7 and joined President Carlton's party at Memphis, Tenn. Mr. Brooks will accompany the other executive officials on the remainder of the inspection trip through the south.

MR. W. H. BAKER, secretary, has returned from a trip to Florida, where he spent ten days in enjoying freedom from office cares.

MR. ASHTON G. SAYLOR, general manager of the Eastern Division, has returned to his office after a business trip through Pennsylvania and Maryland.

MR. S. M. ENGLISH, general manager, Gulf Division, Dallas, Tex., has been re-elected president of the Henry Exall Memorial Society, which is actively instrumental in the development of the material interests of the State.

COL. R. C. CLOWRY, former president of the Western Union Telegraph Company, will leave New York on February 17 for a month's stay at Jekyll Island, Ga.

MR. W. L. JACOBY, vice-president of the American District Telegraph Company, New York, is again at his office after an extensive business trip through the western and southern states.

MR. JOHN A. PFERD, manager of the Western

Union Telegraph Company at Buffalo, N. Y., has retired from further service. He is fifty-four years of age and has been in the service forty-one years. For some time Mr. Pferd has been anxious to retire, but because of his qualifications the company objected. Of late his outside interests have demanded so much time that he renewed his request to be relieved from active charge, and with the appointment of Mr. Allan Woodle as superintendent of the new seventh district, Mr. Pferd's request was granted. He will, however, remain with the company in an advisory capacity.

MESSRS. W. P. DAVIS, division traffic supervisor, Dallas, Tex., and George T. Olmstead, captain of the cable steamer "Western Union," New York, have been retired and placed on the pension list.

MR. W. G. PEEBLES, manager at Atlanta, Ga., recently lectured before the commercial class of the Georgia Technical School, his subject being "The Story of the Telegraph."

MR. J. L. BRADY, cashier in the office of district commercial superintendent W. A. Sawyer, New York, has been transferred to Buffalo, N. Y., as chief clerk to district commercial superintendent A. Woodle. Mr. Brady is succeeded by Mr. G. W. Blanchard.

MR. E. PARSONS, district plant superintendent, Cleveland, Ohio, has been appointed division valuation engineer, with headquarters at Chicago.

MR. R. O. CROWLEY, of the office of general manager H. C. Worthen, Atlanta, Ga., has been retired on pension. Mr. Crowley is well known in New York, having been identified with the executive offices in this city for many years.

MR. P. HARMON, chief operator of the Knoxville, Tenn., office, has been transferred to Tampa, Fla., to occupy a similar position at that point.

MR. S. D. BARGER, formerly and for many years night traffic chief of the Postal Telegraph-Cable Company at Chicago, is now manager of the Western Union branch office at 169 North Los Angeles Street, Los Angeles, Cal.

THE OFFICES at Cedar Rapids, Des Moines and Davenport, Iowa, will soon be moved to more commodious and up-to-date quarters.

WESTERN UNION EXHIBIT AT PANAMA EXPOSITION.—The Western Union Telegraph Company will have an exhibition booth at the Panama-Pacific International Exposition in San Francisco, and numerous offices on the grounds for commercial purposes. The booth will contain quadruplex and duplex apparatus, Barclay printers and probably Morkrum printers, both for operating and exhibition purposes. The new multiplex apparatus will also be exhibited. A large column showing international time will be displayed by the Self-Winding Clock Company, also some cable apparatus.

BRANCH OFFICE ROBBER.—A man entered the Western Union branch office at 3115 West Madison Street, Chicago, recently and at the point of a revolver, ordered the operator, Miss Edith Picchiotti, to hold up her hands. He then robbed the cash register of \$6.50.

THE CABLE.

MR. HENRY F. HARRINGTON, superintendent of the Commercial Pacific Cable Company's cable station at Guam, Ladrone Islands, will leave that place the end of February for six months' vacation. Mr. Harrington has been stationed at Guam during the last seven years. Before that he was in charge of the operation of the Commercial Pacific Cable at San Francisco. Mr. P. McKenna, who succeeded Mr. Harrington at San Francisco, will take charge of the station at Guam.

NEW JAPANESE CABLE.—It is proposed to lay a new submarine cable between Nagasaki, Japan, and Tamsui, Formosa.

Cable Laying and Testing.

Captain B. O. Lenoir, Signal Corps, U. S. A., made an address before the officers and employees of the Puget Sound Traction, Light and Power Company, Seattle, Wash., on October 28, 1914, on the subject of "Submarine Cables." The lecture was largely of an historical character, and traced cable telegraphy from 1813 up to the present time. The present practice of laying and testing cables for faults was also described, and testing formulas given.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to February 10 as follows:

Azores and Eniden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6; Mole St. Nicholas-Port au Prince, December 4; Sitka-Juneau, February 5.

CANADIAN NOTES.

NELSON MCRAE, aged seventy-six years, a merchant in Wyebridge, Ont., and a former telegrapher, died in that place on January 20. He was manager of the office of the Montreal Telegraph in 1872, and later of the Great North Western Telegraph Company's office.

AN ELECTRICAL CLASS of the Great North Western employees in Toronto is holding interesting meetings for the upbuilding of the technical service.

THE CHIEF OPERATORS at Montreal of the Great North Western Company hold monthly meetings for the exchange of ideas and suggestions among themselves and with the chiefs in the Toronto office.

A HOCKEY MATCH is being arranged at Ottawa, Ont., between the managers and clerks on one side against the chief operators and operators of the Great North Western Company. This is an annual event and much interest is taken in it.

FREE WAR MESSAGES IN CANADA.—By an arrangement with the militia department, the Canadian Pacific Railway's Telegraph will handle, free of charge, messages from the War Office or the

Canadian High Commissioner's office in connection with casualties among the Canadian expeditionary forces. Notices of such casualties to next of kin in Canada will also be handled free, while relatives will be allowed to send free to the department three messages asking information regarding wounded soldiers. A week-end service has also been arranged for between relatives and soldiers, sailors and nurses in Great Britain at the rate of five cents per word applied to Ontario, Quebec and New Brunswick, nine cents per word to Manitoba and eleven cents to Alberta and Saskatchewan.

Great North Western London, Ont., Office.

On December 16, 1914, the new Great North Western Telegraph Company's office at London was opened for business. The electrical equipment of this office is the latest in every respect. A seventy-five-wire slate spring-jack board is mounted in an all-steel switch frame, the table terminals being brought to jacks placed in a slate panel, which lays at a 30-degree angle immediately below the main line switch, a double-ended cord being used. In one end of the switch is located a large slate switch panel for controlling the main and local storage batteries, three banks of type D3 cells being used for main line purposes. The office is normally operated direct with direct-current power furnished by the London Electric Company, the storage battery being used as a reserve in case of failure. New style steel operating tables and chairs, together with the latest instruments, are used, giving London the best electrically equipped office in the company's system. The work was done under the supervision of chief electrician H. K. Clark, who handled it exceptionally well. Mr. D. Adams is manager, and R. J. Foster, chief operator, of the London office.

THE TELEPHONE.

MR. J. J. CARTY, chief engineer of the American Telephone and Telegraph Company, New York, is the candidate for nomination for president of the American Institute of Electrical Engineers.

THE INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA held its annual convention at Minneapolis, Minn., January 19, 20 and 21. The following officers were elected: president, E. B. Fisher, Grand Rapids, Mich. (re-election); vice-presidents, E. D. Schade, Johnstown, Pa., and W. H. Bryant, Mobile, Ala.; secretary-treasurer, W. S. Vivian, 19 South La Salle Street, Chicago.

TELEPHONE RATES IN CALGARY.—In 1908 the telephone system of Calgary, Canada, was taken over by the government. The result, says *Concerning Municipal Ownership*, is that the rates are from thirty-seven per cent to 140 per cent higher than were the rates of the private company. The business rate is now \$48 or \$51 yearly, according to the kind of equipment, while the same service under private ownership was rendered at \$35 and \$48. When the government first operated the system, rates for residences were reduced five dollars per annum, but the old Bell rates of \$25 and \$27

have now been resumed, and instead of \$20 for each trunk line for a private branch exchange, the government now asks \$48.

Review of Principal Articles in Contemporary Telephone Publications.

THE MAUI (HAWAII) TELEPHONE SYSTEM is described and illustrated in the *Western Electric News* for February. Mr. E. R. Murray, the author of the article, states that there are three exchanges on the island, in three different towns, the central offices being fifteen miles apart. All of the operators are male natives. The telephone system of the Panama-Pacific Exposition at San Francisco is also described and illustrated in the February number of the same paper.

PLATINUM.—Mr. F. G. Austin is the author of a short article in the February *Western Electric News*, in which he tells where this metal comes from and how it is used in the manufacture of telephone apparatus. The properties of the metal are described. Platinum is infusible in the hottest blast furnaces, but it will fuse at a temperature of 3191° Fahrenheit. It is almost as soft as copper and ductile as gold, and can be drawn into wire 6/100,000 of an inch in diameter.

Telephony for January 30 prints a symposium of the views of telephone men in various parts of the country regarding the outlook for the year 1915. The belief seems to be general that the business has passed the lowest point and is on the upward course.

THE EDISON FIRE.—The telephone situation at the Edison fire, on the night of December 9, is described in the January number of *The Telephone Review* (New York). The operators at the Edison switchboard and in the Orange central office are highly commended for their coolness in handling the situation. Mr. Edison, in a letter to president U. N. Bethell, of the New York Telephone Company, expressed his appreciation of the promptness and efficiency shown by the telephone forces in restoring service.

TELEPHONE INCIDENTS OF THE WAR are described and illustrated in *The Telephone Review* for January. The article emphasizes the value of the telephone in conducting operations at the front, and is illustrated with views showing the uses of the instruments.

New Book on the Telephone.

DRAKE'S TELEPHONE HANDBOOK. By David Penn Moreton, Chicago; Frederick J. Drake & Co. 286 pages; 161 illustrations. Size 4½ x 6¾ inches. Price, \$1.00.

The author of this book, who is associate professor of electrical engineering, Armour Institute of Technology, Chicago, has endeavored to cover the telephone field in this volume in such a way that the book will be of value to all interested in the various

phases of the telephone industry and the numerous applications of the telephone. It is essentially a book for the practical man, and is therefore devoid of the higher mathematics.

The text matter is very clearly written, and the use of analogies is made to aid in an easier comprehension of abstruse scientific points.

The illustrations, especially those of intricate circuits, are satisfactorily clear and the reader or student should have no difficulty in tracing them.

The first four chapters of the book are of the usual fundamental character, dealing with circuits, units, magnetism, electromagnetism, batteries, etc., and the remaining five chapters treat of the practical side of telephony, including magneto telephones and systems, common battery systems, construction of lines, troubles and how to find and remedy them, etc. It is such a book that every practical telephone man will find useful and desirable to have handy—in his pocket or on his desk—for ready reference.

This book is for sale by TELEGRAPH AND TELEPHONE AGE, at \$1.00 per copy.

RADIO-TELEGRAPHY.

MR. E. B. PILLSBURY, general superintendent of the Marconi Wireless Telegraph Company of America, New York, has come into possession of an interesting collection of old telegraph forms, both domestic and foreign, dating back to 1850, and including many telegraphic souvenirs, one of which shows the signal "73" to have been in use as far back as 1854. The collection is in scrap-book form, and was made by the late Charles E. Bliss, a brilliant operator, who was, for many years, Western Union manager at Bangor, Me., and afterwards appointed postmaster there by President Cleveland.

MR. C. H. TAYLOR, engineer of the Transoceanic division of the Marconi Wireless Telegraph Company of America, who has been in England for two months, sailed from Liverpool for New York February 13.

WIRELESS STATION BURNED.—The Marconi station erected for the United Fruit Company at New Orleans, La., was destroyed by fire on December 19, 1914. This was a 50-kw. station and designed to operate with a similar station at Swan Island. The station is now being rebuilt and will be ready for operation in about thirty days.

A CLEVER WIRELESS OPERATOR.—Through the ingenuity of the wireless operator on the steamer "Hanalei," which was wrecked near San Francisco in a recent storm, many of the lives of those on board were saved. After the radio equipment became disabled he, lashed to the mast, signaled to the life savers on shore by means of an electric light at the masthead, and in this way directed their operations with the life lines. In the darkness he kept the rescuers informed as to how the lines were falling and his signals enabled them to fire the mortar with greater accuracy.

MARCONI MESSENGER UNIFORM.—The first uniformed messenger of the Marconi Wireless Telegraph Company has appeared in the financial district

of New York, in an attractive gray suit with crimson trimmings and brass buttons. The name "Marconi" is lettered in red on the standing collar, which also carries gold plated emblems representing electric waves. The cap is of the yachting style, lettered in red, and the boy carries a red leather pouch for messages, the Marconi colors being red and white.

WIRELESS IN AN HEROIC SEA RESCUE.—The steamer "Philadelphia," which arrived at New York February 9 from Liverpool, rescued the captain and crew of thirty-two men of the tank steamer "Chester," found in distress in mid-ocean, improvised wireless playing an important part of the work. When the "Chester" was sighted, Captain Mills, who was on the bridge of the "Philadelphia," telephoned to Mr. Jones, the wireless operator, to get in communication with the stranger, but as no reply was received, the captain called Mr. Jones to the bridge. There the operator discovered that the other vessel, which had lost her wireless equipment, was signaling with lamps, using the Morse code. Lamps were brought to the bridge of the "Philadelphia" and communication established, when it was learned that the other vessel, which proved to be the "Chester," was sinking. Two volunteer crews from the "Philadelphia" rescued the men on the "Chester" in a very stormy and dangerous sea, and the latter steamer was set on fire and left to her fate. Had it not been for the resourcefulness of the operators on the two steamers there is no doubt that all on board of the "Chester" would have perished.

Wireless Telephony Across the Atlantic.

Dr. M. I. Pupin, of Columbia University, New York, is working on the problem of wireless telephony, and believes that it will be possible to converse over practically any distance. Dr. Pupin is the inventor of the "loading coil" which made long-distance telephony possible.

Mr. Peter Cooper Hewitt, who is also conducting experiments in wireless telephony, predicts that it will soon be possible to talk across the Atlantic by telephone. He said that his experiments have proved that articulation obtained through the use of his vacuum tube oscillator was even more perfect than that obtained over ordinary telephone wires.

Institute of Radio Engineers.

The Institute of Radio Engineers held its regular meeting at Columbia University, New York, on February 3.

Mr. John Stone Stone delivered a presidential address and a paper on "The Effect of the Spark on the Oscillations of an Electrical Circuit." The paper described the theory of oscillating circuits having sources of both linear and logarithmic decrements within themselves. Among those who discussed the paper was Professor Zenneck, of Germany.

The reading of the paper on "Wooden Lattice Masts," by Cyril F. Elwell, chief engineer of the Universal Radio Syndicate (Poulsen System), of England, which was postponed at the previous meeting of the Institute, followed Mr. Stone's paper.

Mr. Elwell's paper gave in detail the design, construction and guying of lattice masts.

The board of direction for 1915 is constituted as follows: president, John Stone Stone; vice-president, George W. Pierce; treasurer, Warren F. Hubley; secretary, David Sarnoff; editor of publications, Alfred N. Goldsmith.

Marconi Honolulu Office.

The accompanying illustration shows the Honolulu office of the Marconi Wireless Telegraph Company of America, which is located in Fort Street, the principal business street of the city, in the building of the Hawaiian Trust Company. The interior



MARCONI HONOLULU OFFICE

presents an attractive appearance, being finished and furnished in oak. Mr. W. P. S. Hawk, formerly superintendent of the Postal Telegraph-Cable Company at Chicago, is the local manager, and he has an efficient staff. The messenger force is uniformed in khaki, with red facings. The office was opened on September 24, 1914, and the traffic is stated to be growing rapidly in popularity and volume.

Naval Wireless Work.

In his annual report Secretary Daniels, of the United States Navy, dwells upon several interesting phases of wireless telegraphy. He states that the navy department has opened twenty-five stations to commercial business and that every ship of the navy is herself a commercial station, as all private messages handled are paid for by the senders. He points out that 300 jewelers throughout the country have installed wireless apparatus in order to receive the time signals sent out from the Arlington station, near Washington, and that the number may be expected to grow to 3,000, according to information received.

Referring to the radio compass now under construction at the Fire Island station, near New York Harbor, he says: "This device is intended to send out radio signals of such a character that a vessel in a fog may get a close approximation of her bearing, or compass direction, from the station."

By means of observations taken five or ten miles apart it should be possible for the vessel to determine her actual position with fair accuracy. This is the first installation of this type to be made in this country; but a second installation of different type, though answering the same purpose, is projected for the station at Cape Cod. The signals sent out by the radio compass at Fire Island will necessarily be limited as to range, but the Cape Cod installation will allow of a ship calling the station in the usual manner from any distance within the ship's ordinary range and receiving a definite reply as to her bearing from the station. In the case of Fire Island the ship will determine her bearing from the character of the signals continuously emitted; for Cape Cod the station determines the bearing of the ship from her calling signal and sends the information back. If these installations prove as successful as anticipated, the radio operators of ships will become an important part of the navigating force.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

"MARCONI'S ACHIEVEMENT" is the title of an extremely interesting article, by Ray Stannard Baker, published in the February number of *The Wireless Age*, New York. It is an account of Mr. Marconi's success in signaling by wireless across the Atlantic Ocean, and is authoritative, having been obtained from the inventor himself. The story goes into considerable detail and is accompanied by several illustrations. The illustration of the Cape Cod station suggests a forest, so numerous are the masts. An "inside" story describing the events of the ten days leading up to the dispatching of the first message will appear in the March issue of the same journal.

EXTRA FIRST-GRADE OPERATORS.—The Secretary of Commerce of the United States has issued ten commercial extra first-grade wireless operators' licenses as a mark of recognition for experience, knowledge and skill in radio work. *The Wireless Age* for February points out that six of these operators are in the employ of the Marconi Company, while two received their training under its direction. A short account of the careers of the successful men is given, and photographs of four of them are shown. Mr. E. K. Oxner, one of the operators, states that he believes that there is a considerable number of operators who could obtain first-grade licenses if they were willing to take the examination.

JAMMING.—In a note in *The Wireless Age* Commander F. G. Loring, of the British Navy, points out that attempts to interrupt wireless communication by "jamming" are seldom successful. It is

very difficult, if not impossible, he states, to "jam" a well-organized wireless service. If the enemy attempts interference he must put his own wireless communication completely out of action for the time being, with no certainty of seriously interfering with his opponent's signals.

POWERFUL ARMY PORTABLE STATION.—A powerful wireless outfit which will send messages up to 800 miles under favorable conditions and receive almost any distance has been completed at the Signal Corps laboratory at Washington, D. C. A complete description of this notable outfit is given in the February *Wireless Age*, together with illustrations of the equipment.

MR. WILLIAM W. WARD, manager of the operating department of the Marconi transatlantic station at Belmar, N. J., is the subject of a biographical sketch in *The Wireless Age* for February. He is a native of Cape Breton and was formerly a cable operator. Mr. Ward has had a varied experience in wireless work.

Telegraph Oddities.

William Lawrence, a colored man of Kinston, N. C., has sued one of the telegraph companies for \$5,000 damages, under the mental anguish law, because there was a delay in a telegram reaching him, which announced the death of a former employer. The delay, he states, prevented his attending the funeral, and he has suffered mentally to the extent of \$5,000.

We are informed that a petition in bankruptcy has been filed under the banking laws by a telegraph operator in a western city. His schedule of liabilities shows that he owes \$4,320, and his assets were twenty-five cents. This is considered high financing.

The witty construction man found an opportunity to get in his work recently when he was informed that he would be required to construct three new copper wires in the spring. He replied that cable would be required to keep the wires dry.

After a reprimand to one of the check boys in one of the large telegraph offices, where they are required to use roller skates to expedite the work of transferring messages from one desk to another, the boy was told to put on his skates and go to work.

A manager of one of the Alabama telegraph offices has a display in his office of fruit and vegetables which were raised on his farm.

While a woman was washing a window in York, Pa., recently, she fell through the skylight and landed on an operating table of a telegraph office. An operator received a severe scalp wound from a piece of broken glass.

TO OPPOSE GOVERNMENT OWNERSHIP.—The directors of the Merchants' Association of New York have unanimously decided to vigorously oppose governmental ownership of telegraph and telephone lines. Postmaster-General Burleson's scheme seems to be meeting with insurmountable obstacles.

The New York-San Francisco Telephone Line.

In our February 1 issue was printed a general account of the successful opening, on January 25, of the telephone line between New York and San Francisco, a distance of 3,400 miles. Some facts concerning this remarkable line will, no doubt, be of interest to our readers at this time.

For many years a telephone line from the Atlantic to the Pacific has been the dream of Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, and to his steadfastness of purpose to achieve this result, together with the able assistance and advice of his associates, has his dream become realized. Among his best assistants, Mr. J. J. Carty, chief engineer of the company, deserves the greatest praise for the successful engineering execution of this unparalleled undertaking. He had no previous work of the kind to guide him, but he applied his fundamental scientific knowledge with such accuracy and intelligence that what would frequently appear to the ordinary man as an insurmountable obstacle melted away into nothingness under the fire of Mr. Carty's keen, analytical mind. Although Mr. Carty's was the master hand he very generously accords due credit to his assistants in the various branches of the work. He modestly keeps in the background and states that he is not entitled to all the glory. One of his ablest assistants was Mr. Bancroft Gherardi, engineer of plant, who skilfully handled all the problems involved in the construction of the line itself.

The line crosses thirteen States and is carried on 130,000 poles. Four hard-drawn copper wires, 0.165 inch in diameter (No. 8 B. W. G.), run side by side over the entire distance, establishing two physical circuits and one phantom circuit. One mile of a single wire weighs 435 pounds, the weight of the wires in the entire line being 5,920,000 pounds, or 2,960 tons. This, of course, is the transmission lines alone. In addition to these, each physical circuit uses about 13,600 miles of fine, hair-like insulated wire, four one-thousandths of an inch in diameter, for its loading coils, which are distributed throughout the line about eight miles apart.

The route of the line westward from New York is as follows:

New York to Pittsburgh	390 miles
Pittsburgh to Chicago	545 "
Chicago to Omaha	500 "
Omaha to Denver	585 "
Denver to Salt Lake City	580 "
Salt Lake City to San Francisco	770 "
Total	3,370 miles

On the occasion of the opening the circuit was extended to Jekyll Island, Ga., one thousand miles south of New York, in order that Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, might participate in the ceremonies. This extension made the circuit for the time being 4,400 miles in length. The conversations over the entire circuit were remarkably clear.

The work of stretching this line across the country was child's play compared with the task of

developing the apparatus which would make the line of practical value. "We could have built a transcontinental line years ago," said Mr. J. J. Carty, chief engineer of the company, "but no one could have made it talk. We have just found out how to do that," he said.

Transcontinental voice travel is not the result of the work of any one man, or of any one invention. It represents the scientific discoveries of thousands of men and the results of hundreds of inventions. President Theo. N. Vail said not long ago that the solution was found in the cumulative effect of improvements, great and small, in telephone, line, cable, switchboard and every other piece of apparatus or plant required in the transmission of speech.

One of the chief contributory means to the success of long-distance telephony is the so-called "loading coil" invented by Dr. M. I. Pupin, of Columbia University, New York. This device, which is referred to elsewhere, is one of the most important inventions ever made in connection with telephony, and may be said to rank next to the telephone itself. Without it long-distance telephony would be impossible, unless it was made so by the application of other scientific principles. But Dr. Pupin deserves all the credit for making it possible at a time when it was needed. The original loading coil has undergone much refinement since its invention, but the principle, of course, remains in the instrument of to-day.

Every forward step in the art of telephony has been taken over a scrap heap of apparatus discarded as new and better telephone machinery was invented. The present telephone instrument has 130 parts. The transmitter is the seventy-third type devised and the receiver is the fifty-third in the line that began in 1876. Construction and reconstruction of apparatus in the past ten years has cost more than the present book value of the entire plant. This work has been done all along the line from New York to San Francisco. Tests, experiments and thousands of changes and improvements have had to be made before a 3,400-mile telephone talk could become a possibility. Transmitters, metallic circuits, wire, loading coils and the other machinery of the system have had to be made to work in unison.

The development of the loading coil, for instance, illustrates what has been done. When it left the hands of the inventor, it was as large as a nail keg and the cost of the fine iron wire in it, having peculiar metallic, magnetic and electrical qualities, was exorbitant. To-day the loading coil is in some cases only four or five inches in diameter and the cost of the fine, hairlike, insulated iron wire is comparatively low.

Not over ten miles of the circuit is in underground cables.

It is estimated that when a conversation is being carried on over this line equipment valued at \$2,000,000 is tied up temporarily for the purpose.

The wise telegraph man is a regular reader of TELEGRAPH AND TELEPHONE AGE, and admits he cannot do without it.

Recent Improvements and Developments in Wheatstone Working.

BY WILLIAM FINN, NEW YORK.

(Concluded from page 35, January 10.)

DETERMINING FREQUENCY.—The frequency of vibration is determined by the amount of resistance in P and N, and the capacity value of condenser C. P and N, which regulate the strength of the vibrating current, are made equal to each other, and of such combined resistance as will develop a steady current of about twenty milliamperes in the vibrating circuit. The rate of vibration may then be increased by strengthening the vibrating current, and lowered by diminishing the current. The rate may also be changed by varying the capacity value, an increase of which tends to reduce the frequency, while a lowered capacity has the reverse effect. By making a record of the reversals on the Wheatstone receiver and counting the number of dots run off in a given time, the frequency developed may be measured and compared with that of the transmitting apparatus. This process of "tuning up" necessarily involves more or less delay in the preliminary work of starting up a circuit, and is one of the objectionable features of the vibrating relay arrangement.

NEW RELAY ARRANGEMENT.—There has, however, been recently developed in the engineering branch of the Western Union service an improved form of relay, which, without the aid of any auxiliary apparatus whatever, is capable of doing even more than the vibrating relay has already accomplished in the way of increased speed, with the additional advantage that no preliminary adjustments other than those ordinarily required in Wheatstone working are necessary in starting up the circuit.

Pending the outcome of patent applications, nothing can be said of this relay further than to intimate that as a result of its successful operation under regular service conditions, arrangements are being made to substitute this improved relay for such of the ordinary Wheatstone and vibrating types as are now in use.

DIFFICULTIES ENCOUNTERED IN WORKING.—Despite all such innovations, and the progress otherwise made in developing the working appliances, and notwithstanding the great improvements effected in line construction, the rates of speed and the practical efficiency of automatic circuits are lower to-day than they were twenty years ago, a fact that strongly illustrates the tremendous difficulties encountered in the operation of telegraph circuits under present conditions of working.

The multiplication of wires, and their close contiguity in the greatly extended areas of underground and aerial cables used in their operation, have so intensified the effects of electro-magnetic and electrostatic induction, besides increasing the current-absorbing and attenuating properties of the conductors themselves, that all the improvements hitherto applied have only served to partly check, and not to wholly stop, the downward tendency of which previous mention has been made.

SCREENED CONDUCTORS.—It is believed, however, that a certain measure of relief from these distracting influences will be afforded by the use of the new type of underground and aerial paper-insulated cable now being installed on some of the principal trunk lines of the Western Union Telegraph Company. This new cable, which is intended to accommodate both telegraph and telephone circuits, has been specially designed to shield the telegraph conductors (which are twisted into pairs so as to be available for telephone purposes) from the effects of induction, by enclosing each pair within a metallic wrapping of copper foil, and connecting the various wrappings with the ground. In this way the copper foil, or ribbon, acts as a sort of electrical screen that is perfectly opaque to the electrostatic lines of induction from neighboring pairs, while affording at the same time a path or medium through which the energy of the electromagnetic lines may be more or less dissipated. While the capacity of a screened conductor is greater than that of one unscreened, the loss in efficiency due to increased capacity is more than counterbalanced by the benefits derived from the elimination of the more pernicious effects of induction.

REPEATER STATIONS.—Meanwhile, it had been found desirable in the case of several of the longer circuits, which had been repeatered at some single point approximately midway between the terminal stations, to cut up the lines into shorter sections by the insertion of two repeaters, so placed as to make each section represent about one-third of the total length of the circuit. In this way, it is possible to greatly reduce the "KR" of a circuit, and modify the effects of induction, with corresponding advantages in the way of increased speed and efficiency of working.

POWER CIRCUIT INDUCTION.—Of the many other disquieting influences to which telegraph lines have been subjected, none perhaps are more embarrassing than those arising from the inductive interference caused by the operation of single-phase systems, and the unbalanced condition of three-phase power circuits. The area covered by these disturbances is constantly being enlarged, owing to the extension and increase in the number of transmission lines; and although in one or two instances some diminution in the frequency and severity of the induction has been noted as the result of improvements directly effected in the power circuits, there is little reason to believe that any adequate measure of relief is liable to come from that particular source. In order to ameliorate as far as possible the demoralizing effects of these inductive influences, certain devices calculated to exert a more or less protective tendency have had to be introduced into the telegraph circuits.

RESONANT OR DRAINAGE SHUNTS.—Of these, the "resonant," or "drainage shunt," is the most effective for general purposes. The principle involved in this device (which consists of a small magnetic coil and condenser connected in series) is, that any electrical conductor or system to which the properties of inductance and capacity have been communicated (as in the case under consideration)

thereby becomes possessed of a natural period of vibration analogous to that of a stretched string. And as in the case of the stretched string, which can be made to mechanically vibrate at some particular frequency by imparting the requisite amount of density and elasticity to the string, so it is possible to—as it were—stretch an electrical string or conductor between the main and artificial lines of a telegraph circuit (Fig. 4) and by inserting in this bridge connection a suitable amount of inductance and capacity (properties that correspond with those of density and elasticity in the case of the string) a rate of electrical vibration may be set up in the bridging device to correspond with the frequency of the alternating current disturbances. This bridging device is then said to be "resonant" to that particular frequency, and, consequently, best adapted to facilitate the "drainage" of the disturbing currents.

It unfortunately happens, however, that the frequency of the signaling currents in automatic working more or less closely corresponds with that of the disturbing currents, so that while the latter may

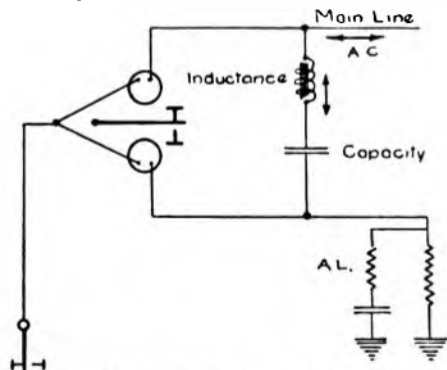


FIG. 4.—"DRAINAGE SHUNT" APPLIED TO ORDINARY DUPLEX AND QUADRUPLIX CIRCUITS.

be effectually disposed of by diverting them through the drainage shunt, a similar action takes place with regard to the working currents, the strength of which may be seriously reduced thereby.

Where the difference between the signaling and alternating current frequencies is considerable, as in the case of hand-worked duplex or quadruplex circuits, the "resonant" principle has been applied with advantage, but for automatic circuits the use of a simple capacity of about twelve microfarads placed across the main and artificial lines has better served the purpose of diminishing the inductive action to a greater or lesser extent, without serious loss to the efficacy of the working currents. The resonant shunt, however, when properly designed, has been found to possess a distinct advantage over the simple condenser, in that it has a sharper critical frequency, and offers higher impedance to frequencies differing from the disturbing frequency.

A recent study of this peculiar property of the resonant circuit has led to the development of a more efficient type of shunt apparatus which can be used on automatic circuits as a very effective drain for the disturbing currents, without sensibly impairing the operative value of the signaling currents.

MECHANICAL CHANGES AND IMPROVEMENTS.—Of the various changes and developments of a purely mechanical character effected in the working equipment, some of the more important include:

(a) The relegation of the old-style "puncher" to a state "innocuous desuetude" and the substitution of a key-board type of perforator by means of which it is now possible to prepare the punched tape at rates up to ninety words per minute without the requirement of any knowledge on the part of the operator as to the particular code involved.

(b) The employment of motor-driven transmitters and receivers, which not only ensure greater steadiness and uniformity of running at any given rate of speed within the limiting ranges, but also obviates the delay and inconvenience formerly occasioned by the running down and winding up of the spring or weight which constituted the motive power of the older types of instruments. The mechanism is now set in motion by pressing one of the buttons forming part of a push switch device, and continues in action until stopped by the pressure applied to its companion button.

(c) The work of transcription at the receiving station is now greatly facilitated by the slip-pulling and winding devices used as accessories to the various typewriting or copying machines, in front of which the slip to be transcribed is automatically drawn at any desirable rate of speed, and whose movement may be stopped, started, or otherwise varied under the perfect control of the copyist concerned.

CONCLUSION.—It may be said of the Wheatstone system, that at no period during the thirty-three years it has been established in this country, has it been so much in evidence as at the present time, its electrical growth and development in recent years having enabled it to keep in step with the march of progress being made in all the other technical branches of the Western Union service.

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.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, FEBRUARY 16, 1915.

Doing One's Best.

No matter how humble the calling of the individual, how uninteresting and dull the round of his duties, he should do his best. He should dignify what he is doing by the mind he puts into it, he should vitalize what little he has of power or energy or ability or opportunity, in order to prepare himself to be equal to higher privileges when they come. —W. G. JORDAN.

Importance of Managers Being Neutral.

A telegraph manager asks us to give him a good reason why he should preserve neutrality in his conversation with customers of his company. He states that his sentiments and opinions favor a certain nation now at war, and he knows of no power that can prevent him from giving expression to his feelings or opinions on the rights and wrongs of the war and the nations engaged in it, whether he is in the office or out of it. It would be an insult to his intelligence, he asserts, for a company to place a check upon the expression of his views.

Our belligerent friend is quite right when he asserts that there is no power on earth to muzzle his tongue, but there is a power to remove him from the position he holds if he injures the business of the company he represents. He is paid to safeguard its interests, and not to jeopardize them.

A great struggle, such as the present European war, stirs men's souls to their depths and impels them to take sides. Most men are positive as to the correctness of their opinions about such matters, and when two or more engage in an argument there is likely to be a display of bad temper, if nothing worse. Arguments of this kind have been known to separate bosom friends and disrupt families, and it is easy to imagine what risks a manager assumes when he undertakes to impress his personal opinions upon his company's customers. Those who disagreed with him would undoubtedly show their resentment and disgust by withdrawing their patronage from the company. The loss of business on such inexcusable grounds would soon come to the notice of the superintendent and that official would be derelict in his duties if he did not promptly make a change in the management of the office concerned.

The manager of a telegraph office must preserve a strictly neutral attitude on all public questions in his dealings with his company's customers if he does not want to come to grief. All men do not think alike, and the less a business man antagonizes those upon whom he depends for his business the better off he will be.

A German doctor with English patients, for instance, very discreetly avoids discussing war matters, and so long as he does this he will preserve their good will; but the moment he expresses his opinions and tries to provoke a discussion, they will take offense and leave him, no matter how skilful he may be professionally. So it is with managers. If they have the company's interests at heart they will avoid irritating their customers in any manner whatsoever.

Telegraph and Telephone Educational Organizations.

It is very interesting and significant to note the wide extension of technical education facilities in the telegraph and telephone services. In almost every issue it is our pleasure to record both the work of existing societies and the organization of new ones for the purpose of elevating the technical, moral and social status of telegraph and telephone employes throughout the country. In many of the smaller cities, following the lead of the large ones, there is great activity in this direction, and it augurs well for the future of the telegraph and telephone to see so much enthusiasm among the employes to learn the technics of their calling. Many have learned and others are learning the importance and value to themselves of taking advantage of every possible means to acquire a deeper knowledge of the science of electricity as applied to the telegraph and telephone. This is what we have been trying to impress upon our readers for years, and we are glad to know that so many have given the matter their serious thought and are making their services more valuable to the companies. The companies, on the other hand, are giving hearty and material support to this widespread educational movement and doing all in their power to further it. Hence the two interests are working together in harmony with consequent benefit to each.

The American versus the British Quadruplex.

BY J. M. FERNANDEZ LAMOTHE, C. A. RAILWAY
TELEGRAPHS, ROSARIO, ARGENTINA.

In an article entitled "SOME NOTES ON AMERICAN TELEGRAPHS," published in the April, 1914, number of the *Post-Office Electrical Engineers' Journal*, of London, by Mr. John Hume Bell, the statement is made that the American arrangement of the B or No. 2 side of the quadruplex "appears to offer an advantage over the British method, as it obviates the need for two relays in the case of repeaters, and, also, in that it permits uniformity in wiring both A and B local circuits."

The main advantage, however, that is, its greater efficiency, seems to be overlooked, and, in fact, few telegraphers realize the reason for this superiority—at least I have never seen this matter fully explained.

The American system not only has the advantages mentioned, but the arrangement in itself is more effective in correcting the breaking of signals, and permits quadruplex working on longer lines, other conditions being equal.

Let us examine both methods and see why this is the case. In the British system (Fig. 1) the

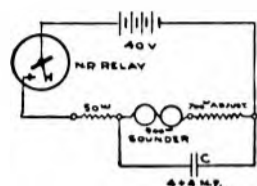


FIG. 1.

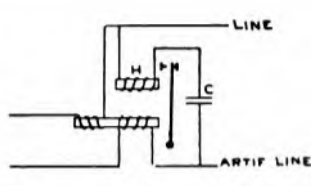


FIG. 2.

B relay is allowed to break when the current is reversed at the distant end, but the gap is bridged in the sounder by the discharge of the condenser C, which holds the sounder armature down during the period of no magnetism. The condenser discharge takes place not only when a signal is split in the relay through the operation of the distant A key, but also at the end of every dot or dash made by the distant B key, and, therefore, tends to fill the spaces between them.

On such a principle the theoretical limit of working is reached when the length of the break (period of no magnetism in the neutral or B relay) is as long as the spaces between the successive elements of a letter, as it would be impossible to fill the breaks without, at the same time, joining these elements together, forming a continuous dash. The practical limit, however, is reached much sooner, as the margin between the filling of the breaks and the keeping of the signals clear becomes so reduced that the working is rendered precarious and practically impossible long before, as is easily understood when considering that an increase in distance (or K R) readily causes the break-lengths to be increased while the spaces are reduced, thus leaving no margin for correction.

It is seen that the object is not exactly attained. The arrangement, to be perfect, should be one that will correct the breaking of the B signals caused

by the A reversals, without in any way affecting the B signals themselves.

This object is more closely arrived at by the American holding electromagnet and condenser system, as shown in Fig. 2. Here the discharge of the condenser C through the coil H holds the armature against the working stop, while the line magnets are momentarily demagnetized during reversal of the current, when the condenser discharge is most effective, and is practically inactive between B signals.

It is in this particular effect, where the high efficiency of this system lies. Assuming a ratio of 1 to 3, when the B key is closed the condenser charge is + 3, and, in reversing the potential changes to - 3, hence the difference of potential, and, consequently the discharge, and effect for bridging the breaks is equivalent to 6.

Now, the charge when B key is open is 1, when it is closed is 3, hence the discharge, or the effect tending to join the signals is only 2. The working margin is widened and the signals, in many cases, are so perfect that an operator may ignore whether he is receiving on the B or on the A side.

All that has been previously said refers to the receiving arrangements, but there is still another reason, relating to the sending apparatus, that further increases its efficiency. It has already been shown that the widest margin is obtained when the reversal breaks are short, and the spaces between dots and dashes are longer, because it makes possible to fill the gaps and still keep the signals clear. The advantage of the American system, in this respect, lies in the use of the transmitter against the key employed in the British system, as the former gives sharper signals, with greater spacing than the latter.

By thus improving both the receiving and sending arrangements the American quadruplex has reached a remarkably high degree of perfection.

[The difference in efficiency between the English and American quadruplex systems, so far as the operation of the neutral side is concerned, is more or less clearly established in favor of the American system by at least some of the theoretical considerations applied by the author to the two cases. The English arrangement, we understand, does very well for the comparative short English lines, but there is reason to believe that it does not answer nearly so well as our standard method when applied to the longer American lines.—Editor.]

THRIFT IN AUSTRALIA.—The savings banks in Australia are conducted by the state, and more than one out of every three persons in the country is a depositor. The average deposit is \$189.50 per person, the total being \$371,617,495 for 1,961,042 depositors.

Mr. C. W. Gulick, of White River Junction, Vt., writes: "I have been out of the business for some years, but TELEGRAPH AND TELEPHONE AGE keeps me in touch with what is going on and I would miss it very much. Thanks for renewing my subscription."

Early Telegraph Days in Canada.

BY R. F. EASSON, TORONTO, ONT.

(Concluded from page 65, February 1.)

On quitting Father Point I returned to the Toronto office, where I worked the heaviest circuits for some years, and in due course was appointed chief operator. The Montreal Telegraph Company, during its entire existence, in return for the revenue resulting from the service, collected such items of news of general interest, suitable for publication, as transpired throughout the country. The manager of each telegraph office was therefore expected to be a vigilant, reliable and discreet newsgatherer. All these despatches centered at Toronto, from which place they were distributed, after examination and approval, to the various newspaper subscribers, locally and at outside points.

Agents were instructed to see to it that reports sent forward for general use were reliable as to facts and strictly impartial and neutral in political or partisan matters. Anything of purely personal interest or calculated to promote private ends or speculations had no place in these despatches. The company, for nearly forty years, supplied the New York Associated Press with such Canadian news as was required by that association, and also performed a similar service for the United Press for a short time. These services were discontinued in the early nineties. While acting in the capacity of chief operator I had a more or less official supervision over the press work. In 1881, when the Montreal Telegraph Company and the Dominion Telegraph Company were merged in the Great North Western Telegraph Company, with H. P. Dwight as general manager, the press business assumed such proportions as to require the supervision of a responsible head, and I was accordingly appointed "Superintendent of Commercial News and Press Service." The Great North Western Telegraph Company continued to collect news on its own account for the use of Canadian papers until 1910, when the system was abolished. The Canadian papers at this time organized a press association to cover Canadian news, and took this matter into their own hands.

The writer retired from the telegraph service four years ago, having been engaged in it continuously for sixty-one years.

There is to-day one other telegrapher in Canada who joined the service at an earlier period than the writer, namely, Mr. N. W. Bethune, who until a few years ago was district superintendent of the Great North Western Telegraph Company, with headquarters at Ottawa. Mr. Bethune entered the service of the Montreal Telegraph Company in 1847, while I made my debut in 1849. Although in his eighty-seventh year, this veteran still enjoys a fair measure of health, and last summer contributed an interesting article to TELEGRAPH AND TELEPHONE AGE on the early history of the telegraph in Canada.

Mr. J. T. Townsend, a resident of Toronto at the present time, is another old-time telegrapher. He joined the Montreal Telegraph Company in 1850. In the same year he was appointed to take charge

of the company's office at Queenstown. He remained there two or three years, when he deserted the key to accept a tempting position in the Commercial Bank of Canada (long since defunct), at St. Catharines. Banking proved to have no special attractions for Mr. Townsend, and in the course of a year or two he returned to his first love and was given the management of the Montreal Telegraph Company's office at Brantford. Mr. Isaac McMichael, well known throughout the western states and Canada as an accomplished and up-to-date telegrapher and man of affairs, was a pupil of Mr. Townsend. Mr. Townsend remained in Brantford until 1866, when he was appointed western inspector Great North Western Telegraph Company, and also inspector of the western section of the Grand Trunk Railway's telegraph system. This dual office he held until about ten years ago, when he retired. He is now in his eighty-eighth year. Owing to a fall four years ago, Mr. Townsend sustained a serious injury to one of his legs, since which time he has been confined to his house. Notwithstanding this handicap he enjoys fairly good health.

I should be wholly wanting in historical fidelity did I neglect all mention of Ben B. Toye in connection with pioneer telegraphy in Canada. Toye engaged with the Montreal Telegraph Company at Toronto as office boy in 1848. Being apt, he speedily became an operator. About this time Hon. Malcolm Cameron and some friends built an independent line from Hamilton to London and young Toye was given charge of the London office.

This line was finally absorbed by the Montreal Telegraph Company, and Toye returned to the Toronto office in 1852. He was then a first class sound operator, and was undoubtedly among the first, if not the very first, of Canadian operators to read by sound. He was an excellent penman, made a beautiful copy, was adroit and accurate and paid due regard to punctuation and the proper arrangement of the message generally. He was also a student of electrical science, acquainted with chemistry and electrical phenomena. The Toye repeater is of his invention. This instrument was among the first automatic repeaters in use. About 1881 he was appointed electrician to the Great North Western Telegraph Company and superintendent of the western division, with headquarters at Toronto. As an officer he was methodical and often exacting, but considerate and just. His memory will long have a place in the affections of those whose fortune it was to be associated with him from the earlier to the vastly different later days of Canadian telegraphy.

In the late sixties Mr. Thomas A. Edison, while en route from western Canada to Boston to serve as an operator in that city, was detained at Toronto for a day or two owing to a severe snow blockade on the Grand Trunk Railway at Scarborough Heights, a short distance east of the city. Mr. Edison spent a good deal of the time during his enforced detention around the office and in conversation with Mr. Toye. Edison, who was then quite a youth, had the reputation of being a capital operator. After he had taken his departure Toye remarked to me that he was the most extraordinary young chap he

ever met, that his pockets were filled with all sorts of diagrams of electrical connections and contrivances, some of them possibly of no great practical value, some of them impossible, but all ingenious and clever.

Toye died many years ago, but he lived to see the gifted Edison become, through the great range of his mental powers and diversity of talents, a public benefactor of world-wide fame, and an outstanding figure in any carefully selected grouping of the greatest men of the age.

For over half a century I saw Mr. Dwight almost daily. He died about three years ago at the ripe age of eighty-four years, honored and respected by all who knew him. Mr. Dwight was a rare man. Not only was he an energetic, progressive and far-sighted business man—keen, shrewd, popular and politic—but he was a man of fine tastes and a Christian gentleman. Kind-hearted and generous, zealous of good works—when any worthy cause required such assistance as he could render—his broad-minded sympathy was quick to respond. He was one of those men who believed that human happiness is produced not so much by great pieces of good fortune that seldom happens, as by little helpful kindnesses that may be made to occur every day. During the long years in which I was associated with him, nothing ever occurred to disturb or weaken the cordial good will and abiding sympathy that seemed to guide and control our business intercourse and personal friendship. He lived a clean, active life and retained his manly sense and energy of mind to the end.

I revere the memory of H. P. Dwight. One of Toronto's leading newspapers, *The News*, owned and edited by Sir John S. Willison, in a tenderly impressive editorial at the time of Mr. Dwight's death, headed, "One of Nature's Noblemen," said in part: "No more wholesome man ever lived among us than Mr. Dwight—generous, humorous, gracious and lovable. His whole life was a benediction and a blessing. For his friends he had an infinite tolerance. For those with whom he disagreed in opinion he had a delicate cynicism which he could not make severe. But he was never feebly slack in purpose or conviction. In his judgments there was no malice, but he could state a case strongly and smile if he created irritation among those at whom his criticisms were directed. In Mr. Dwight there was a suggestion of Sam Slick and of Mark Twain with a flavor of Lincoln without Lincoln's sadness. No one was more welcome at clubs; no one ever more happy in his own chosen companionships."

Mr. Dwight retired from the general managership of the Great North Western Telegraph Company, in 1903, but retained the presidency of the company up to the time of his death. Mr. Isaac McMichael, formerly of Minneapolis, succeeded Mr. Dwight as general manager, and administered the affairs of the company with marked ability and success for about ten years, when he was called away by death. Mr. Geo. D. Perry, formerly treasurer-secretary and superintendent of supplies for the Great North Western, succeeded Mr. McMichael as general manager, and is the present incumbent of that office.

As announced in TELEGRAPH AND TELEPHONE AGE of recent date, the sphere of influence, activity and service of this company has been considerably enlarged lately, and under the management of Mr. G. D. Perry excellent results may confidently be looked for.

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.]

Upon what does the difference of potential in a cell of battery depend? (page 115)

Does the size of a cell and the size of the elements in it affect the difference of potential?

Upon what does the current capacity of a cell depend?

How are batteries classified?

What is a primary battery?

What is a secondary or storage battery?

Does a storage battery "store" electricity?

Why is a simple copper-zinc cell not commercially satisfactory?

What is the effect of the accumulation of hydrogen gas on the copper plate of a cell?

What is this accumulation of gas called?

What is the waste in a primary cell called? (page 116)

What is the cause of waste in a primary cell?

What is the object of amalgamating the zinc element of a cell?

What is the construction of a satisfactory cell for intermittent work: what are the elements of such a cell?

What is the electrolyte of such a cell composed of?

How is polarization minimized in this cell?

What is the name of this type of cell?

How is the Leclanché cell constructed, and what type of cell does it represent?

Is the Leclanché cell suitable for closed-circuit work?

What are the advantages of a "dry" cell, and how is the cell constructed?

Why is the "dry" type of cell sealed at the top? (page 117)

How does the "dry" cell compare with the Leclanché cell in the matter of current capacity and endurance?

What type of cell is most suitable where steady current is required for a considerable length of time?

What are the two types of cell generally used in local battery exchanges?

How is the gravity cell constructed?

What is the action of a gravity or "crowfoot" cell?

(To be Continued.)

Rules for the Wiring of Offices.

(Concluded from page 30, January 10)

35. Care should be used when installing cable to avoid sharp bends that may cause breaks in the sheath or conductors.

36. Postal standard wires and intermediate office cable only will be used for making the telegraph equipment connections inside offices.

37. Postal outside twist or Postal code standard wire may be used between the entrance to the building and the telegraph switchboard and between the generator switchboard and the resistance coils. For other telegraph wiring Postal office wire or Postal interior office cable will be used.

MOTOR GENERATOR, RECEIVER, STORAGE BATTERY AND ELECTRIC LIGHT WIRING.

38. The wiring of these installations must be done in conformity with the National Electrical Code requirements, copies of which may be obtained locally or from division engineers.

39. Electric light wiring of any character must be done to conform with the National Electrical Code rules. Approval of all such work should be obtained and the certificate forwarded to the division engineer.

40. Taps made from electric light circuits to feed telegraph circuits through resistance coils should be treated as electric light circuits between the electric light wires and resistance coils and such coils must be protected with a No. 42 fuse between the electric light circuit and the coil. Where coils are mounted in banks one fuse may be used to protect the entire bank.

GROUND WIRES.

41. The ground wire for the telegraph equipment must not be less than No. 14 B. & S. gauge, approved code standard. Postal code standard wire may be used for the purpose. Sharp bends or kinks should be avoided in ground wires.

42. The ground wire must run in as straight a line as possible to a good permanent ground. This may be obtained by connecting to a water or gas pipe connected to the street mains or to a ground rod or pipe driven in permanently damp earth. When connections are made to pipes, preference shall be given to water pipes. If attachment is made to gas pipe, the connection in all cases must be made between the meter and the street mains. In every case the connection shall be made as near as possible to the earth.

43. When the ground wire is attached to a water pipe or gas pipe, it may be connected by means of an approved ground clamp fastened to a thoroughly clean portion of said pipe, or the pipe shall be thoroughly cleaned and tinned with rosin flux solder, and the ground wire shall then be wrapped tightly around the pipe and thoroughly soldered to it.

44. The sheaths of lead-covered underground cable may be used to obtain a ground when such sheaths provide a good ground.

LARGE TERMINAL OFFICES.

45. Equipment at large terminal offices will be installed to meet the specific requirements of each place under the direct supervision of the division engineer and subject to the instructions and approval of the electrical engineer.

TELEGRAPH CIRCUITS BETWEEN BRANCH AND MAIN OFFICES.

46. When such circuits run entirely in underground conduit between the main and the branch office, fuse and arrester equipment is not necessary upon them at the branch office. If the circuits between the main and the branch office are run entirely or in part overhead in either cable or wire, each such wire entering the branch office must be connected to the fuse end of a No. 66 block. The other end of this block must be connected to a porcelain base jack.

47. The rules governing the wiring of intermediate offices, etc., will be followed as regards the wiring of branch offices with the exceptions above noted.

CALL CIRCUIT WIRING AT MAIN AND BRANCH OFFICES.

48. All call circuit wires entering main and branch offices whether they come in overhead or underground must be terminated upon the fuse ends of No. 66 blocks. The other terminals of these blocks will be connected to the call circuit equipment in accordance with standard diagrams.

49. The protective equipment, jacks, relays and switches used in connection with call circuits must be mounted upon non-combustible, non-absorptive material. Call circuit wires or cables run between cross-connecting racks (see paragraph 19) and call circuit switchboard equipment must be run and supported as specified in paragraph 3.

CALL CIRCUIT WIRING IN CUSTOMERS' OFFICES.

50. Call circuit wires entering a building above ground must have drip loops immediately outside the building at entrance. The holes through which the wires pass should be bushed with non-combustible, non-absorptive insulating tubes slanting upward towards the inside. Two wires may enter through the same bushing where necessary.

51. Each call circuit where entering or leaving a building either overhead or underground must be provided with a Postal standard fuse and arrester block No. 66 equipped with a No. 42 fuse. This equipment must be located as near to the point of entrance or exit of the wires as practicable.

52. Where call circuit wires enter a building by either overhead or underground cables the cable should be terminated in a metal or asbestos lined terminal box. The protective equipment in such cases should be mounted in this box.

53. Fuse blocks and call boxes must be located in a dry place. Postal code standard or code standard double wire will be used to connect the outside circuit to the fuse block.

54. Postal inside pair may be used to connect the fuse block to the call box unless other wire is required to meet the conditions. Where ground

wires are used in connection with call boxes in customers' offices, office wire o or inside pair may be used for the purpose. Such grounds should preferably be made to water pipes by ground clamps.

LEASED WIRES AT CUSTOMERS' OFFICES.

55. Wires entering customers' offices, except when run entirely underground from the main office, must be provided with standard fuse and arrester blocks No. 65 containing fuses No. 41. These should be located as near the entrance of the wires to the building as practicable. Each pair of wires constituting a loop will be terminated upon a standard porcelain base jack. The instrument wires should be connected as shown in diagrams of standard connections.

56. Postal office wire o should be used for wiring customers' offices for leased circuits. The wiring should be done to conform to the rules covering the wiring of intermediate offices, etc., as far as practicable.

British Telegraphs and Telephones.

The report of the postmaster-general of Great Britain on telegraph and telephone operation for the year 1913-14 shows that at 6,257 offices where the traffic is light, the telephone has been substituted for the telegraph. Joint extensions of the telephone and telegraph systems are now made where the traffic would not have justified the provision of either service alone.

The dispatch and delivery of telegrams for telephone subscribers by telephone is increasing, over four million messages having been so dealt with during the year. Manual typewriters are now used generally at large offices for typing telegrams, over 300 being in use, in addition to the direct printing telegraph instruments. High-speed telegraph apparatus has now reached a high rate of development; for Wheatstone working the Gell perforator has been standardized, and the Creed reperforator and printer has been much improved. Sextuple-duplex working, which gives six separate channels in each direction on a single circuit, has been applied to the Baudot system experimentally between London and Birmingham, and quadruple-duplex sets will shortly be installed between London and Liverpool and Glasgow. A new form of Murray multiplex apparatus is being worked experimentally between London and Manchester.

Many phantom circuits have been provided for telegraphing over the trunk telephone lines, which are very substantially constructed and less likely to be interrupted than the lighter telegraph lines.

Telegraphic communication with the Continent has been improved by laying a new four-wire cable to Germany, and by the extension of multiplex working on the Baudot system.

To provide against interruption of the telegraph lines to Aberdeen and the north of Scotland, a high-speed wireless station is to be erected near Stonehaven, to work in connection with that at Cullercoats.

During the year 184 new telephone exchanges were opened, compared with fifty-five in the previ-

ous year, and 44,058 stations were added to the system, an increase of six per cent, compared with 29,638 (4.2 per cent) in 1912-13. The total number of exchanges on March 31 was 2,831.

The trunk system was increased by 106 new exchanges, 456 additional circuits and 47,279 miles of wire, and the trunk calls increased by over two million. It has been necessary to commence an underground telephone cable between London and Birmingham and Liverpool, as well as other cables between important centres. Last December a cable seventy-two miles in length—the longest submarine telephone cable in the world—was laid across the Irish Sea, affording three, or perhaps four, additional circuits.

The total mileage of post-office wires, including spares, was 2,886,025 miles, an increase of 8.4 per cent. Of this, telegraphs accounted for 267,252 miles, telephones for 1,846,565 miles and spares for 772,208 miles of single wire; while aerial wires measured 947,392 miles, underground 1,926,743 miles and submarine 11,890 miles.

The net loss on the working of the telegraphs for the year is estimated at \$6,154,780, and the net profit on the telephones at \$1,363,215.

An Old Telegrapher the Head of the Westinghouse Electric Company.

Edwin M. Herr, president of the Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa., is an old-time telegrapher. He was born at Lancaster, Pa., May 3, 1860. He began carrying messages at Denver, Colo., in 1873, for the Western Union Telegraph Company, where he learned telegraphy. He did extra work as an operator in 1874 and 1875 in that office when he began his duties as a regularly appointed operator. He first started as a railroad operator on the Old Kansas Pacific Railway, now the Kansas Division of the Union Pacific Railway, at Deer Trail, Colo. Mr. Herr later was press operator at Pueblo, Colo., and afterwards became identified with the Chicago, Milwaukee and St. Paul Railway Company, at Milwaukee, Wis. In 1887 and in 1888 he was superintendent of telegraph of the Chicago, Burlington and Quincy Railroad. From this position he drifted into general electrical lines and that he has made good is best indicated by the position he now holds, which is the head of one of the greatest electrical industries in the world.

WHEN CAPTAIN CLOWRY WAS MADE COLONEL.—A clipping from the *Missouri Democrat* (now the *Globe-Democrat*), of St. Louis, Mo., dated December 15, 1865, referring to the advancement of "Captain R. C. Clowry, assistant quartermaster and superintendent of the military telegraph of this department, to the rank of major," was recently sent to us. Captain Clowry, at the same time, according to the clipping, received a brevet commission of lieutenant-colonel. The article praises Colonel Clowry and his work, and points out that in 1861 he constructed the first mile of telegraph ever used for the military service of the government in this country.

English Telegraph Service in the War.

In an article in the January number of *The Telegraph and Telephone Journal* of London, entitled "With the Expeditionary Force," Lieutenant A. A. Jayne, of the Royal Engineers, gives an interesting account of the English telegraph service at the front. From this article we make the following abstracts: "Field air line can be erected at the rate of about five miles a day by a small detachment of non-commissioned officers and men, and an insulated wire can be laid on the ground at the rate of about four miles an hour.

"The arrangements and organization of the military telegraph rooms in war time are not so rough-and-ready as many people would imagine," Lieutenant Jayne says. "That everything in use is designed for the purposes of dismantling and setting up again at a moment's notice is true, but order prevails throughout. Improvements in apparatus, in devices in the instrument rooms, and in the working are being made almost daily. The double-current Wheatstone duplex sets are now being placed on a baseboard, so that when the time arrives for moving the apparatus can be carried away *en bloc*, and as the internal wiring is fixed it will be only a matter of a few minutes to join up at the new office. Similar arrangements are made in regard to the other apparatus. Formerly the test boards, known as commutators, were connected and simply placed on a table. These are now fixed to baseboards.

"Upon arrival in this little town [no name of town given], I found general headquarters located in a large college," continues Lieutenant Jayne. "The telegraphs occupy quite a large room and conditions are fairly comfortable. When the number of chairs proves to be insufficient, boxes are used. No sounder screens (resonators) are to be found, and again boxes, used for packing instrument sets, are brought into action for keeping contiguous sounders at a respectful distance. The staff come on duty in full marching order, and while at work room has to be found for neatly stowing rifles and equipment away. It is difficult to recognize telegraphers during war time, for when they parade for duty they look as good and as keen soldiers as one would wish to meet. They are drawn from the London postal district, and from provincial offices, and while excellent soldiers, they are no less expert telegraphers. They take their business seriously and their ready response to all calls made upon them reflects credit on both services. When business is brisk in the firing lines the wires leading to them are correspondingly busy. It is, of course, highly important that tactical messages and operation orders should be expeditiously dealt with. The messages are hurried through by the 'check,' i.e., the collector, conveyed at once to the delivery point and thence delivered within a minute or two to the commander-in-chief's office. There are no slack periods, for as soon as the 'business' houses are closed in the field, the offices at the various bases commence work. Then lengthy indent messages on ordnance and other supplies begin to come in and Wheatstone working is resorted to. Pressure continues up to

5 a. m., when there is a slight lull for a short time. Then first one and then another circuit 'wakes up,' and that is the sign that the activities for the day 'farther up' have commenced.

"Night has its excitements as well as day," says Lieutenant Jayne, in conclusion. "An operator announces that he is losing 'X——' and quite steadily is ticked out, 'I say—we are being shelled and are——' The rest of the sentence is easily guessed, and that is the signal to rush any urgent work through to 'X——' on another wire before they are lost completely. Soon, however, communication to that point stops altogether, but not for very long, as a rule, for a telegrapher must send something telegraphic if it is only on a spoon at dinner. Presently we are called very steadily and the distant station must have got in from a pole outside the place receiving so much attention from the enemies' guns. Sometimes the engineering parties get too far ahead with their work and then communication ceases very abruptly! The Germans seem to have a rooted objection to anything which we have come to regard as necessary to civilized life. The bursting of shells in the vicinity of telegraph wires seems to have quite an adverse effect upon good construction and maintenance."

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 \$3.50. Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, on receipt of price.

Mr. J. M. Carson, Southern Railroad, Statesville, N. C., writes: "I have derived a lot of information and pleasure from reading the AGE. I like it very much."

How to Write English Correctly.

Mr. William Brewer, an old time telegrapher, formerly and for many years located at Cincinnati, Ohio, but for over twenty years past identified with the Bulletin Press Association of New York, some time ago produced a small book entitled, "The Writer's Vade-mecum," which contains a great deal of very interesting and instructive matter. The book sells for \$1.00 per copy. Mr. Brewer has given us his consent to reprint in our columns any portion of this work that we may consider of value to our readers, particularly those who desire to excel in the art of writing correctly. In the preface Mr. Brewer, among other good advice, has this to say:

"Every sensible person who can read and write may compose matter fit for publication. Every one who can talk intelligently may write intelligently. The best way to write is to set down the words precisely as though one were telling the story to another.

"The simpler, plainer and more direct the style, the more likely it is to prove interesting. But would-be writers delude themselves that success depends upon the use of high sounding words and resonant sentences. They assume that the plot must be involved and that the style must be stately and dignified.

"Where the conclusions of neophytes correct, then experienced writers would throw aside their pencils in despair. But there are no such besetments in the way of any writer.

"There are not many things for him to learn concerning the duties and requirements of a writer. So few are they that it is believed that the instructions given are ample for all of his needs.

"It is not within the province of this writing to declare what each one should prepare. No two people will write alike. One inclines to poetry, another to prose. One seeks to become a writer for newspapers, another for magazines, and yet another would be a writer for books; romance attracts one, history another and biography another.

"He who uses his eyes and ears may find topics in the prattle of children, in the wisdom of venerable neighbors, in the beauties of brooks and vales and hills and woods, in the wild shriekings of the storms and in the sighing of the zephyrs at eventide. He may evolve pleasing sentiments from the creations of his brain or he may catch them from the lips of those about him.

"Be one's self in writing. Do not imitate any writer, however much he may be admired. Imitators fail invariably of success. One must write along his own lines and ultimately have a style peculiarly his own, or he will fail in the work of a writer. Write correctly. The rules of grammar are few and the exceptions so limited in number that one easily may master all of them. A sentence—every sentence and all sentences—contains a statement of fact (not necessarily of truth). It may contain several statements and be termed compound, complex, etc., but after all, a sentence is a declaration. 'He lives' is a sentence with a subject 'He' and the action (manner of) 'lives.' Every

sentence must contain so much. 'He lives for others' is a complete sentence. 'He' may have a dozen modifiers, 'lives' may be qualified by adverbs, and 'others' may be made to apply to a class; yet with all these changes and amplifications it would still remain a sentence. Note carefully. Every sentence consists of three parts: the agent, actor or doer, the action or manner of action, and the person or thing acted upon. The reason that many writers fail, or are obscure in style, is because they do not keep this fact in mind. Every word connected with the agent should be as close as possible to the agent; and so of the mode of action and of the person or thing acted upon. Because this is the underlying and all important truth of all sentence-building, let the fact be further illustrated. The actor, agent or doer is called the subject, the manner of action the verb and the person or thing acted upon the object. Every word which modifies, qualifies, restricts or governs the subject belongs with it, and so with the two other divisions of the sentence. Where this rule is not observed, the sentence becomes involved and it is not easy to determine the meaning of the writer. Here is a sentence taken at random from a New York daily newspaper: 'He was removed to Hudson Street hospital in a serious condition, suffering from exposure.' This sentence is badly involved. As it reads the man was suffering from exposure while en route to the hospital. Nor has the hospital aught to do with his condition. The sentence should read: 'Being in a serious condition as the result of exposure, he was removed to Hudson Street hospital.' The only part played by the hospital was that of receiving the man."

(To be Continued.)

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.

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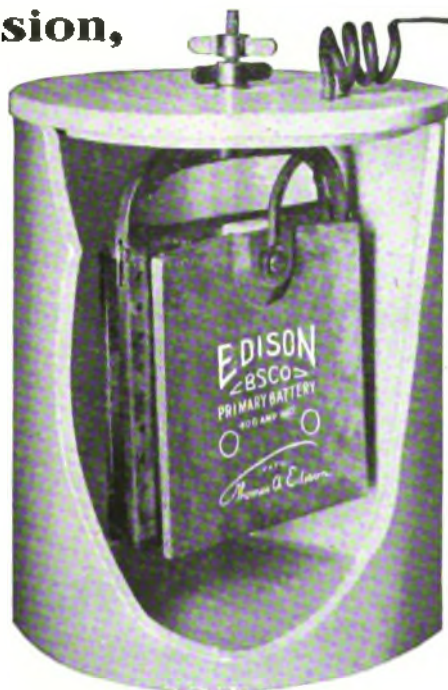
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An illustration of a thick, multi-stranded cable, likely made of Kerite, coiled and draped across the upper left portion of the advertisement. The cable has a textured, segmented appearance. Below the cable, several coins are scattered on a light-colored surface. Some coins are standing upright, while others are lying flat. The coins have various designs, including stars and circular patterns. The overall scene suggests a connection between the cable and financial investment.

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General Offices, 30 Church Street, New York Western Office, Peoples Gas Building, Chicago

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THE RAILROAD.

J. A. FOUNTAIN, aged fifty-six years, superintendent of the Wilmington, N. C., district of the Atlantic Coast Line Railroad, died in Wilmington, on January 7. Practically his entire business career was spent with the Atlantic Coast Line, and he held, at various times, the positions of agent, train dispatcher and superintendent of transportation, with headquarters at Richmond, Va. He was widely known in railroad circles.

WIRELESS TELEPHONE ON LACKAWANNA.—Tests of the wireless telephone on a moving train were conducted on the Lackawanna Railroad, on February 7, when spoken messages were clearly heard from Lonsberry to Binghamton, N. Y., a distance of twenty-six miles. Mr. L. B. Foley, superintendent of telegraphs and telephones, states that conversations have been carried on over a distance of fifty-two miles.

DISPATCHING TRAINS BY WIRELESS.—Mr. L. B. Foley, superintendent of telegraphs and telephones, Lackawanna Railroad, New York, will read a paper on the subject of train dispatching by wireless before the Railroad Club, United Engineering Societies' Building, New York, on February 19. Mr. David Sarnoff, assistant traffic manager, Marconi Wireless Telegraph Company, New York, will discuss the paper.

THE MARCH MEETING of the Western Division of the Association of Railway Telegraph Superintendents is scheduled to take place in the reading rooms of the Chicago North Western Railway, Chicago, Ill. The date will be announced in our March 1. Mr. M. H. Clapp, superintendent of telegraph of the Northern Pacific, St. Paul, Minn., is chairman of the committee.

WIRELESS IN AUSTRALIAN RAILWAY CONSTRUCTION.—The Australian government is making arrangements to equip the trans-continental railway works with four wireless plants, so as to enable the working parties to keep in touch with each other, and thus avoid delays in the exchange of instructions. The sets have been designed by the Commonwealth engineer for radiotelegraphy (Mr. Balsillie). Each will have a range of about 150 miles, but will rarely be required to work over twenty to thirty miles. They will be used chiefly at the head railway works. There is to be a truck fitted with wireless plant at the railhead on the western Australian end of the line and another at the south Australian end. Two wireless plants carried in motor-cars are to accompany the advance work gangs.

CONVENTION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—The annual meeting of the Association of Railway Telegraph Superintendents will be held at Rochester, N. Y., June 22, and there is every promise that it will be largely attended and highly interesting from a practical standpoint. It is proposed by the James D. Reid Memorial Committee, of which Mr. C. P. Bruch, of New York, is chairman, to ask the superintendents to attend the unveiling of the Reid monument at Mount Hope cemetery in Rochester, at some time (to be appointed) during their visit to Rochester. Mr. James

D. Reid was the first superintendent of telegraph, and during most of his life was affectionately known as the Father of the Telegraph. He was known personally to most of the members of the Association of Railway Telegraph Superintendents, and it is fitting, therefore, that they should take part in the unveiling ceremonies.

A. J. Casale, Inventor, a Former Telegrapher.

Mr. Anthony J. Casale, the inventor of the electric automatic locomotive control which was briefly described on page 69 of our February 1 issue, was born near Naples, Italy, November 17, 1881, and was educated in electrical engineering in Naples. He was employed as an operator on the Mediterranean Railroad of Italy from 1897 until 1900. His invention for stopping trains automatically in cases of impending danger is based on new principles and is attracting the attention of prominent railroad men.

MUNICIPAL ELECTRICIANS.

WIRELESS FIRE ALARMS.—Wireless equipment has been installed at the Highland fire station, Lynn, Mass.

IMPROVED FIRE ALARM BOX.—A fire-alarm box of the break-glass type, has been developed in New York to meet the requirements of recent fire prevention laws. The box is equipped with a mechanical movement which, when started in operation, opens and closes an alarm circuit the proper number of times to announce, by a series of single strokes on alarm apparatus, the number of box operated. After the glass is broken, it cannot be replaced until the box is rewound and set for another alarm.

OBITUARY.

GEORGE W. COY, aged seventy-eight years, of Milford, Conn., an old-time telegrapher, died in Chelsea, Mass., on January 23. He was wounded in the Civil War and was a cripple the rest of his life.

J. A. KILCOURSE, aged forty-six years, a telegraph operator in Louisville, Ky., died on January 27. He was for many years connected with the Western Union and was recently operator for the brokerage house of E. H. Morgan & Company.

CHARLES F. KIRSCHBAUM, aged sixty-two years, a former well-known old-time New York City telegrapher, died in St. Vincent's Hospital, New York, on January 31. Mr. Kirschbaum was for over thirty years identified with German newspaper work.

JOHN HENDERSON.—In our January 16 issue was printed a notice of the death of "Joseph" Henderson, an old Canadian operator, in Portland, Oregon, on December 30, 1914. The name "Joseph" was an error, and should have been "John." John Henderson was identified with the Canadian telegraphs in the early fifties. He became prominent as a telegraph manager on the Pacific Coast and had charge of the offices at Sacramento and other important centers for many years. He was well and favorably known along the entire Pacific Coast.

INDUSTRIAL.

First Destructive Storm of the Winter.

Two days (December 7 and 8) of sleet, rain, cold, high winds and falling trees resulted in 25,000 miles of fallen wire and the prostration and breaking of 1,200 poles on the toll and local lines of the Southern New England Telephone Company. By prompt and effective emergency shipments of material for making temporary repairs from the Western Electric Company's warehouse at West Haven, Conn., it was possible to re-establish toll lines to every exchange in the state by the evening of December 10.

In the seventy-two hours that elapsed between seven o'clock p. m., December 7, and the same time



FALLEN POLE WITH SLEET COVERED WIRES.

December 10, there were shipped over one million feet of twisted pair copper steel distributing wire, ninety-three thousand pounds of bare copper wire, nineteen thousand pounds of iron wire, over a ton of copper tie wire and twenty-six thousand sleeves, as well as a great quantity of other line construction material. The total bulk shipped during this period weighed over 100 tons and was moved in six special trolley freight carloads, three special freight cars and numerous express shipments.

Western Electric Developments in 1914.

The Western Electric Company, during 1914, made a number of new and important developments in electrical apparatus. The use of the standard package idea as adapted to interphone outfits has been extended to include, in all, four different combinations. Interior and outside wiring outfits are packed with everything needed to put up the interphones.

A new desk stand for intercommunicating service has recently been placed on the market for use in five- and nine-station interphone systems. It has ringing buttons in the base and eliminates the extra push-button block that has heretofore been necessary, thus producing a more compact and convenient equipment.

A new type of equipment for central battery central offices has been developed and placed on the market after the successful termination of a number of trial installations. This switchboard equipment gives a form of semi-automatic operation by making use of an automatic ringing and automatic listening feature. A new automatic ringing mechanism has been developed for use with these automatic ringing and listening equipments. This

mechanism, which is used to produce the ringing and silent intervals, is of the clock-work type.

As a further development in standardizing switchboard equipment, a universal type of multiple switchboard section has been produced. This can be used for any one of the following varieties of equipment: Common battery multiple; common battery partial multiple; common battery multiple or partial multiple without answering jacks; lamp signal magneto multiple; lamp signal magneto convertible, and magneto multiple or partial multiple using combined jacks and signals. By standardizing frameworks in this manner, great flexibility is obtained.

On magneto equipment making use of combined jacks and signals, the latter are mounted ten per strip on newly devised punched mountings. These mountings are arranged to mount from the back of the board, as in the case of multiple jacks and answering jack lamp sockets, and produce a more flexible and better appearing switchboard equipment.

Development work in mine telephones has been confined to the perfection of the mine rescue telephone equipment.

An efficient loud-speaking telephone for railway train dispatching work has been produced after considerable development work. The present Western Electric loud-speaking telephone is unique in that it has both of the essential qualities of clear enunciation and large volume. Service installations have already been made on the lines of two large railroad systems. The loud speakers are used at the train dispatcher's office and way stations instead of head receivers. This relieves the operator of the necessity of wearing a telephone instrument continuously, and during thunder storms or other electrical disturbances, prevents the troublesome static noises from reaching the operator's ears.

A mechanically held selector has been developed for way-stations signaling service. This is a group type selector which does not require current during the ringing period, after it has once been operated. This is of considerable advantage in simplexing lines and, furthermore, produces a saving of battery current.

A convenient type of milliamperic and voltmeter small enough to be slipped into a coat pocket is available for line testing. Accuracy is assured by careful calibration of the meter scale.

There is now on the market a three-bar generator that is sufficiently powerful to operate ten to thirty telephones connected to a line five to twenty miles long and its cost is such that it is economical for use on moderately loaded lines.

The No. 200 relay for switchboard equipment is one of the most sensitive supervisory relays yet developed, its construction permitting of a greater winding space than former types.

A serviceable and efficient washing and wringing machine, placed on the market during the year, has already met with a great deal of favor. Every moving part of this machine is enclosed. No belts or chains are used, as the motor is direct connected to the moving parts by a worm gear shaft drive.

Banquet of Dot and Dash Club.

The annual banquet of the Dot and Dash Club, Philadelphia, Pa., was held at the Colonnade Hotel in that city on the night of January 30, and many prominent telegraph officials and old timers, to the number of 200, were present. Among them were Charles P. Bruch, vice-president Postal Telegraph-Cable Company, New York; J. W. Reid, district commercial superintendent, Western Union Telegraph Company, Philadelphia; C. E. Bagley, district superintendent, Postal Telegraph-Cable Company, Philadelphia; J. H. Wilson, manager, Postal Company, Philadelphia; R. A. Black, manager, Western Union, Philadelphia; F. W. Griffin, superintendent, American Telephone and Telegraph Company, Philadelphia; Joseph Mac Ivor, of the Philadelphia highway bureau; J. M. Albright, of the Pennsylvania Railroad; C. E. Diehl, superintendent, Fire and Police Telegraph, Harrisburg, Pa.; J. A. Chapman, American Telephone and Telegraph Company; C. A. Stimson, Philadelphia Electric Company; Leo Firman, assistant chief, Electrical Bureau, Philadelphia; Judge C. L. Cole, Atlantic City, N. J.; T. E. Fleming, Western Union Telegraph Company, New York; I. D. Maize, H. V. Emanuel, R. C. Bartley, Harry Williams, Dr. C. Bigler, A. W. Springer, A. H. Spracklen, Colonel J. S. Green, W. J. Meloney, and many others.

Mr. Charles P. Bruch was one of the principal speakers of the evening, the subject of his address being "The Telegraph Man."

"I would like," he said, "to remind you of, and impress upon you, the fact that in the telegraph service, to a greater extent than in other business, the man is the important factor. 'A prophet is not without honor save in his own country,' and I think the public and even telegraph men themselves fail to realize and appreciate what the telegraph man has done and is doing for the world at large.

"The telegraph man usually develops from the messenger boy. Service as a telegraph messenger is an excellent training for boys. In the course of their daily work they are taught promptness, accuracy and courtesy. It is a noteworthy fact that almost without exception the present officers of telegraph companies began as messengers. No doubt future telegraph presidents, general managers and vice-presidents are now rushing up and down the streets and in and out of our offices. If we only knew which of them are some day to be the 'bosses,' how respectfully we would greet them and how deferentially we would address them!

"But, aside from what these boys may accomplish in future, they have already earned respect and consideration for their earnestness, faithfulness and intelligence in the performance of their present duties. As many of them are to succeed us in the management and care of great properties, and in the carrying on of public service, they deserve all the help and kindly consideration that can be given them. Those of us who have occasion to deal with them should take care that we set them good examples in uprightness, square dealing, diligence in business and faithfulness to duty in all the relations of life.

"The telegraph operator, 'the man behind the gun,'" continued Mr. Bruch, "is worthy of much

greater public recognition than he is accustomed to receive. He works patiently and hard, in season and out of season; always under nerve-racking conditions; not infrequently at isolated and even dangerous posts. In his keeping are the social and business secrets of the community. He never betrays them. The operation of railroads, the movement of vessels, the transaction of financial and social affairs, the collection and distribution of news, the progress of armies and the fighting of their battles all depend upon his faithfulness, accuracy, skill and trustworthiness. And the whole structure of the telegraph relies on the lineman. He faces discomforts, hardships and unseen perils. He tramps by day and night, through flood, snow and summer heat, keeping up the wires. The worse the weather the more certain it is he must go 'out on the line,' for sleet and gale are the wires' worst enemies and the lineman is their sole defender.

"Young men in the telegraph service who are earnestly and intelligently striving to make their way in the world have opportunities that are scarcely equalled in any other line of business. In their daily work they absorb, perhaps unconsciously, a knowledge of grammar, punctuation, business methods, trade conditions, market prices, and get the news of the world almost at first hand. They come in contact with and earn the friendship and confidence of the best people in the community. In short, the telegraph service is a university. It gives a liberal education. Its pupils gain practical knowledge and training in diligence, loyalty, self-reliance, courage, and all qualities that make for usefulness. They go out to take their places as efficient workers in every field of endeavor. Hundreds of men who regard the telegraph as their alma mater are foremost in business, science, the learned professions and in public service.

"And not for the telegraph alone is the world indebted to the sons of Morse. Among those who have gained their education over the sounder and the key are leaders in the learned professions, in public service and scientific investigation—leaders in the development of the railway, of the electric light, of the telephone, of the iron and steel industries, of journalism and of finance. That master of manufacture, finance and philanthropy, Andrew Carnegie, commenced his business career as a telegraph messenger; that great inventor, Thomas A. Edison, began as a telegraph operator.

"On the rolls of the telegraph are names that will always be famous in the world's history. It would take hours to name them all, and days to recount their achievements. The pioneers in the world's progress during the past century are the men who, on the foundation of Morse's invention, have built up the network of wires that enmeshes the globe.

"The invention and development of the telegraph have made possible the marvelous progress of civilization that has rendered the times in which we live noteworthy above all others in the history of the world. Without the telegraph and the applications of electricity that have been directly or indirectly the outgrowth of the telegraph, commerce, manufacture, science and art, as they are to-day, would not have been developed and could not exist.

"The great public which is the beneficiary of the telegraph man's work express neither appreciation nor thanks. Nevertheless, his patient, loyal efficiency is of the highest value to the world. In fact," said Mr. Bruch in conclusion, "it is the self-sacrificing devotion to duty, not alone of telegraphers but of all men in the service of the public, that makes possible the development of a mighty civilization. Their deeds are common, but not commonplace. Neither wishing nor seeking praise or great reward, they are intent only upon the tasks that each day brings and content in the satisfaction of work well done."

Judge Clarence L. Cole, of Atlantic City, in an address, dwelt upon the importance of the telegraphers' work to-day, and Mr. Clement H. Congdon spoke of those of the telegraph field who are "gone but not forgotten."

The following officers were elected: president, S. S. Garwood; vice-president, Andrew S. Weir; treasurer, J. H. Wilson; secretary, Charles B. Wood; assistant secretary, W. W. Donnelly.

THE SAN FRANCISCO TOURNAMENT.—As the time approaches for the holding of the San Francisco telegraph tournament (May 27, 28 and 29) interest in the affair grows rapidly. All over the country expert operators are at work brushing up in the expectation of being selected as contestants, and some surprises are looked for. The question of pitting hand sending against machine sending is yet to be decided, and as there are good arguments on both sides the decision is looked forward to with much interest. An expected and interesting feature of the tournament will be the wireless event. This will be the first representation of wireless at a tournament and will no doubt prove a great attraction. The tournament will be unique in many respects and from present indications it will be the greatest and most notable ever held.

THE CHICAGO TELEGRAPHERS' AID SOCIETY held its twenty-sixth annual meeting on Sunday, January 31. The following officers were elected: C. J. Phelps, president; C. H. Shell, vice-president; A. J. Fuller, secretary; R. J. Gill, treasurer. A number of important amendments were made to the constitution and by-laws, one of which reads as follows: "No member shall be paid more than

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.

twelve weeks in any one calendar year nor more than twenty-four weeks for any one illness or injury."

Philadelphia Electrical Aid Society.

The twenty-seventh annual meeting of the Electrical Aid Society of Philadelphia was held in Philadelphia, Friday, January 15. The retiring officers were all re-elected for the year 1915. The total membership on December 31, 1914, was 1,180.

RECEIPTS FOR THE YEAR.

Dues	\$6,850.50
Admission fees	92.00
Interest on deposits	283.23
Total	\$7,225.73

DISBURSEMENTS.

Sick benefits (201 members)	\$5,947.00
Death benefits	600.00
Expenses	1,368.08
Total	\$7,915.08

RELIEF FUND.

Balance December 31, 1913	\$ 577.94
Receipts, 1914	49.96
	\$ 627.90
Payments	4.30

Balance December 31, 1914	\$ 623.40
Amount invested and in bank	\$8,922.89

Following are the officers: 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: F. E. Maize, A. S. Weir, Jno. A. Chapman, E. T. Aitken, Geo. J. Wells.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 62c. 35 to 40, Full Grade \$1.50; Half Grade 75c. 40 to 45 Full Grade \$2; Half Grade \$1.

M. J. O'LEARY, Sec'y, P. O. Box 610, NEW YORK.

Telegraph and Telephone Age

No. 5. NEW YORK, MARCH 1, 1915. Thirty-third Year.

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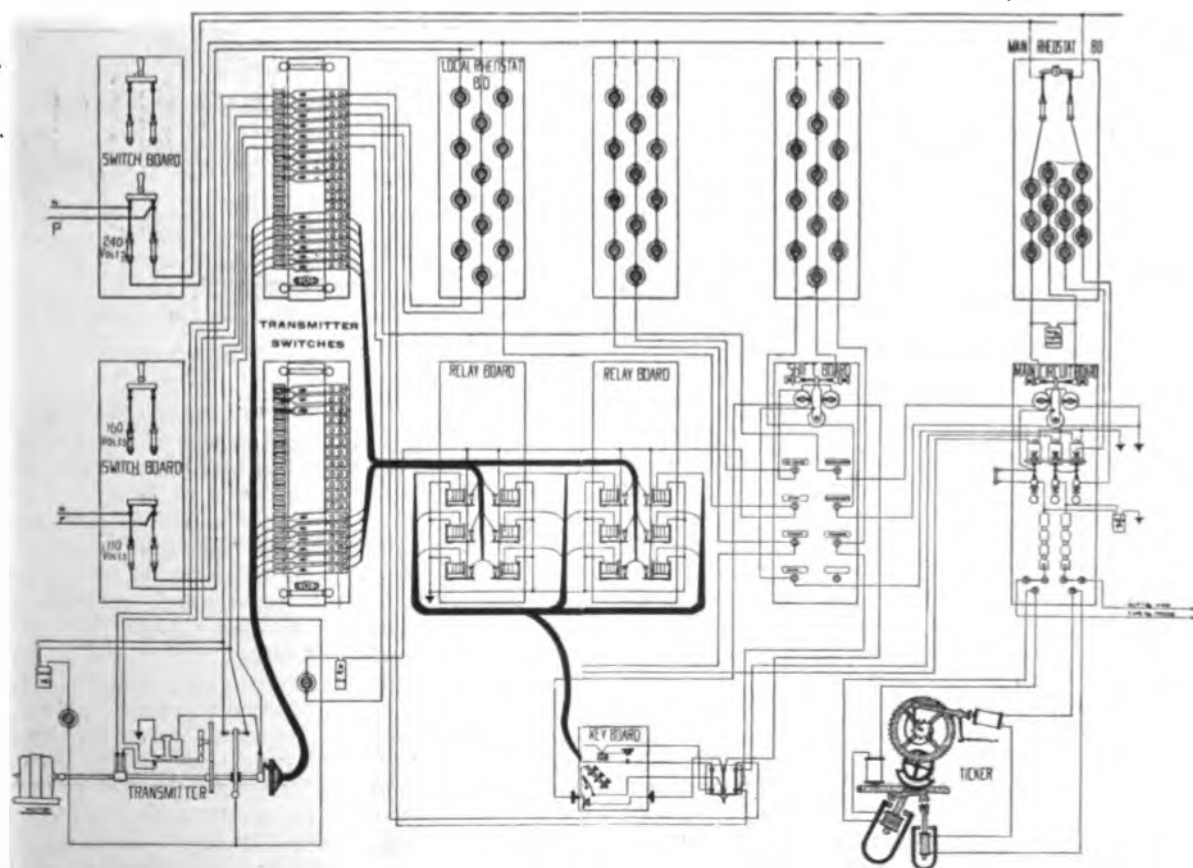
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The Western Union Ticker Service.

BY C. R. TILGHMAN, GENERAL SUPERVISOR, TICKER SERVICE, WESTERN UNION TELEGRAPH COMPANY, NEW YORK.

There are many different kinds of "tickers" employed, some of them having been in use for a quarter of a century and are still doing good work. The Western Union Telegraph Company alone is operating seven different kinds of tickers in New York City, but there are two special styles in general use throughout the country, of which we will give a brief description. The self-winding type 1-a ticker, formerly known as the S. P. B. P. ticker, is the standard for fast stock service. It is a two-wire ticker. One wire, called the type wire, operates the escapement magnet that controls the type wheels and also operates the neutral press magnet which controls the press lever and does the printing.

The escapement magnet is wound to eighteen ohms and the press magnet to fourteen ohms. The coils of these two magnets are connected together in series. The second wire is used to operate the polar shift magnet and the neutral magnet that controls the winding device. The shift magnet, twelve



FIGS. 1 AND 2.—CONNECTIONS OF A TRANSMITTING PLANT.

ohms, and winding magnet, fourteen and a half ohms, are connected in series.

The equipment and connections of a transmitting plant are shown in Figs. 1 and 2. They consist of the fused battery switches, lamp panels, thirty selecting relays, one for each character on the type wheel, a master shift relay and seven pinjacks, through which the various local circuits are connected for measurement and testing; a keyboard and two transmitters, with 110-volt direct current, one-sixteenth horse-power motor and two transmitter switches, with eighteen contact fingers on each, which are controlled by one lever.

On the right-hand side of Fig. 2 is shown a main lamp or rheostat panel having a double-pole fused switch and four rows of lamps, with three lamps in each row. Below this panel is shown a main circuit panel having a polar relay of 105 ohms resistance and three single-coil neutral relays of fifteen ohms each. Brass plates and plugs mounted on the face of the panel control resistance lamps mounted on the back of the panel. There are six pinjacks on the bottom of the panel.

The operation of this equipment is briefly as follows:

The 110-volt motor is geared to a friction wheel on the transmitter and rotates the shaft which operates a pole-changer which sends alternating current through the polar relay on the main circuit panel, causing the armature to vibrate. Positive and negative current is connected to the opposite contact points of this relay and from the vibrating armature an alternating current passes to the contact points on the left-hand neutral relay, called "the repeat," and thence, through the adjustable lamp resistance, to the pinjacks and on to the type line, thus operating the escapement and press magnets of the various tickers on that circuit.

A local current of 110 volts is connected through one of the lamp panels to the right-hand coil of the master shift relay, and then flows through a test jack to the right side of the keyboard. When the operators press a letter key, this current passes through a connecting wire to one of the thirty selecting relays, and from the contact points of this relay another local circuit connects through the transmitter switch to the sunflower on the transmitter. On the end of the revolving shaft of the transmitter is a contact finger, which trails over the face of the sunflower, and when it comes in contact with the segment connected to the key the operator has pressed the current passes through to the stop magnet and stops the transmitter at that point. This stops the action of the polar relay on the circuit panel and also stops the tickers long enough for the press magnet to close and print the character selected.

One of the important features of this ticker is the automatic shifting device, which makes it possible to shift from letters to figures or figures to letters at any point without the use of a special shift key. This is controlled by the master shift relay. When the operator presses a letter key which is in the outside circle on the keyboard the current passes through the right-hand coil of the

master shift relay and from the contact points of this relay a local current passes to the right-hand neutral relay on the main circuit panel, which causes a positive current to flow over the second wire of the ticker circuit through the polar shift magnet, causing the ticker to print letters. When the operator presses a figure key on the inside circle of the keyboard the current passes through the left-hand coil of the master shift relay and opens its contact points. This opens the shift relay on the main circuit panel and a negative current then passes over the second wire. The polar shift is thus reversed and thereby causes the tickers to print figures.

There is a small watch spring on each ticker, and this spring furnishes the power that revolves the

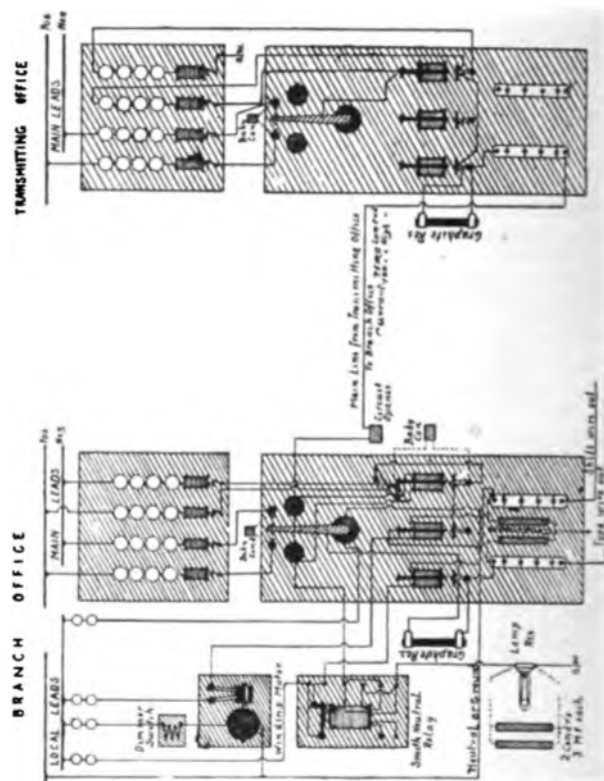


FIG. 3

type wheels. It is wound up automatically by the opening and closing of the second or shift wire as follows: On the shaft of the transmitter is a device that opens and closes a local circuit about 475 times per minute. This operates the winding or pump relay located in the middle of the main circuit panel. The circuit from the shift relay passes through the back contact points of this pumper relay and is opened and closed 475 times per minute. This operates the neutral winding magnet connected in series with the polar shift magnet on each ticker.

The armature of the winding magnet has a rocker arm attached, and as the circuit opens, this arm is drawn back by a spiral spring and by means of a ratchet wheel and feed dogs the watch spring is wound up. Whenever the watch spring becomes as tight or strong as the spiral spring, it stops winding, thus avoiding overwinding and breaking of the spring.

After the transmitting or local plant described is connected up, as many main circuit panels as desired may be added, and any number of ticker circuits thereby operated from one keyboard. Two transmitters are always furnished with each local plant, one for reserve, and by means of the transmitter switch all of the thirty-seven wires connected can be quickly changed from one transmitter to the other.

Any number of tickers, up to fifteen, can be worked on one circuit, according to the length of line and voltage used. The average is ten to twelve tickers, with about 240 volts and 350 milliamperes of current. Five tickers can be worked with 110 volts and 350 milliamperes. The number of revolutions per minute of the transmitter shaft determines the revolutions per minute of the type wheels on the ticker. This is from 150 to 170 revolutions per minute. The average is 160, which is equal to forty cycles per second. This self-winding ticker can be operated over a long-distance circuit of approximately 150 miles. The connections for this long-distance service are shown in Fig. 3. In this case only one wire is used. Positive and negative increase and decrease currents operate the relays at the distant or branch station, while local batteries operate the tickers. A 110-volt motor, with a device attached for winding the tickers, is used at the branch station. Several towns may thus be worked on one wire. (To be Continued.)

Telegraph and Telephone Patents.

ISSUED FEBRUARY 2.

1,126,701. Semi-Mechanical Telephone System. To A. M. Bullard, New York.

1,126,745. Telegraphic Type-Printing Receiver. To A. Franke, Grunewald, and E. Ehrhardt, Berlin, Germany.

1,126,803. Telephone-Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,126,952. Semi-Mechanical Telephone System. To A. M. Bullard, New York.

1,126,963. Semi-Automatic Telephone System. To A. H. Dyson, Chicago, Ill.

1,126,966. Sending Mechanism for Electromagnetic Waves. To R. A. Fessenden, Washington, D. C.

1,127,005. Telephone System. To C. L. Howk, Newark, N. J.

1,127,161. Head Band for Telephone Receivers. To N. Baldwin, Mill Creek, Utah.

ISSUED FEBRUARY 9.

1,127,405. Telephone System. To E. H. Clark, Austin, Ill.

1,127,467. Telephone-Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,127,738. Tuning Device for Wireless Telegraph Systems. To A. J. Coughenour, Fort Leavenworth, Kan.

1,127,855. Telegraph Key. To J. N. Bell, Oneida, N. Y.

1,127,876. Selective Signaling System. To J. C. Field, Orange, N. J.

1,127,889. Telephone-Exchange Apparatus. To E. E. Hinrichsen, Alexander, Ill.

1,127,921. Apparatus for Radio Communication. To G. W. Pickard, Amesbury, Mass.

1,128,019. Telephone Call Recorder. To D. J. McGauran, Geraldton, Western Australia, Australia.

1,128,210. Signaling System. To G. Witty, Scranton, Pa.

1,128,262. Telephone System. To H. S. Turner, San Diego, Cal.

Stock Quotations.

Following are the closing quotations of telegraph and telephone stocks on February 23:

American Telephone and Telegraph Co.	118
Mackay Companies	74
Mackay Companies, preferred	67
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2 $\frac{3}{8}$
Western Union Telegraph Co.	61

PERSONAL.

MR. THOMAS AHEARN, of Ottawa, Ont., was a New York visitor on February 24, attending a directors' meeting of the Canadian Westinghouse Electric Company.

MR. THOMAS A. EDISON celebrated his sixty-eighth birthday, on February 11, by working hard all day. He received many congratulatory letters and telegrams and all of the employes of his works wore appropriate buttons and ribbons in honor of the event.

MR. BRYAN GRANT, who was identified with the Commercial News Department at 195 Broadway, New York, for forty years, but who was retired on a pension some time ago, recently fell down stairs and is now confined to the Memorial Hospital, Orange, N. J. He is in a very serious condition on account of his advanced age. The wife of Mr. Grant dropped dead about three weeks ago.

MR. J. MADISON WELLS, for many years a prominent Southern railroad and commercial telegrapher, having been employed at Savannah, Ga., Tampa, Fla., Nashville, Tenn., and at many other points in these states, but who, for the past six years, has been secretary to Mayor Hilary Howse, of Nashville, has been elected city judge in that city. During his leisure moments Mr. Wells studied law and has, up to the present time, made good use of his qualifications for the benefit of the public at large.

MR. JAMES B. NORRIS, former manager of the Western Union office at Chattanooga, Tenn., and a military telegrapher during the Civil War, but who recently retired from active service, was recently married at Kansas City, Kan., to Mrs. Emmaline Morse, of Kalamazoo, Mich. Both bride and bridegroom are seventy-two years of age, and had been lovers in their youth. Mr. Norris entered the service of the United States Military Telegraph Corps at the breaking out of the Civil War, which caused a separation of the pair. They did not meet again until about five years ago. In the meantime Mr. Norris had become a widower and Mrs. Morse a widow.

W. H. Flann, Superintendent of Telegraph of Oil Pipe Line Interests, Oil City, Pa.

Mr. Wilson Howard Flann, whose appointment as superintendent of telegraph for the New York Transit Company, Northern Pipe Line Company, The Buckeye Pipe Company and the Indiana Pipe Line Company, with headquarters at Oil City, Pa., was announced in our February 16 issue, was born in Pittsburgh, Pa., April 8, 1881. He entered the telegraph service in Pittsburgh about June, 1903, as check boy with pipe lines and advanced through the positions of telephone operator, storekeeper, operator and gauger at a pumping station, and construction man. He was for a time employed as pumper and pipe machine man for the Forest Oil Company in the McDonald field. Later he built telephone lines for the United Fuel Gas Company in West Virginia, and for the Ohio Fuel Supply Company in Ohio, afterwards being promoted to be superintendent of telegraph and telephone of both companies.

In January, 1912, he went to Oil City as assistant to the late F. G. Boyer, superintendent of telegraph, and after the latter's death Mr. Flann was, on February 1, selected to fill the vacancy thus created.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, returned to his office Tuesday, February 23, having completed a four weeks' inspection trip, during which he visited all the principal places in the southwest, and also in the southern states, going as far south as Tampa, Fla. He was greatly pleased with the condition of affairs in all the offices visited; with the Postal staff at each point and the co-operation given by every member of the staff, particularly the messengers and linemen. During his trip Mr. Reynolds conferred with all of the superintendents of the company, and while at Kansas City, Mo., met Mr. J. J. Whalen, manager of the New York main office, who was on his way west. Mr. Reynolds expects to leave New York again in a few days for an inspection trip. He proposes to continue his plan of visiting offices until the one announced some months ago of visiting every office in the system has been completed.

MR. J. S. GRIFFITH, of the Mackay Telegraph and Cable Company at Houston, Tex., is a candidate for the office of democratic executive committeeman.

MR. W. P. SPELLMAN, formerly manager at Bristol, Conn., has been transferred as manager at New Britain, Conn., vice C. H. Burr, resigned.

MR. A. K. AKERS, the recently appointed manager of the Richmond, Va., office, was formerly employed in the New York office and attended Columbia University for several terms. He is a writer of short stories.

NEW FLORIDA OFFICES.—This company expects to open offices at Lawtey and Sparks, Fla., about March 1. These are two important strawberry shipping points.

PANAMA EXPOSITION OFFICE.—This company

has opened a spacious and handsomely equipped office in the famous "Tower of Jewels," near the main entrance on the Panama Exposition grounds, San Francisco. Its central location and complete facilities enable the Postal Company to satisfactorily serve both visitors and tenants in the Exposition City.

MESSENGERS' Y. M. C. A. CLUB.—Twenty-five Postal messenger boys, in full uniform, were guests of the boys' department of the Atlanta, Ga., Y. M. C. A., February 16. Accompanying the boys were A. M. Beatty, manager; J. Albert Spurlock, assistant manager; J. E. Arnold, delivery clerk, and Carl Bagwell, assistant delivery clerk. The entertainment consisted of games, a swimming contest, etc. A Postal Telegraph Y. M. C. A. Messenger Boys' Club was formed.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Return of President Carlton and Party.

President Newcomb Carlton and the general officers of the Western Union Telegraph Company, who left New York on January 31 on a trip of inspection through the Western, Southern and Gulf Divisions, returned to their offices February 18.

After leaving New York, the first stopping place was Cleveland, Ohio, where a new location for the main office was selected, to be occupied about January 1, 1917. Toledo, Ohio, was the next stopping place, then the party went to Detroit, Mich., where the new office in that city was inspected.

General meetings were held at Detroit, Mich., Indianapolis, Ind., Chicago, Ill., Minneapolis, Minn., Kansas City, Mo., St. Louis, Mo., Cincinnati, Ohio, Memphis, Tenn., New Orleans, La., Atlanta, Ga., Jacksonville, Fla., and Richmond, Va., at each of which free and open discussions were held on questions pertaining to improvement in the service, reduction of errors, development of business, etc. Following the general meetings, separate ones were held by the heads of the commercial, traffic and plant departments for the discussion of matters pertaining to these branches of the service with the local representatives of these departments. The meetings were attended by the general managers, division, traffic and plant superintendents, district superintendents, managers, chief operators and plant representatives of the larger offices. The general managers and division heads accompanied the visiting party within their own territories.

Luncheons or dinners were given at the various points and were attended by all those present at the meetings.

President Carlton and general commercial manager John C. Willever gave short talks on matters of general interest to the service.

It was decided by the officials to renovate and improve the offices at St. Louis and Kansas City.

The New York party consisted of Messrs. Newcomb Carlton, president; L. McKisick, assistant to the president; J. C. Willever, general commercial manager; G. M. Yorke, general superintendent of plant, and W. N. Fashbaugh, general superinten-

dent of traffic. Vice-president Belvidere Brooks joined the officials at New Orleans, La., and remained with them the rest of the trip.

MR. W. J. HOLMES, superintendent of tariffs, is in Florida, where he will spend a month.

MR. W. S. BARKER, district plant superintendent, Boston, Mass., and Mr. A. Woodle, district commercial superintendent, Buffalo, N. Y., were recent executive office visitors.

MR. E. D. STONE, commercial agent, New York, told the "Story of the Telegraph" before the members of the Men's Club of St. John's Church, in Jersey City, N. J., February 16.

MR. THEODORE GOODRICH, manager of the Hartford, Conn., Western Union office, gave a lecture at the recent meeting of the Western Union Society of Connecticut, held at New Haven, Conn., his subject being, "The Story of the Telegraph."

MR. B. F. RAGSDALE, assistant district commercial superintendent, Atlanta, Ga., delivered a lecture on "The Story of the Telegraph" to the employees at Savannah, Ga., on the evening of February 8, and repeated the lecture the following day before the students of Richards Business College. Mr. Ragsdale was assisted by Mr. T. D. Guin, who operated the stereopticon lantern.

MR. DAVID B. MITCHELL, manager of the race department of the Western Union Telegraph Company, New York, for many years previous to 1906, who has been suffering from an abscess for several months past, has been removed from the hospital to his home at New Rochelle, N. Y. He is now convalescing.

MR. D. C. GRANT, chief operator of the Albuquerque, N. M., office, has been appointed night chief operator at Denver, Col.

MR. W. J. ROSS, night chief operator at Memphis, Tenn., has been appointed chief operator at Chattanooga, Tenn., to succeed J. H. Pickering, deceased.

JOHN H. PICKERING, aged fifty years, chief operator at Chattanooga, Tenn., died suddenly in the operating room of the company on January 29. A peculiarly touching and graceful event took place in connection with Mr. Pickering's death. The deceased held in his hand a subscription list signed by the office employees for the purchase of a present for manager Tudor, whose resignation was to take effect February 1. Manager Tudor picked it up and substituted his own name for that of Mr. Pickering on the list and indorsed the subscription as a fund for the purchase of a floral tribute to the dead chief operator.

Why Many Operators Fail.

Mr. S. M. English, general manager, Gulf Division, Dallas, Tex., recently addressed a letter to all employees of that division, of which the following is a copy:

"The man who succeeds above his fellows is the man who early in life clearly discerns his object and toward that object habitually directs his powers. Even genius itself is but fine observation, strengthened by fixity of purpose.

"Men seldom fail because they do not know, but because they do not act. All of us know the 'I-told-you-so' fellow who can tell you how and why the other fellow was promoted instead of him and who goes on telling the same story year after year, as his fellow-workers advance and leave him behind.

"Some men know a lot of things they have learned from books, yet they may starve to death because they do not make practical use of their knowledge. They do not combine knowledge with work. There are thousands of this class who never do a useful thing; who are never known to anybody but the census enumerator.

"Knowledge never counts until it is coupled with action.

"Service, the thing that gives a man the right to live, can only be performed by men who unite knowledge with action—men who know how and do it now.

"Learn how to do a thing right, then do it, and you will never be a failure.

"Every man who does not advance has a story to tell of how it happened. He is always ready with an excuse. When he is late, somebody forgot to wake him up. When he doesn't turn out good copy, the typewriter is no good, usually because he never cleans or oils it. When his average is low, he blames it on the wire or the man at the other end. He always thinks that somebody has it in for him and is holding him back. Whatever his excuses may be, they sound good to him, because he is only a poor excuse himself.

"Labor is the basis of inspiration and no man can obtain success without hard work."

"A circular issued by TELEGRAPH AND TELEPHONE AGE concerning Jones' Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students, will no doubt interest those of you with ambition to advance in the service. If you haven't a copy, the same may be had upon application to TELEGRAPH AND TELEPHONE AGE, New York."

Resignation of Mr. T. P. Cummings.

Mr. T. P. Cummings, district commercial agent of the Western Union Telegraph Company at New Orleans, La., has resigned to accept the district agency for Louisiana of the New England Mutual Life Insurance Company of Boston, with headquarters in New Orleans.

Mr. Cummings was born in New Orleans, October 25, 1868, and was reared in Mississippi. He began his business career as a messenger at Jackson, Miss., and while thus employed, learned telegraphy, becoming manager of the Postal Telegraph-Cable Company's office at that place in January, 1891. In 1892 he was appointed manager for the Western Union Company at Greenville, Miss., and in 1900 returned to Jackson as manager for the same company. In November, 1902, he was transferred to New Orleans as manager, and filled that position with success and honor. He was afterward rewarded by being appointed superintendent and later district commercial agent.

Mr. Cummings is very popular among the telegraph fraternity in New Orleans, and their best wishes go with him in his new field of endeavor.

THE CABLE.

THE CABLE SHIP "Restorer," of the Commercial Pacific Cable Company, is now flying the United States flag. She was built in England and formerly carried the English flag, but on account of the existing conditions arising out of the European war, it was deemed best to place the ship under the protection of the United States flag.

REGISTERED CODE ADDRESSES.—The restrictions which the British military censors placed upon the employment of registered telegraphic code addresses during the first three months of the war emphasized the great value of this privilege to the cabling public. Registered code addresses were first introduced by Mr. George G. Ward, vice-president and general manager of the Commercial Cable Company, and since their employment the system has been extended throughout the entire world, saving the public, in the aggregate, millions of dollars. The European nations have a fixed charge per annum for the use of registered addresses, but the Atlantic cable companies make no charge whatever for this privilege, although, in some cases, firms employ as many as ninety registered addresses.—*Postal Telegraph*.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to February 23 as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6; Mole St. Nicholas-Port au Prince, December 4; Sitka-Juneau, February 18.

CANADIAN NOTES.

MR. H. A. LOGAN, manager of the Great North Western Telegraph Company's office at Belleville, Ont., has enlisted as a telegrapher with the first contingent of Canadian troops.

A "HOME GUARD" has been formed in Montreal among the members of the telegraph service of the Canadian Pacific Railway Company. The members include Mr. W. J. Camp, assistant manager; superintendents F. J. Mahon and J. Fletcher, J. M. Mitchell, and about twenty others.

THE VARIOUS CAMPS of the Canadian force at Salisbury Plain, England, have been interconnected by means of telegraph and telephone lines and compact apparatus, the invention of Major F. A. Lister and Captain F. C. Kilburn, of the Divisional Signal Company. The same instrument can be used for telegraph and telephone purposes.

MANY TELEGRAPHERS from different points in Canada have announced their readiness to join the signal company of the divisional engineers. Many other telegraphers are anxious to enlist, but they are debarred by the fact that they are not familiar with the Continental Morse alphabet.

A STAMP WAR TAX has been levied in Canada on telegrams and cablegrams. The tax is one cent upon messages costing fifteen cents or more, and the toll is collected from the sender of the message.

CANADIAN POLES.—The British post-office is considering the question of purchasing telegraph poles of the larger sizes in Canada, the market on the Continent having been closed to it on account of the war.

THE MARITIME TELEGRAPH AND TELEPHONE COMPANY, which operates in the Maritime provinces of Canada, held its annual meeting at Halifax, N. S., February 9. The total receipts for the year were \$631,687 and the net revenue \$113,165.

THE TELEPHONE.

MR. A. S. HIBBARD, the well-known telephone official, Chicago, Ill., has been elected a director of the Chicago Telephone Company.

MR. C. G. DUBOIS, comptroller, American Telephone and Telegraph Company, New York, has been elected a director and member of the executive committee of the Southern New England Telephone Company.

MR. P. H. HOPKINS, acting general manager of the Missouri and Kansas Telephone Company, Kansas City, Mo., has been appointed general manager of the company.

MR. G. W. SIMMONS, of St. Louis, Mo., has been elected a director of the Southwestern Telegraph and Telephone Company of Missouri.

THE ANNUAL MEETING of the American Telephone and Telegraph Company will be held on March 30.

TELEPHONE SERVICE IN NEW YORK.—A bill was introduced in the legislature at Albany, N. Y., on February 19, providing that upon request the New York Telephone Company must install instruments in residences for which there will be a yearly charge of \$30 for unlimited service.

LOWER TELEPHONE RATES IN NEW YORK.—After a long investigation by the New York Public Service Commission into the valuation of the physical properties of the New York Telephone Company, with a view to bringing about a reduction in telephone rates in New York City, the commission has virtually decided to order a reduction, and the company will agree to some cut, the amount of which is as yet unsettled, however. This reduction will be added to the ten per cent reduction made last year.

PHILADELPHIA TALKS TO SAN FRANCISCO.—Telephonic communication between Philadelphia and San Francisco was formally inaugurated on February 11 over the Bell system by three taps on the Liberty Bell, the sound of which over the wire was the signal to a bugler in San Francisco to play "The Star-Spangled Banner." The strains of the national anthem were distinctly and clearly heard by 200 persons who held receivers to their ears in Philadelphia. Dr. Alexander Graham Bell, in Washington, listened to the conversations between the mayors of Philadelphia and San Francisco, and of others.

ENGLISH TELEPHONE LINES DAMAGED BY SNOW.—During a recent snowstorm in England, over 12,000 telephone wires in London and the south of England were brought down. Owing to the scarcity of labor, great difficulty was experienced in repairing the damage. The services of one hundred skilled linemen from the Royal Engineers were loaned by the war office to assist in the work of restoration.

Review of Principal Articles in Contemporary Telephone Publications.

Post-office experiments with automatic equipment at telephone exchanges in England are described by Mr. F. C. G. Twinn in *The Telegraph and Telephone Journal* (of London) for February. As a result of an investigation of the telephone system of the United States, made by certain officers of the British Post-office in 1911, it was decided to fit one or two telephone exchanges in England with automatic equipment, in order that the suitability of this type of equipment for the telephonic service of that country might be determined by practical experience. Arrangements were accordingly made with the Automatic Telephone Manufacturing Company to replace the manual equipment at Epsom and the official switchboard in the general post-office in London by full automatic equipment of the Strowger type, and with the Canadian Machine Telephone Company of Toronto to equip an automatic exchange of the Lorimer type at Hereford. The exchanges at Epsom and the general post-office have been in operation since 1912, and have afforded, on the whole, a very satisfactory service. These two exchanges were equipped with the object of ascertaining whether automatic equipment was capable of affording a satisfactory service in the climatic and traffic conditions existing in that country, and it was not expected these preliminary experiments would show the extent to which the replacement of manual by automatic equipment could be justified on financial grounds. The main question to be determined is how far the replacement of manual by automatic equipment is capable of justification on financial grounds, and it is hoped these experiments will enable the post-office finally to determine the conditions under which the automatic or semi-automatic exchange is preferable to the manual.

Interference of transmission lines from a legal point of view is the title of an article in *Telephony*, by Harold L. Beyer. It gives an analysis of the respective rights of various utilities in public highways, with reference to damage caused by induction and conduction, and presents some important legal decisions on the subject.

Women as "Linemen" is the subject of a short illustrated article in the *Pacific Telephone Magazine* for January. The picture shows Mrs. Nellie Wheelock, of Concrete, Wash., at the top of a pole, with spurs and safety belt. It appears from the story that Mrs. Wheelock, who is employed by the Skagit River Telephone and Telegraph Company, has proved to be a very successful telephone man-

ager. The lineman assigned to her district gave her so much trouble through his unreliability that she purchased a pair of climbers and complete kit of tools for emergency work, and took his work into her own hands. This was in 1910, and since that time she has done all kinds of outside telephone work, installing and disconnecting, as well as switchboard repair work. She has about 300 miles of wire in her territory.

Difficulties out of the ordinary which have been encountered in underground construction work in Philadelphia are described by J. I. Kinney in *Telephony* for February 20. It is the unusual and unexpected difficulties that arise from time to time in laying out the work in congested city streets that tax the ingenuity of the conduit engineer, the author states. In these cases there are no beaten paths to follow. Each presents its own particular problems, the solutions of which require much thought and careful study. The article is liberally illustrated with views of difficult situations met with in the actual construction work.

Chapter III of *Telephony's* Home Study Course for telephone men, which appears in the issue of that journal for February 20, deals with chemical sources of electricity. It is a very complete discussion of the primary battery.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company, New York, attended a directors' meeting of the Canadian Marconi Company at Montreal, Que., February 23.

MR. G. S. DE SOUSA, traffic manager of the Marconi Wireless Telegraph Company, New York, has returned from a trip to Washington and Baltimore on business of the company.

MR. C. H. TAYLOR, engineer of the transoceanic division of the Marconi Wireless Telegraph Company of America, arrived from London on the steamer "Lusitania," February 20. His visit to England was to attend a conference of the English engineers of the Marconi Company.

MR. W. D. TERRELL, radio inspector in charge, Department of Commerce, New York, has been transferred to the same service at Washington, D. C.

ARCHIE THOMAS, aged twenty-one years, wireless operator at the leper colony at Penikese Island, Buzzards' Bay, Mass., and himself a leper, died of pneumonia recently. The colony is thus deprived of an important means of communication with the outside world.

THE MARCONI TELEGRAPH-CABLE COMPANY has introduced two new wireless services to the United Kingdom—the wireless lettergram and the week-end lettergram. The rates for the former to London and Liverpool are sixty cents for the first thirteen words, and to other points, seventy-two cents; for the latter, they are \$1.00 for the first twenty-five words, and \$1.24 to other points.

Wireless in the War.

At the annual alumni day celebration at Columbia University, New York, on February 13, Professor M. I. Pupin told the graduates some things about the use of wireless telegraphy in the European war.

The use of wireless, he said, had transformed the method of manœuvering. The French system has a central station which covers a radius of 200 miles and effects communication with all points of the army. Then there are many substations. The knapsack station is carried about in sections which weigh twenty pounds each by four men, and can be set up in five minutes. The aerial wireless is carried by the airships and the receiving wire is trailed from the aeroplane. There is, of course, no ground connection, but this fact merely limits the radius of the apparatus. Elaborate automobile stations are employed, and even the cavalry carry their stations, with the antennæ sticking out in front of the horses. These cavalry stations are called "wireless whiskers" because of the peculiar appearance of the outfit. There has been only one betrayal of the code of any army.

At four o'clock each morning the English war office sends out its messages to the entire fleet within a radius which covers the Atlantic and goes as far as the Red Sea. He stated that these orders may be heard on the wireless plant at Columbia University any morning. The code is made secret by the shortening of the wave length, and other changes.

Opening of the San Francisco Fair by Wireless Telegraph.

President Wilson, at Washington, officially opened the Panama-Pacific Exposition at noon, San Francisco time—three o'clock Washington time—on February 20, by closing a key which sent a wireless signal, this signal being received through the antenna on the Tower of Jewels on the Exposition grounds. The opening exercises in San Francisco were attended by 50,000 persons.

Messages to President Wilson at Washington were to have been sent over the long-distance telephone, but at the last minute it was decided to use the telegraph.

In sending the signal which officially opened the exposition, the President used a telegraph key studded with gold nuggets, which was used by President Taft in opening the Alaska-Yukon Exposition. Several distinguished government officials were present at the ceremony. Exactly at three o'clock, Washington time, the President closed the key for several seconds amid a burst of hand-clapping.

Operative exhibits are shown by the Western Union and Postal Telegraph-Cable Companies, the American Telephone and Telegraph Company, the Pacific Telephone and Telegraph Company and of the Marconi Wireless Telegraph Company.

Exhibits of electrical apparatus and appliances of all kinds are very numerous and extensive.

Two dollars will bring TELEGRAPH AND TELEPHONE AGE to your address for one year.

MUNICIPAL ELECTRICIANS.

MR. D. C. DONOHUE, who, for some time past, has had charge of the fire-alarm telegraph system in the Borough of Brooklyn, New York, has been transferred to the New York City headquarters of the same department, which are located at 157 East Sixty-seventh Street. Mr. Donohue is an old-time commercial telegrapher, and is well known to the New York fraternity.

THE FIRE-ALARM SYSTEM OF NEW YORK CITY.—Mr. Putnam A. Bates, electrical engineer of the fire department, New York, lectured before the New York Electrical Society February 17 on "The Fire-Alarm System of New York City," in which he reviewed the history of the system; referred to its shortcomings and outlined the plans for its improvement.

CLAXON HORNS IN BALTIMORE FIRE ALARM SERVICE.—The fire department of Baltimore, Md., has installed a number of Claxon horns on posts through the congested district of one of the principal streets to give notice of the approach of fire apparatus. There are five of the horns in the circuit, connected in multiple, current for which is supplied from the engine house in which one of the companies passing the protected district is located. The current is thrown on the circuit by the operation of a time switch controlled by the movement of a switch, which one of the firemen closes as the apparatus leaves the house. The closing of the circuit connects the horn circuit with the street current from which the house is illuminated. The signal is arranged for a continuous blast for one and one-half minutes, when the circuit is automatically opened. Three companies being stationed in the house, which was specially designed for their accommodation, the signal can be repeated for the companies which follow on second and third alarms. To prevent confusion, testing is done at noon daily by a short stroke similar to an automobile signal which, if missed, is promptly reported by the traffic officer. The experiment, which has been in operation for about one month, is very successful and on several occasions has shown its efficiency by clearing the street, giving the apparatus clear passage and minimizing causes of accidents. Mr. J. B. Yeakle is superintendent of fire telegraph, Baltimore.

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.

The Application of Science to Telephone Engineering.*

BY PROF. GEORGE S. MACOMBER, OF CORNELL UNIVERSITY, ITHACA, N. Y.

Prof. Macomber introduced his paper with a chronological record of the development of the telephone engineer, and then continued as follows:

In the early days, before the application of scientific methods, the supposedly most desirable kind of service was determined by a simple guess which was then called judgment. In modern telephony those days have long since passed when a guess unchecked by scientifically prepared data could be passed as good judgment. Nowadays everything must be "Proved In" before it is O. K.'d.

In order to more clearly show the nature of telephone engineering problems, let us consider first, a very common example: Assume that, near a large city in which there is a multi-office telephone system, there is a certain small suburb where, due to improved transportation, real estate development, or some other cause, possibly a proposed reduction in rates, there is liable to be in the near future a rapid and extensive increase in the demand for telephonic service, which has up to the present been so very small that a local central office had not been established; the limited demand being supplied from an adjacent suburban central office.

In such a case the problem of the telephone engineer is to devise and apply a method of study applicable to the given particular case which will give with a high degree of accuracy, the most probable magnitude, location, and class of service which will be demanded not only at the time the proposed construction is completed, but also the probable growth and changes in quantity, location, or quality of service to be demanded for the next three, five, ten, or even twenty years.

The solution of such a problem does not prove to limit the engineer's mental activity to a narrow electric circuit study, but on the other hand, demands the exercise of engineering ability of the highest type. To be sure, the pioneers in telephone engineering have already given us general methods of attack for such problems, but new and better methods are continually being sought and developed. Furthermore, like other engineering problems, this one has to be analyzed and sub-divided into many smaller problems, each requiring special considerations in order to make standard methods of solution applicable to the particular case. Some details of one of the methods in use by telephone engineers for the solution of such a problem will be considered in order to illustrate more clearly the general character of the telephone engineer's methods.

A "Development Study" of the territory under consideration is made by canvassing the territory and recording on a large scale map by means of suitable symbols, the number and class of residences or business establishments in each block. These

data, in conjunction with the general history of the development of the place, and such present and proposed plans for the development of its larger institutions as may be obtained, form the basis of a scientific development study. Such a study can be made to give very reliable data regarding the most probable demands for telephone service of each of the various classes, as well as for the general location of the "centre of gravity" of the telephonic population near which centre the proposed central office should normally be located if suitable space is available at reasonable cost.

From the results of such a development study and other available data bearing on the relation of the proposed central office to the other central offices of the city system, such as the distances, and the probable number of calls between this and each of the other offices, etc., the telephone engineer is able to select the most suitable size and type of central office equipment, the proper number and type of trunk circuits to be installed, and also determine the most desirable one of the many possible methods of operating these trunks so as to give the standard quality of service desired at a minimum cost per call for the given traffic conditions.

Besides many general engineering problems similar to that just outlined, it is necessary to make special studies of various kinds in which advanced physical science is applied in order to obtain better results. This may be illustrated by considering the various problems of telephone transmission.

The extensive introduction of electric lighting systems, direct current electric trolley systems, high tension electric power transmission lines, and finally the grounded alternating current interurban railway system have each in turn greatly increased the difficulty of maintaining quiet lines for the transmission of speech.

In the early days of telephony, single wire grounded circuits were used, but later, in order to improve the service and eliminate the noise due to earth currents, a two-wire, or so-called metallic circuit was adopted.

In order to eliminate the inductive disturbances called "cross talk," a scientific system of transpositions was adopted, and to secure still more immunity from such cross talk, continuous transpositions in the form of insulated twisted pair wires and cables were employed, but bringing the wires close together as in twisted pair increased electrostatic capacity of the circuit and impaired the transmission. Science came to the rescue by replacing rubber as the insulating medium with paper and air. Such paper insulated cable, however, must be kept free from moisture by a suitable covering. Originally pure lead was used for this purpose, but scientific investigation showed that an alloy of lead and tin was more suitable for over-head cables, and quite recently science has shown that an alloy of lead and antimony is still better and cheaper.

Although lead covered paper and air insulated cables are for certain cases very desirable, it was early found that their relatively high capacity and conductor resistance as compared with that of over-

* Abstract of paper read before the engineering section of the American Association for the Advancement of Science, at the Philadelphia convention, December 31, 1914.

head wires, made the use of such cables undesirable for long-distance telephone service. It has been long known that the limiting factors in telegraphic transmission was proportional to the product of the resistance and electrostatic capacity of the line, also that it might be possible to reduce the effect of the line capacity by increasing the line inductance. However, it was not until 1900 that Prof. Michael I. Pupin gave us the scientific solution of the difficulty in the so-called "Loading Coil," and, in addition, the requisite knowledge as to how to apply such coils to practical telephone circuits. Since that time, another interesting and similar scientific solution of the same problem has been given in the Krarup cable. The practical result of thus "loading" telephone lines is that the distance over which satisfactory telephonic transmission can be obtained on a properly loaded line of given construction is from five to eight times as great as on an unloaded line of the same kind or type.

The latest application of science is for the elimination of inductive disturbances set up in telephone conductors by the high tension alternating-current system of the New York, New Haven & Hartford Railroad. The corrective devices referred to consist of so-called neutralizing transformers. The invention is the result of careful scientific investigation, based upon recommendation which originated with Prof. Charles F. Scott. Another interesting and recent application of science affecting telephone transmission is that of the Cooper Hewitt mercury arc telephone relay.

Not only in telephone transmission has it been necessary for the telephone engineer to solve technical problems in advance of the corresponding problems in general electrical engineering, but also in switchboard design. He made use of methods years ago which have only recently come into general engineering use. The central energy relay switchboard was designed and put into use over fifteen years ago. It is the direct result of a scientific motion study similar to those which have but recently been introduced in manufacturing and general engineering.

Not only have motion studies been made by designers of telephone apparatus, but also mental process studies have been and are being made in order that the mental effort on the part of both subscribers and telephone operators shall be reduced to a minimum. It may appear to the average telephone user to be a matter of chance that the operators make use of certain more or less "stock phrases" in making replies to subscribers, but as a matter of fact and scientific interest, these phrases are carefully determined and standardized by many of the better managed telephone companies.

Scientific methods are employed in many other ways. For example, psychological tests have been applied in the selection of switchboard operators and in determining the most efficient ratio of rest periods to the period of work at the switchboard under various conditions.

Even the selection of a name for a new central office in a large multi-office city is not a simple matter but requires careful scientific investigation. The

final choice must be one not readily confused with the names of existing offices. It should be so characteristic of the territory it represents that the name will suggest the general location of the district to the average telephone user. It should not contain certain syllables not definitely recognized over the telephone, and it should not be unduly long.

Another example is the continuous study of methods and systematic means for eliminating troubles and the causes of troubles on telephone lines. So well has the system of testing been worked out, that the number of out-of-order reports has in recent years been very greatly reduced and now a large number of the troubles are discovered and corrected by the telephone company without the subscriber being aware that the trouble existed.

How to Measure the Height of Poles.

Following is a simple and practical method of determining the height of a standing pole, its application, however, being dependent upon the presence of sufficient sunlight to cast a shadow.

Take a wooden rod and drive it into the ground near the pole to be measured. The rod will cast a shadow on the ground. Measure the height of the rod from the ground line and measure the length of the shadow. Then measure the length of the shadow of the pole, and we have all the data necessary to determine the height of the pole. Suppose the height of the rod above the ground to be ten feet and of the shadow five feet, and the length of the shadow of the pole fifty feet. We then apply the rule of proportion in this way, the length of the shadow of the rod is to the length of the shadow of the pole as the height of the rod is to the height of the pole.

This rule expressed mathematically is,

$5 : 50 :: 10 : x$,
 x being the quantity to be determined—the height of the pole in this case. By multiplying 50 by 10 and dividing the product by 5 we get,

$$\frac{50 \times 10}{5} = 100, \text{ the height of the pole.}$$

5
 This principle can be applied to any standing object, such as a tree, a house, a chimney, or anything else that can cast a shadow.

Book on Testing.

"Electrical Instruments and Testing," by Norman H. Schneider, is the latest work on electrical testing, 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 possess a copy of this work. 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.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, MARCH 1, 1915.

Employ the Moments.

No man who despises the moments can meet with large success, either in his own character-building or in his service to his day and generation. Our lives must keep pace with the passing moments if our work is to be telling and lasting. Alertness, watchfulness, readiness are necessary to use the moments wisely.

The Mackay Companies' Annual Report.

The annual report of the Mackay Companies, published elsewhere in this issue, will be read with unusual interest at this time, reflecting as it does the effect of general business conditions upon the telegraph service in the United States. President Clarence H. Mackay points out that increasing operating expenses may necessitate an increase of telegraph rates, in order to prevent the telegraph companies from falling into the condition of the railroad companies.

Intelligent Wireless Ship Operators.

The possibility of the wireless equipment on a steamer being carried away in a storm at sea, has, no doubt, been the cause of more or less anxiety in the minds of those chiefly concerned. Such an occurrence would, under ordinary circumstances, render a ship helpless as far as calling for aid is concerned, but, fortunately, sea wireless operators

are wide-awake and resourceful young men, who do not lose their heads in emergencies. If there is any way to continue the fight for help and life under such trying circumstances they will think of it and put it into execution, as if under the spell of inspiration.

On two occasions recently, where the rescue of lives at sea has been involved, and in which wireless played a preliminary part, it has been recorded that after the equipment had been disabled the exchange of Morse signals between the distressed ship and the rescuing vessel was continued in the darkness by means of lanterns in the hands of the operators.

This temporary expedient opens up a wide possibility in the interests of sea-faring men and sea travelers. Why would it not be a good plan to supply wireless operators with a powerful lamp for such emergency use? Of course, the rays from a lamp cannot compare in penetrative power with the electric waves of the wireless, but, in emergencies, even an oil lamp in the hands of an intelligent operator would be better than nothing. If the ship in distress and the rescuing ship are close by the wireless operators can communicate with each other by means of lamp flashes, or, indeed, in any other manner which permits of dots and dashes being formed and read visibly or audibly.

The most important factor in the operation of wireless is, of course, the operator, and the employment of wireless on ships, with live, intelligent human brains back of it, has added immensely to the safety of lives and property at sea. We do not believe that the wireless operator receives as much credit in the public mind as he deserves, but, in point of fact, he may be said to be the greatest element of safety on board of the ship in times of danger, not even excepting the captain.

Standardizing the Size of Publications.

The rules and regulations of national and many state public service commissions, under whatever titles they are known, prescribe a standard size for documents of every description filed with them. This standard is eight by eleven inches, and it is interesting to note that this size was adopted by TELEGRAPH AND TELEPHONE AGE over twenty-five years ago. After long experience and consideration it has been acknowledged to be the most suitable for reference and handling.

Prior to this standardization of form publications were put out in all sizes and shapes, according to the fancy of those producing them, and without any reference whatever to convenience in handling, but now that system has been applied to the matter it is a source of gratification to us to note that the size of this journal has become the standard.

An Old Tenant.

A record of twenty-one years as a tenant in one building is rare in these days of rapid changes, but that is a distinction which TELEGRAPH AND TELEPHONE AGE is proud of. This journal has occupied its present quarters at 253 Broadway, New York, for twenty-one years, having moved into the building early in 1894.

Electricity.*

BY J. F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER,
POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.
(Copyrighted.)

[NOTE.—The following is the first of a series of articles, written by Mr. Skirrow, dealing with the application of electricity to the telegraph. It is Mr. Skirrow's purpose to make these "talks" as untechnical and plain in their language as possible.]

The class in electricity was in session, and Brown had fallen into a doze. "Mr. Brown! Mr. Brown!" the professor shouted. "Answer the question, what is electricity?" Brown, slowly coming back to earth, stammered, "I—I—I did know, professor, but I've forgotten." "Good heavens!" cried the professor, "what a calamity! Here's the only man who ever knew what electricity is and he's forgotten!"

Now it is a fact that we don't know what electricity is, but we do know what it does and how it does it well enough to enable us to harness it and to put it to work in our business, and though we cannot see it as we can see a solid or liquid, ways have been found to measure its strength and quantity.

Perhaps because the methods of measuring electricity somewhat resemble those used in measuring fluids, electricity is sometimes referred to as a "fluid." It is not necessary for the purposes of this article to discuss the various theories as to the nature of electricity, so let us call it a fluid, because it is probably easier to describe its actions as such than in any other way, and let it go at that for the present.

Now this electric fluid is of such a nature that it permeates all matter. In its normal state electricity may be likened to a mixture of two colors, such as brown and blue, united in even quantities to form a neutral color. We refer to these two elements as "positive" and "negative" electricity, and when separated their attraction or affinity for each other always tends to bring them together again in even quantities so that they may again establish a "neutral" condition.

The energy consumed in separating combined positive and negative charges of electricity from each other in their neutral state is returned when the charges again unite, and this energy may be utilized to perform work.

Let us note here that any fluid may be stationary like water in a cup, or in motion like water passing through a pipe. We may use the term "the charge" in referring to stationary electric fluid and "the current" when referring to moving electric fluid.

A charge or current of electricity may be produced in various ways. One of the simplest methods of creating a charge of electricity is by friction. If a piece of coarse paper is briskly rubbed upon a piece of carpet it will be found that the paper when placed against the wall will adhere to it for a short time. Rubbing the paper and carpet together separates the positive and negative con-

ditions in each and transfers these conditions so that the paper becomes all negative and the carpet all positive. We say that the paper is electrified negatively and that the carpet is electrified positively.

When the paper is placed against the wall it attracts negative conditions from the heretofore "neutral" wall, with the result that the mutual attraction of these negative and positive conditions holds the paper against the wall. After a short time there is a transference of negative and positive conditions between the paper and the wall, both again becoming neutral, and the paper falls because there is no longer any attraction.

A hard rubber comb, a glass rod, or a stick of sealing wax, rubbed with a piece of silk will cause electrification of both the materials used and effects may be observed. It may be noted here that while bodies charged with opposite conditions attract, bodies charged with the same conditions repel each other—hence the electrical rule; "unlikes attract, likes repel."

If small pieces of paper are laid upon a table and an electrified comb or other article is brought within a few inches of them, the pieces will become electrified with the opposite condition, or, as it is sometimes called, "polarity," and will therefore be attracted and drawn up to the comb. As soon as the papers come in contact with the comb, however, their polarity is changed and becomes that of the comb, so they are immediately repelled and fall back to the table. After remaining on the table a few moments, and thereby becoming again neutralized, they are again attracted, and again repelled, and so on. We have here an exhibition of the phenomena of both electrical attraction and repulsion.

All solids, liquids and gases may be electrified by friction, but it is easier to electrify some than others. In the case of materials, such as glass, sealing wax and hard rubber, it is found that only the parts rubbed become electrified, but when metals are used the charge is distributed over the entire body of the metal.

We call materials which readily conduct a charge of electricity over their surface conductors, and materials which do not readily conduct a charge insulators. Conductors or insulators, however, vary in degree, the range of "conductivity" or "insulation" varying similarly to temperature; that is, conductivity and insulation are relative terms like heat and cold.

The conductivity or insulation of materials varies with the temperature and with the atmospheric conditions. Thus a cold wire is a better conductor than a heated one, and a dry glass line insulator is a better insulator than a moisture-covered one, and so on.

Now, if we have means for producing electricity and for causing the electricity to flow along a conductor, such as a copper wire, to a distant point, insulators made of glass to prevent the electricity leaving the wire at its points of support and mechanism at the distant point that will respond when the current flows over the wire, we have the ele-

* From *Postal Telegraph*.

ments of a system by which signals may be transmitted from one place to another by electricity, or, in other words, the means for establishing a telegraph circuit.

The next article will deal with batteries.

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.]

Why is the name "gravity" given to such a cell?
Is the polarization in a gravity cell an advantage or a disadvantage? Explain why.

Why is a gravity cell not suitable for intermittent work? (Page 118)

What is the construction of an Edison-Lalande cell?

How is the copper-oxide element in this cell held in the solution, and what is its action?

What becomes of the hydrogen liberated in the Edison cell, and what is the result?

Is the Edison cell an "open" or a "closed" circuit battery?

What are the voltages of the Léclanché, gravity, and Edison cells?

Is there any way to restore an exhausted gravity cell?

What is the action in such a cell when a current is sent through it in the reverse direction?

What type of storage cell is in general use?

What is the difference between the "soft lead" and the "hard lead" types of storage cells? (Page 119)

Who was the inventor of the original storage battery, and what were its elements?

When a current of electricity is passed through the cell, what is the effect? and if this current be removed and the circuit of the cell closed, what action takes place?

What is the objection to Plante's method of "forming"?

What shorter method was discovered of "forming" the lead plates, and who was the inventor?

How is the modern "grid" manufactured?

What electrolyte is employed for storage batteries?

What are the usual proportions of acid and water in making the electrolyte? (Page 120)

Why is it important to use pure materials in making up the electrolyte?

What means are adopted to increase the current output of the cell and decrease its resistance?

How are the lead plates arranged in a cell with reference to each other, and are the positive and negative plates equal in number?

The positive and negative plates being so close

together, what precautions are taken to prevent short circuits between the plates?

What is meant by the "buckling" of a plate?

Name the principal cause of "buckling."

What is the danger to be avoided in the disintegration of the "active" material of the plates? (Page 121)

Why does the specific gravity of the electrolyte rise during service?

What is the electromotive force of a storage cell on discharge, and how high does it rise in charging?

What is the safe discharge limit of electromotive force?

How is the capacity of a cell rated?

Apart from buckling and disintegration, what is the most serious source of trouble in a storage cell?

What is the cause of "sulphating," and what is its effect?

(To be Continued.)

James D. Reid Memorial.

At a meeting of the board of trustees of the James D. Reid Memorial, which took place on February 24, at 253 Broadway, New York, the monument, now in position over the grave of Mr. Reid in Mount Hope Cemetery, Rochester, N. Y., was formally accepted. Mr. Charles Keck, the well-known sculptor of New York, designed the monument, and it is pronounced to be both appropriate and satisfactory in every particular.

The members of the Association of Railway Telegraph Superintendents, in attendance at their annual meeting at the time of the unveiling ceremony, will be asked to participate in the dedication functions.

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 the ailments 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, 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.

Report (Slightly Abridged) of the Mackay Companies.

Following is the annual report of the Mackay companies, which was issued February 15:

Business depression in the United States, both before and since the outbreak of the war in Europe, has affected your telegraph company in common with other enterprises, and your trustees have been compelled to insist on the most rigid economies in operating expense; besides refusing to pay commissions to proprietors or managers of hotels, apartments, stores and other places where telegraph facilities have been installed for the accommodation of guests, tenants, or patrons; and declining to enter into unprofitable engagements with railroad companies; all of which are drains on the legitimate profits and resources of the telegraph company.

Your dividends have been earned, and as in previous years reconstruction has been charged to operating expenses, and your properties have been maintained in a high state of efficiency. Nevertheless should wages and material continue to increase in value, as they have in the past, it may be necessary to increase telegraph rates just as it has been found necessary to increase railway rates. Unremunerative rates always mean hardship to the operating force and detriment to good service and it may be that the time has come to take measures to prevent the telegraph companies from falling into the condition of the railroad companies. The fact is also thereby emphasized that the reductions in telegraph rates and cable rates on certain classes of business during the past few years have been without justification and such land line telegraph rates as are now more or less inconsistent with other existing land line rates may have to be changed. A readjustment of rates may not be undertaken immediately, but the contingency may arise in the near future, and if so, an increase will be as justifiable as the recent increase of railroad rates throughout the United States, and as proposed in Canada.

There have been no important additions to your cable system during the year, and notwithstanding the abnormal conditions created by the war the cable systems both in the Atlantic and Pacific oceans have been operated without interruption or even serious delay in the service. It must be a source of great satisfaction to the federal government and the general public, in these times of political stress throughout the world, that they have available a cable traversing the Pacific ocean touching only American soil on its way to the Far East, including China and Japan.

On the land line system substantial extensions have been made to new cities and towns. In addition to the stringing of numerous wires, a new pole line has been constructed from Cheyenne to Laramie, Wyo., and from Fort Steele, Wyo., across the State of Wyoming, to Salt Lake City, Utah, via Ogden, Utah, a distance of 412 miles. The standard for fast and accurate service established by your land lines cannot be approached by any other system, and constant study is being made to effect further improvement. The land line messages have been con-

finied to two classes, day business and night business. No sub-classifications are allowed to interfere with the first-class, full-paid, regular telegrams. Innumerable letters commendatory of the company's service prove that this policy is favored by the business community. The fast service of the Postal Telegraph-Cable Company is faster than the fastest or so-called "urgent" telegraph service in Europe, and yet in Europe the fast or urgent service is charged for at three times the regular telegraph rate.

The decision in favor of the Postal Company in the suit against the Western Union and Southern Pacific Companies to prevent the Western Union Company from keeping the Postal Company off the right of way of the Southern Pacific Railway, has been affirmed by the United States Circuit Court of Appeals, thus ending that litigation.

The Western Union Telegraph Company's monopoly in the Republic of Mexico has been referred to on previous occasions. The Postal Company still stands ready to furnish competitive telegraph service between that country and the United States at greatly reduced but yet remunerative rates. The Western Union rate between Mexico City and New York City is \$1.75, and the distance is 2,867 miles. The Postal Company's rate between New York City and San Francisco is \$1, and the distance is 3,400 miles. The Postal Company's wires already reach the Mexican border at El Paso, Tex., and can be used to give telegraph service throughout Mexico, while The Commercial Cable Company is prepared to furnish an alternate route by a cable to Vera Cruz. It certainly is no object to the public either of Mexico or of the United States to continue the present monopolistic service.

The Interstate Commerce Commission several months ago began a systematic investigation into the practices which have grown up with the use of wires leased to brokers, and the enormity of the abuses disclosed prompted the management of your land line system to terminate all leases of that class. It developed that the lessees were carrying on, in addition to their own, a telegraph business for others. They had become, in fact, illegal telegraph companies. Many brokers, non-lessees, complained to the Interstate Commerce Commission that leased wires were a discrimination against them. Furthermore, the diversion of wires from the general public telegraph business to such special purposes handicaps fast service, especially during storms. Hence, in accordance with its determined policy not to allow any interference with its public service, the Postal Company discontinued leasing wires to brokers. The action has received wide endorsement.

The income of the subordinate companies of The Mackay Companies is greater than is required to pay the dividends of The Mackay Companies, but its policy is to obtain from its subordinate companies only enough money to meet those dividends.

The Postal Telegraph Employees Association continues its good work. The association was organized in 1907, with the unique and essential features that no dues should be paid by the employee, and that the members of the association, or their bene-

ficiaries, should receive during sickness and at death certain cash allowances from the company. Practically all of the employees of the company are members of the association. The plan has worked harmoniously and to the great satisfaction both of the employees and of the company. It has been of substantial benefit to the employees in the way of money allowances paid by the company, and has been a benefit to the company in the increased loyalty and efficiency of the employees, who appreciate the spirit shown by the company in looking after their welfare.

A contract with the Canadian Pacific Railway has been renewed. As is well known, that railway is the largest and most important in the Dominion of Canada, and operates its own immense telegraph system. This contract is entirely different from the usual railroad-telegraph contract in the United States. It provides for the interchange of telegraph business the same as between two telegraph companies, and does not burden the telegraph company with deadhead railroad telegrams.

The twelve million dollars realized about five years ago from the sale of American Telephone and Telegraph Company stock is still preserved intact, 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 Mackay Companies has no debts. Its outstanding preferred shares (\$50,000,000) have not been increased during the past eight years. Its outstanding common shares (\$41,380,400) have not been increased during the past ten years. In other words, no bonds, notes or stock have been issued and no debts incurred during the past eight years.

The shares of The Mackay Companies continue to be an attractive investment for the employees of The Commercial Cable and Postal Telegraph systems, and their holdings are constantly increasing, especially as to the preferred shares. Mutual savings associations have been organized and fostered by the company in various cities throughout the country, whereby employees are enabled to buy shares in The Mackay Companies on the installment plan. These mutual savings associations perform other important functions, as were recently described in the *Saturday Evening Post*:

"Take the case of the telegrapher first: In New York and elsewhere many were borrowing from loan vultures at interest rates ranging from 400 to 1,000 per cent a year. By holding the club of attaching their wages over their heads the lenders kept the victims in a state of mental terror, which impaired their efficiency. Frequently the most competent men were forced to jump their jobs to escape this persecution. The result was the formation of the Mutual Investment Association of the Postal Telegraph-Cable Company, which has set a new mark for economic welfare. It is really a savings club. Membership is gained by subscribing to a share of stock with monthly installments. This makes regular saving necessary. There is no limit to the value of a share. Dividends are declared out of the proceeds of the installments, but instead of being paid in cash, they are put to the credit of members, and thus continuous saving is encouraged.

"The earnings are from two sources: One by the investment of the money saved in high-grade stocks or bonds; the second is in loans to Postal employees.

"The association not only encourages its members to save, but by an arrangement with a building and loan association, assists them to get homes. Operators who never knew what the word thrift meant now have bank accounts and are living in their own houses.

"Another evil corrected was the buying of merchandise on the installment plan, which is always costly. Stores that sold employees clothes on weekly payments were also lending them money and covering it up on the books as goods bought. So an arrangement was made by which the investment association would provide its members and other employees with what they needed at cash prices, to be returned to the organization in easy installments and with no interest charged. The association's profit is in the liberal discount it gets from the stores.

"This plan of saving and lending money has proved so successful in New York that Mutual Investment Associations have been started by Postal employees in many other cities."

The report is signed for the trustees by Mr. Clarence H. Mackay, president.

PROFIT AND LOSS ACCOUNT.

FOR THE YEAR FEBRUARY 1, 1914, TO
FEBRUARY 1, 1915.

RECEIPTS.

Income from investments in other
Companies\$4,246,014.19

DISBURSEMENTS.

Dividends paid on
The Mackay Companies:
Preferred shares\$2,000,000.00
Common shares 2,069,020.00
Operating expense, in-
cluding Federal Income
Tax, Transfer Agents,
Registrars, Auditors'
and Trustees' compen-
sation, office rent, sal-
aries, stationery, en-
graving of certificates,
etc. 60,584.58
Balance carried forward. 116,409.61

\$4,246,014.19

BALANCE SHEET.

ASSETS.

Investments in other
Companies\$91,996,160.10
Cash 589,959.01
\$92,586,119.11

LIABILITIES.

Preferred shares is-
sued\$50,000,000.00
Common shares issued. 41,380,400.00
Surplus 1,205,719.11

\$92,586,119.11

How to Write English Correctly.

(Continued from page 93, February 10.)

The constant thought with the writer should be to keep each distinct part of the sentence to itself. Modifiers of nouns are the articles "a," "an," "the" and all adjectives. "A good, brave and true man." Adjectives are readily recognized because they contain some property, quality or essence of the nouns. Adverbs may be joined to adjectives to temper or emphasize their meaning, as a "very" good man. Adverbs modify verbs, as well as adjectives and other adverbs, as, "He drove rapidly"; "he still will lead me" (modifier of verbs). "He drove very rapidly" (modifier of adverb). But adverbs should not be used as adjectives, nor adjectives as adverbs. In the sentence, "The rose smells sweet," "sweet" is an adjective and used adjectively, being a modifier of "rose." The infinitive and all verbs used infinitively take the adjective in this sense, but it must be understood they are not used adverbially. They express a property of the noun and not a mode of action. "Very pleased" is bad form; when "very" is used in such sense it must modify another adverb, as "very much pleased."

There are three kinds of verbs: transitive, intransitive and the neuter verb, "to be." The first takes a direct object after it, as "He struck him." The others do not, as "He sat (intransitive) upon a log." (The preposition, "upon" is required to govern the object. The verb cannot complete of itself the mode of action), and "It is I."

NOTE: "It was him," "It is me," "It is him," "It was her," etc., are all incorrect. The neuter verb takes the nominative before, as well as after it. But the passive form of verbs also rejects a direct object and requires a preposition, as "John was struck by William."

It is to be regretted that the subjunctive mode is going into disuse. Its signs are the conjunctions "if," "though," "but," "unless," "except," etc. But the best writers are substituting for it the indicative or direct form, although retaining the conjunction. "If I be a man," "If I were he," "Though he slay me," etc., are subjunctive; but many writers use, "If I am a man," "If I was he," "Though he slays me," etc.

In the signs of the potential it is well to remember that "may" implies permission; "can" and "could," possibility; "would," a contingency, and "should," an obligation. "Shall," "will" and "shall have" and "will have" offer very nice distinctions in usage, and writers are urged to consult a dictionary and grammar as to their various shades of meaning. The infinitive takes the objective, never the nominative. It is used sometimes as a subject or noun, as "to love is to live." ("To love" and "to live" are both used substantively, one the subject before and the other the subject after the verb.) "To be or not to be, that is the question." ("To be or not to be" is used as a noun in the nominative, the subject of "is.")

A common fault with writers is a splitting of the infinitive and other verbs. This is inexcusable, although many writers of repute are guilty of it. The entire verb belongs together. No other word

should divide it. Here is a sentence taken from one of the most prominent newspapers in the United States, and, too, from an editorial column. "Had the unhappy creature who burned himself almost to death when his nurses were busy been born some centuries ago," etc. Here the verb is "had been born," the pluperfect, indicative, passive of "bear." It is one word and should be so treated, yet the editor divided it far apart. The sentence should have read: "If the unhappy creature who burned," etc., "had been born some centuries ago," etc. But the infinitive suffers most from this butchery. Here is a fixed rule: Keep all of the verb together under all circumstances, whether it be in the indicative, infinitive or any other mode. Introductory expletives should be used sparingly. They serve a purpose in preventing too sudden breaks from one point of a proposition to another. In effect they are conjunctions, but are not regarded as parts of speech. They may be any conjunction, or interjection, even, and are employed by the best writers. "Now it came to pass," "And in those days," "Notwithstanding, the fact remains," etc.

A rock of much stumbling with writers is the proper use of the imperfect and past participle of verbs. "I seen him," "I have saw him," etc., are examples of gross error in this particular. Nouns are always in the objective with a preposition. "Between you and I" is simply execrable, yet a noted British author was guilty of using it. "Between" is a preposition and "me" in the objective, must be used. "You" is correct, because you is objective, as well as nominative. "He hit you" ("you" is in the objective). "You hit him" ("you" here is in the nominative).

Pronouns cause many errors. "Ye" is never in the objective, "thou" is nominative, "thee" objective, "whom," never "who," is used with the infinitive: "Whom to know is life everlasting." Reporters and editors repeatedly are guilty of using "whom" in the nominative, whereas it is objective always. "This," "these" are used with "former"; "that," "those" with "latter." When comparison of adjectives is used, the comparative is referable to two only: "Of the two he is the better man." The superlative involves more than two: "He is the grandest man of his age," "Of the ten contestants he was the greatest."

Write without effort and with clearness. Have distinctly in mind just what you wish to say and record it in words the value and meaning of which you fully understand. Especially avoid exaggeration. Employ strong yet subdued adjectives and adverbs. Do not call a small fire a "great conflagration." Avoid "tautology." Do not write "funeral obsequies," because a "funeral" is an "obsequy" and an "obsequy" is a "funeral." Read Bunyan's "Pilgrims' Progress," and study its style. That book, the pureness of whose style challenges the admiration of all scholars, is remarkable for its simplicity and the elegance of its English. Its author was not a scholar and his knowledge of words was restricted to those in common use among his neighbors. It is no evidence of erudition to use polysyllabic words and those not in general use.

(To be Continued.)

Developments and Opportunities in the Philippines.

Mr. Samuel W. Beach, formerly of the Bureau of Posts, Government of the Philippine Islands, Manila, P. I., who recently returned to his home in Danville, Ill., sends us the following interesting observations and facts concerning affairs in the United States insular possessions:

"Were it not for the ever-lasting cry for 'independencia,' with its consequent political and commercial unrest," says Mr. Beach, "there exists no spot on earth better calculated to live in and make money than in those islands. Through the excellent work of the bureau of health, all of the old-time epidemics and plagues have disappeared, and, with a proper heed of the bureau's cautions, an American may live there with little fear for his health. Good native labor is exceedingly cheap. Farm hands get about ten cents per day, our money. A man can secure the necessary land and plant, say, 5,000 cocoanut trees, very cheaply. Their upkeep requires practically no labor. They bear fruit after the sixth year. After that, for thirty-five years, each tree will yield a net profit of one Yankee dollar annually. Some of our soldier boys of '98 have such plantations, some owning as many as forty thousand trees. That means \$40,000 a year. There are millions of acres of suitable land untouched, unsurveyed and even unexplored. America has discouraged colonization by Caucasians. Then there are other products that may be cultivated easily and cheaply that yield handsome dividends, among them hemp, rice, tobacco, sugar and hardwood and the mining of gold. It will always seem a shame that we have not developed our opportunities in the Philippines. Ex-president Taft, while Governor-General, began filling the brains of the natives with the thought of early independence and that thought has grown beyond control. One might as well give absolute independence to a batch of Indians, and the simile would be complete, provided the Indians comprised seventeen or more distinct tribes, each more or less distrustful of the other, and each having a candidate for 'presidente.'

"Our government has done wonders there. Upon all of the larger islands may be found the best of roads and schools. There were 720 miles of nondescript telegraphs and no telephones when we took possession only sixteen years ago. Now the telegraphs alone aggregate between six and seven thousand miles of wires and cables; the city of Manila has an extensive modern telephone system owned by a private corporation, and throughout the islands the various provinces operate telephone lines connecting the principal cities.

"Some of the telegraph lines penetrate hostile districts, were built under armed guard, and in several districts the American supervising linemen find it safer right now to go over their lines armed. The wireless station at Jolo is protected day and night by armed sentries. Operating the telegraph under such circumstances is no joke, but it has been proved an excellent investment, not from a monetary standpoint, but it has brought those isolated, semi-civilized districts into a closer relation with

the outside, and opened up inter-island trade wonderfully.

"The Philippine insular government operates a telegraph school in the post-office at Manila, open to any native who has spent a few years in a grade school. Here he is taught not only telegraphy but postal work. He stays in school an average of five or six months, during which time he is paid a salary of thirty pesos (\$15) per month. Upon graduation he is placed in some post-office as a student-operator and may then be promoted until he receives as high as 1,440 pesos (\$720) per year. Considering that in Spanish days he could not hope, excepting in rare instances, to receive more than fifteen or twenty pesos a month, it would seem that the Filipino telegrapher-postmaster should be highly loyal, appreciative and satisfied. In reality, very few of them are. It keeps a squad of twelve post-office inspectors on the constant jump to keep them in the straight and narrow path.

"As telegraph operators, Filipinos are very good, some of them acquiring marvelous speed, juggling English, Spanish, Japanese and cipher dispatches as 'pronto' as the American operators. But they fall flat on instrument work, few of them even learning how to adjust a relay. They have not been able to fathom the workings of simple repeater sets, although, undoubtedly, the time may come when they will have mastered the art.

"Thus are the natives in all walks of life. They are immature. It will take several generations to train them so that they may walk among us as an independent people—independent in all that the word implies, and it will be unjust to give them independence until then.

"The successful growth of the telegraph system of the Philippine Islands is due to the untiring efforts of a handful of men who, in 1898, answered the call to arms as volunteers in the signal corps, served as telegraph operators in the campaigns against the Spaniards, the Filipinos and the fierce Moro tribesmen, and when the war clouds blew over, stayed there and devoted the best of their lives to their chosen profession. The present superintendent of telegraph, Captain Rush P. Wheat, is one of these, and Mr. John N. Weir, his assistant; John T. Roberts, chief operator at Manila; Thomas Bower, of the cableship 'Rizal'; John W. Willey, superintendent of telegraph of the Manila and Dagupan Railway, and many others—they were all under fire in the early days, the last-named, Mr. Willey, having been permanently disfigured by having a Moro warrior slash his face with a heavy war bolo.

"These men performed even more dangerous work than did Strouse, Bates, O'Brien, or any of the famous telegraphers of Civil War days, and their memory should be engrossed in the history of famous operators."

Mr. P. W. Rieb, manager of the Western Union Telegraph Company's Cable station at Rye Beach, N. H., in remitting to cover his subscription for another year, writes: "Your paper is a welcome guest at this station."

Care of Telephone Apparatus and How to Locate and Remedy Troubles.

The following article, and those to be published in succeeding issues, are made up from "Hyde's Telephone Troubles and How to Find Them," as well as from other sources. They will be particularly helpful to telephone installers and inspectors, as well as to those having the practical management of telephones.

MAGNETO BELL CONSTRUCTION.

A magneto bell box contains a small generator of current for ringing the bells of another box; polarized ringers for ringing its own bells when actuated by its own generator or that of another box; and, lastly, a switch by which either the bell apparatus or the speaking apparatus may be connected, at will, to the line. In all forms of bell boxes, when the receiver is hung on the hook, the switch connects the bell apparatus with the line wire; and when the receiver is removed from the hook, the switch connects the speaking apparatus with the line. This switch is attached to the hook upon which the receiver is hung, and is operated by the weight of the hook.

The magneto generator is either "short circuited" or "open" in all bells, except when in use. This is accomplished by two wires, one from each extremity of the generator coils. These two wires connect, or make contact with each other, forming a shorter path for the current around the generator than through it. In bridging bells, however, the generator circuit is open when at rest. Thus, when the generator is not in use, the resistance of the coil in the generator is removed from the line, and, also, the inductive effects of the coil. Cutting these coils from circuit, in this manner, improves the working of the line very materially.

In some forms of bells this cut-off or shunt wire is broken when one wishes to ring, by pushing in a button, or closed if a bridging bell. In others it is done by an automatic attachment to the crank shaft, so that while the crank is being turned the shunt wire is broken, or closed if bridged, allowing the current generated to flow to line. As soon as the crank motion ceases, the generator is then cut out by the shunt wire.

The switch before mentioned, which is operated by the receiver hook or fork, has another function in addition to that of connecting the line alternately to the ringing and the speaking apparatus. It closes and opens the circuit of the local battery that works the transmitter.

Nearly all forms of battery used with the transmitter, such as the Leclanche, dry, and others, will weaken and become useless in a short time if the circuit is kept constantly closed and the battery continuously at work. Besides, there is an unnecessary waste of material.

Hence, one of the battery wires passes through the bell box and is connected to the switch in such a manner that, when the receiver is hanging on the hook, the battery wire is broken, and the battery is in a state of rest. But when the receiver is taken down, the switch connects the receiver to the line

wire, and also closes the local battery circuit, so that the local battery is brought into action.

Magneto bells may be either of the series or bridging type; the series bell being looped in on the circuit and the bridging bell connected or "bridged" directly across the circuit.

The ringers of a series bell are generally of about eighty ohms resistance, being necessarily low wound, as the ringers form part of the circuit.

The ill-effects caused by retardation in the ringer coils when bells are connected in series may, in a measure, be reduced by shunting the ringer coils with a resistance coil of four or five times the resistance of the ringers.

Bridging bell ringers range from 1,000 to 2,500 ohms resistance. The bridging bell is used extensively on metallic circuits and grounded lines, when two or more subscribers are placed on the same circuit. When used on metallic circuits the bells are "bridged" across the two wires of the circuit; and "bridged" to ground at each station when used on grounded lines, thus making it possible to operate a number of instruments on one circuit without much perceptible loss. (Should extension bells be used on bridged lines they should be equipped with high-wound ringers, and be "bridged" or "legged" off just as the magneto bells are.)

TOLL LINE OR PARTY LINE BRIDGING BELL.

This style of bell is one that may be rung with an alternating current, but only generates a pulsating current which will not actuate its own or other polarized ringers on the line, but will operate the signal at the exchange. This is done by placing a split bushing on the commutator of the generator, one-half of which is connected with the armature coil. This connects the coil with the line during one-half of each revolution, causes a pulsating or interrupted direct current.

By using this bell, toll stations or subscribers on the same line are enabled to signal the central office without ringing each other's bells, thus avoiding excessive ringing of subscriber's bells, it also prevents toll stations from calling each other direct, giving the main office a chance to check the business.

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The ringers of this style of bell are bridged to earth, two from each side of the circuit.

The bell is equipped with a low-voltage generator, so it will not actuate the high-wound ringers of the bells, but will throw the drop at the central office.

(To be Continued.)

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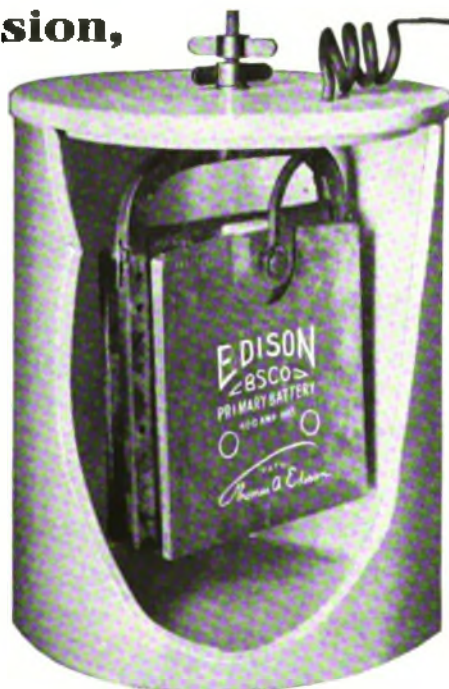
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THE RAILROAD.

Mr. E. C. KEENAN, general superintendent of telegraph, New York Central Lines West, Chicago, was a recent New York business visitor.

Mr. L. B. FOLEY, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York, accompanied by Dr. Lee de Forest, left for San Francisco on February 24, to look into the merits of the Poulsen continuous wave system of wireless telegraphy in use on the Pacific Coast. This is a non-interfering system.

PHEASANT CROSSES WIRES.—In our January 16 issue mention was made of a cross on a line in California caused by a snake. Mr. J. L. Henritzy, superintendent of telegraph of the Colorado and Southern Railway, Denver, Col., writes that one of his linemen cleared a cross by removing a Chinese pheasant, whose neck was in the twist of two wires. As the bird had not been dead over an hour, it made a toothsome morsel for the table, besides supplying beautiful long tail plumes.

Meeting of Western Division of Association of Railway Telegraph Superintendents.

Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railway, St. Paul, Minn., chairman of the Western Division of the Association of Railway Telegraph Superintendents, announces that the regular meeting of that division will be held in the East Room of the La Salle Hotel, Chicago, Ill., on March 17 and 18. One session will be held on each of the two days, beginning at 10 a. m. and ending at 1 p. m. This plan will give the members two afternoons to visit the annual exhibition of the National Railway Appliance Association, which is to be held in the Coliseum and Armory Building in Chicago, March 15-19. The management of the La Salle Hotel has quoted the following special rates to the members of the association: Single room, with bath, for one person, \$2.50 a day; double room, with bath, for man and wife, \$4.00 a day.

Members are requested to make room reservations direct with the hotel management, and as early as practicable.

The following subjects will be presented and discussed:

1. "Pole and Wire Maintenance," paper by Mr. E. H. Ward, of the Western Union Telegraph Company.

2. "Modern Testing Facilities and Their Relation to Railway Wire Plant Efficiency," paper by Mr. W. Rogers, telegraph engineer, Missouri Pacific Railway Company, St. Louis, Mo.

Opportunity will be given to bring up other subjects of general interest for discussion and also to hold an executive session if it is deemed necessary.

3. "Shall Inside Maintenance be Handled by Linemen or Special Equipment Men?" paper by Mr. L. M. Jones, superintendent of telegraph, Atchinson, Topeka and Santa Fe Railway, Topeka, Kan.

Mr. Rogers' paper will give a description of the

latest wire-testing facilities suitable for the use of a wire chief on a railroad.

While the topic assigned to Mr. Jones has been freely discussed at previous meetings, it is one on which there is still a considerable difference of opinion and which it is believed can be further discussed with profit in order to arrive as far as possible at a logical conclusion as to the proper organization necessary to maintain telegraph and telephone equipment on a railroad.

Printed copies of the papers will be sent to the members before the meeting so that all may have ample time to become familiar with their contents, and be prepared to take part in the discussions.

It is believed that the subjects for discussion as outlined will prove attractive and, considering the excellent opportunity afforded to visit the exhibits at the Coliseum, a large attendance is assured.

Rochester Convention of Association of Railway Telegraph Superintendents.

The topics committee of the Association of Railway Telegraph Superintendents held a meeting in the Hotel Statler, Buffalo, N. Y., February 11. This committee is composed of Messrs. J. F. Caskey, chairman, W. Marshall and E. P. Griffith. Up to the present time papers have been promised as follows:

W. H. Hall, superintendent of telegraph, Missouri, Kansas and Texas Railway, "Censorship of Telegrams," which will probably be discussed by H. D. Teed, of the St. Louis and San Francisco, and J. F. Caskey, of the Lehigh Valley.

N. E. Smith, superintendent of telegraph, New York, New Haven and Hartford Railroad, on the subject of "Interference from Parallel Power Lines," to be discussed by Mr. S. L. Van Akin, assistant superintendent of telegraph, New York Central and Hudson River Railroad.

G. W. Nelson and E. E. Hudson, of the Gordon Primary Battery Company, and Thomas A. Edison, Incorporated, respectively, on "Primary Battery for Telephone Transmitter Work on Train Dispatching Lines." These latter papers will probably be discussed by Mr. W. E. Harkness, with an open discussion of the entire convention.

R. E. Chetwood, plant engineer Western Union Telegraph Company, on "Some Features of Construction and Maintenance Work," to be discussed in open session.

J. J. Carty, chief engineer, American Telephone and Telegraph Company, will also present a paper.

The topics committee expects to have six papers, and as the convention will be full of interesting features, it does not believe it would be wise to have matters which will require about all the time available.

Friendship Circle Banquet.

The ladies of the Friendship Circle, Chicago, have been planning for a long time to entertain their husbands and a few guests, and their plans culminated in a most enjoyable banquet at the La Salle Hotel, Chicago, January 25. There were thirty-

four present. The president, Mrs. Wm. Bennett, acted as toast mistress in her usual happy manner, and gave some very good pointers to the men present.

Mrs. J. H. Finley responded to the "Circle," and in a few words explained its aim, which impressed the men principally as a "Talk Fest" Club, the members of which required a year to get a good start to begin to talk.

Mrs. F. T. Wilbur responded to the toast "Man," and caused great merriment in the unique descriptions and attributes she applied to him.

Mrs. F. H. VanEtten followed with a toast to "Woman," which brought out some new traits and characteristics of both men and women, but, on the whole, favorable to the specie.

Mrs. P. W. Drew then added to the spirit of the occasion by a very appropriate story of preserved peaches, in which the recipient of the peaches appreciated the "spirits" in which they were presented more than the peaches themselves.

Messrs. Wm. Bennett, E. C. Keenan and P. W. Drew, made some humorous remarks befitting the occasion.

During the repast the guests were entertained by an orchestra and a soloist.

Train Dispatching by Wireless.

At a largely attended meeting of the New York Railroad Club, February 19, Mr. L. B. Foley, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York, read a paper on "Train Dispatching by Wireless." Among those present at the meeting were Messrs. David Sarnoff, contract manager, Marconi Wireless Telegraph Company of America, New York; J. L. Hogan, jr., National Electric Signaling Company, and the following railroad telegraph superintendents: N. E. Smith, New York, New Haven and Hartford, New Haven, Conn., and F. G. Sherman, Central Railroad of New Jersey, Jersey City, N. J., and S. L. Van Akin, assistant superintendent of telegraph, New York Central and Hudson River, Syracuse, N. Y.

Mr. Foley's paper was, in the main, descriptive of the work done on the Lackawanna road in applying wireless to the operation of trains, which has already been described at length in these columns.

The first passenger train was equipped with wireless telegraphy, and messages transmitted to and from the train and fixed stations at Scranton and Binghamton on November 21, 1913.

The Lackawanna Railroad Company, he said, first made experiments with the wireless telegraph and telephone in 1909, but the apparatus at that time was not sufficiently developed to be of practical use. During the early part of 1913 towers were erected and wireless telegraph stations installed at Scranton and Binghamton, and it was found that the service between these points was equally as satisfactory as the Morse telegraph, and could be relied upon when the telegraph and telephone service was impaired.

The company now has five stations equipped with Marconi apparatus, as follows: Hoboken, Scranton, Binghamton, Buffalo and two limited passenger trains.

In discussing Mr. Foley's paper Mr. Sarnoff, in referring to the tuning of wireless apparatus, said that the latest developments provide for continuous wave transmission and that the special types of receivers used in connection with this apparatus afford greater selectivity. Experience has shown that wave lengths on the Lackawanna system of the order of 1,500 to 2,000 meters are much more effective than wave lengths of lower value. The speed of the train has no apparent effect on the reception or transmission of signals. There are more ships fitted with wireless entering the port of New York, Mr. Sarnoff said, and there are more coast stations of various types and power located close together than in any other city in the world; yet seldom, if ever, is there a case where a radio message is not delivered because of interference.

Land line operators, he continued, could soon learn the Continental code and easily become familiar with the operation of wireless apparatus. The electrical force of any railroad should have no difficulty in installing a wireless set and later maintaining it.

In a written communication Mr. J. F. Caskey, superintendent of telegraph of the Lehigh Valley, stated that sleet storms were more disastrous now than they were twenty-five years ago, due largely to the heavy load carried on the poles, and when the railroads suffer from lack of telegraph and telephone communication and when their signal wires break down due to excessive storms, it is a more serious matter to-day than it was years ago. There are three ways of maintaining service. First, by building stronger lines of poles; second, underground construction, and, third, the development of a wireless plant. He did not doubt that a wireless plant could be made of great value, but thought there might be some confusion in communicating with dispatchers and fixed stations if a large number of trains were equipped with wireless. Referring to governmental control of wireless, he thought that if there is danger of the government interfering at times or causing the railroad companies to discontinue the use of their apparatus, it would be a serious matter. He also referred briefly to the experiments with wireless telephony and thought that the expense and effort are worth while. He commended the work on the Lackawanna.

Mr. John L. Hogan, jr., F. G. Sherman, and N. E. Smith also participated in the discussion. Mr. Smith dwelling particularly upon interference from high-voltage transmission lines.

OLD TIMERS IN NEW BRUNSWICK, N. J.—Twenty-three old-time telegraphers held a meeting and banquet in New Brunswick, N. J., February 10. A permanent organization was formed, with W. H. Everson as president; W. V. Kibbe, vice-president; J. F. Downing, secretary; G. V. Phillips, treasurer. A committee was appointed to select a name for the organization.

OBITUARY.

J. SHEETS, a well-known operator in the South, died at Wilson, La., February 13.

EDMUND D. KEOGH, formerly a telegraph operator of Chicago, died in Burlington, Iowa, February 10.

T. LYNCH, formerly manager of the Western Union Telegraph office at Wilkesbarre, Pa., died at Upper Pittston, Pa., February 14.

H. WARD LEONARD, aged fifty-four years, a well-known electrical engineer and inventor of New York, died suddenly while attending the annual dinner of the American Institute of Electrical Engineers at the Hotel Astor, New York, January 18. Mr. Leonard was associated with Mr. Thomas A. Edison in the early days of electric lighting, and among his inventions were resistance units and other devices used in telegraph operation.

SIDNEY F. SHIRLEY, aged fifty years, former operator for the *Boston Globe*, died at his home in West Everett, Mass., February 12. His death was caused by a general breakdown in health. Deceased was one of the most prominent operators in Boston, and had a wide circle of friends among telegraphers and newspaper men. After the *Boston Globe* wire had been restored during the great blizzard in 1888, Mr. Shirley received 16,500 words in less than eight hours, copying with a pen. In 1906 he took a prize at the Boston telegraph tournament. While employed by the *Globe* he was for some years correspondent of several of the country's leading newspapers. After leaving his newspaper position he entered the service of the banking house of Lee, Higginson and Company, and worked one of its fastest wires. He was with this firm for five years until two years ago, when he was stricken with illness, from which he never recovered.

Death of G. T. Williams.

George T. Williams, aged eighty-two years, a well-known telegraph pioneer and official, died at his home in Cleveland, Ohio, February 10. In 1850 he learned telegraphy and was appointed operator at Newcastle, Pa., in 1851. Later he was sent to Pittsburgh, and was an operator in the office of the Ohio Telegraph Company, where Andrew Carnegie was a messenger boy.

Mr. Williams entered the Western Union service in 1856, and became manager at Leavenworth, Kan., in 1859. In 1862 he was appointed superintendent of all lines west of St. Louis, and in 1866 was transferred to the Cincinnati district for the Western Union Company. He resigned this position in 1881 to accept one as builder and superintendent of a line on the "Nickel Plate" railway between Buffalo and Chicago. When he retired from active business in 1892, he was superintendent of telegraph for that railroad system. In the war days, Mr. Williams worked with Colonel R. C. Clowry at St. Louis. Mr. Williams was well known throughout the country. Since his retirement from active service he has been an occasional contributor of matter of historical value to the columns of TELEGRAPH AND TELEPHONE AGE.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 581 and 582 to meet the claims arising from the deaths of L. A. Shape, at Milwaukee, Wis.; J. Long, at Westfield, Mass.; C. C. Lewis, at Norfolk, Va.; W. Moake, at New Orleans, La.; F. Lund, at Brooklyn, N. Y.; C. S. Phillips, at Alma, Mich.; W. R. Williams, at Seattle, Wash.; G. W. Davis, at Jacksonville, Fla.; J. A. Kilcourse, at Louisville, Ky.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

The branch office at 107 South Street will soon be moved to handsome new quarters at No. 8 Fulton Street, and the office at 276 Eighth Avenue is to be moved to 269 West Twenty-third Street.

The office in the Bath Beach section of Brooklyn has been moved to Fifty-third Street and New Utrecht Avenue.

CHICAGO WESTERN UNION.

A conference called for the discussion of the subject of sending machines took place on the fourth floor of Western Union Building, Chicago, Friday afternoon, February 12. Mr. T. W. Carroll, division traffic superintendent, addressed the meeting for a few minutes and an interesting paper was read by Mr. Fred Ford, concerning records of "bulls," as found in the claim department.

One of the more important questions brought before the conferees was whether it was advisable or not to adopt a standard adjustment of sending devices. "Rag-time" sending causing a whirlwind of dots and dashes entirely too long was among the minor topics discussed.

Many other phases of the subject were discussed, with a view to improving and perfecting the service, and various plans were suggested for the elimination of errors, but no definite action was taken at this session. Another conference will be held at an early date.

Among those present were chief operator E. T. Jones, assistant chief operator A. J. Fuller, night chief operator C. H. Shell, assistant night chief operator E. F. Wach, wire chief W. F. Webber, and night wire chief C. J. Phelps, besides supervisors of the traffic department, and quad-room attendants.

Washington Irving in "Rip Van Winkle" says, "Are we so soon forgotten when we are gone?" Miss Fannie Bogart, of the Marinette, Wis., office, does not forget her friends who have been kind and patient with her during her early experiences in the telegraph business. She has forwarded to the Chicago force some poetry of a very interesting character. In it she mentions the signs of many of the operators, all of whom were patient and kind to her in her trials as a beginner at the receiving table and as a novice in the use of a typewriter. Among those mentioned were "UN," "JM," "PI," "GB," "W3," "JS," "VS," "HA," "FB" and "EW." Some of us old boys who have tried to lend a helping hand to those less experienced on the wire often wonder if these kindnesses and acts of self-sacrifice are really appreciated and remembered.

Earl N. Syfert, aged twenty-one years, a former Chicago operator, died in Peoria, Ill., February 2. He was of the new generation of fast senders, and his lively and witty disposition won for him many friends. Funeral services were held at Oquawka, Ill. He is survived by his wife.

Frank H. Gournoe, aged forty-two years, died on February 20, of pleuro-pneumonia, after a week's illness. He was chief clerk to chief operator E. T. Jones. Mr. Gournoe was well known in the South and North as traveling auditor. He also served the company as chief clerk to Mr. F. H. Tubbs while the latter was district superintendent.

ST. LOUIS WESTERN UNION.

Manager W. H. Spain gave a lecture at Central Library in this city to the employees of the company, his subject being "The Story of the Telegraph." The lecture was illustrated.

Mr. W. J. Dill, night repeater chief, did not report, as usual, at 5 p. m. on the night of February 16. There is a reason why. He was detained at his home, looking over his "male," which the "Stork Post" delivered to him in an eight-pound package at 11:30 a. m.

Mr. Geo. A. Riber, repeater chief in the Chicago division, has been confined to his home with the grip since February 12.

Mrs. M. J. Cassidy, mother of Mr. M. J. Cassidy, late night chief operator, died at her home February 16. Some beautiful flowers were sent by Western Union employees and co-workers, with their sincere sympathy.

The Western Union Electrical Society has changed its night of meeting to the third Thursday in each month. The main feature of the meeting of February 18 was the lecture upon the history and development of the telegraph, illustrated by stereopticon views, by Mr. W. H. Spain, manager of the St. Louis office. There was a large attendance.

SPOKANE, WASH., WESTERN UNION.

On January 27 the employees gave a very enjoyable dance and card party at the Eagles Hall, at which 185 guests were entertained. Music was furnished by Reamer's orchestra. The reception

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.

committee was composed of T. F. Barnett and J. J. Rupp, of the automatic department; wire chief C. D. Weightman and wife, manager B. S. Jones and wife, Frank Smith, Florence Giffin, A. A. Salmon and wife, chief operator T. P. McKinney, B. L. Youngs and wife, E. J. Lasalle and W. W. Lipscomb. Chief operator McKinney welcomed the friends on behalf of the employees in a short and appropriate address and then started the grand march with manager B. S. Jones and wife as head couple, followed by Mr. and Mrs. A. W. Niemeyer, both old former employees. During the evening manager Jones called Mrs. Niemeyer, W. F. Straub and T. P. McKinney to the platform and introduced them as three of the oldest employees, having been employed in Spokane before the fire in 1889. At 10:30 p. m. lunch was served, after which dancing and card playing was resumed and continued until midnight. The invited guests were highly pleased with the entertainment.

District traffic superintendent J. P. Barnhart, of the Mountain Division, Denver, Col., was a recent visitor.

District traffic superintendent G. D. Hood, of Seattle, visited us on January 25 and 26.

Day traffic supervisor O. Sellsted, of this office, has been on the sick list since January 22, suffering with pleurisy. W. W. Lipscomb is acting supervisor during Mr. Sellsted's absence.

The recent storm in the central states has caused an influx on the northwest route. During the heaviest period a second printer and one Morse sender was placed on the Spokane-Helena trunks.

A steady increasing business is promised the northwest for 1915.

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ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 20 to 25, Full Grade, \$1.25; Half Grade, 62c. 25 to 30, Full Grade, \$1.50; Half Grade, 75c. 30 to 35, Full Grade, \$1.75; Half Grade, 87c. 35 to 40, Full Grade, \$2.00; Half Grade, \$1.00. 40 to 45, Full Grade, \$2.25; Half Grade, \$1.12. 45 to 50, Full Grade, \$2.50; Half Grade, \$1.25. 50 to 55, Full Grade, \$2.75; Half Grade, \$1.37. 55 to 60, Full Grade, \$3.00; Half Grade, \$1.50. 60 to 65, Full Grade, \$3.25; Half Grade, \$1.62. 65 to 70, Full Grade, \$3.50; Half Grade, \$1.75. 70 to 75, Full Grade, \$3.75; Half Grade, \$1.87. 75 to 80, Full Grade, \$4.00; Half Grade, \$2.00. 80 to 85, Full Grade, \$4.25; Half Grade, \$2.12. 85 to 90, Full Grade, \$4.50; Half Grade, \$2.25. 90 to 95, Full Grade, \$4.75; Half Grade, \$2.37. 95 to 100, Full Grade, \$5.00; Half Grade, \$2.50.
M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 6.

NEW YORK, MARCH 16, 1915.

Thirty-third Year.

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The Western Union Ticker Service.

By C. R. TILGHMAN, GENERAL SUPERVISOR, TICKER SERVICE, WESTERN UNION TELEGRAPH COMPANY, NEW YORK.

(Concluded from page 101, March 1.)

Another type of ticker used very generally by the Western Union Telegraph Company is what is

known as the "Universal" ticker and is an improvement on the old Edison instrument. It has two neutral magnets, one to operate the type wheels and one to do the printing. Two wires are required. The operation of the ticker is very simple. It is driven direct by the battery and only one polarity of current is required. It has no springs or weights to be wound and it has fewer parts than any other type. The equipment for a transmitting plant is shown in Fig. 4, and consists of a six-inch by twenty-inch slate panel, with fused knife switch and resistance lamps, two piano-key transmitters, a double-pole double-throw knife switch, together with the type and press relays, which are six ohms each, all mounted on the panels, as shown in Fig. 4.

The connections are so simple they can be seen at a glance. The 110-volt current is brought to the fused knife switch on the lamp panel, thence to the type relays on the right side of the panel shown in Fig. 5, thence through the double-pole double-throw switch to the type break wheel on the transmitter to ground. The connections for the press side are the same, with the exception that the left-hand relays and apparatus are used. The current in these relay circuits should be about 250 milliamperes. There are fifteen contacts and fifteen breaks on the type break wheel and the contacts are longer than the breaks. This is to insure a firm closing of the type relays. The press break wheel has thirty contacts, and they are smaller than the thirty breaks. When the transmitter is running at about eighty revolutions per minute the type relay armature should vibrate stronger with the closing or down

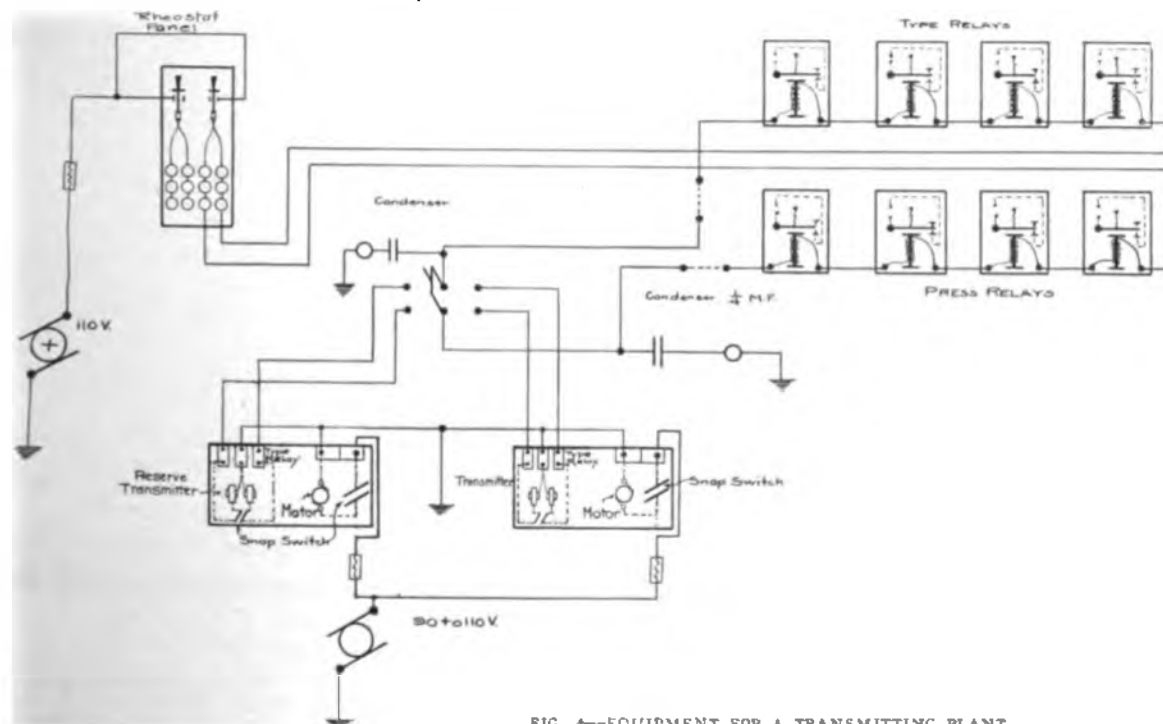


FIG. 4—EQUIPMENT FOR A TRANSMITTING PLANT.

stroke than with the up stroke. The press relay should be adjusted so as to normally stand open and only close while a key is depressed and the trans-

mitter stopped. presses a key and stops the transmitter, thus closing the press relay in the transmitting station, the contact points of this relay shunt out a lamp resistance

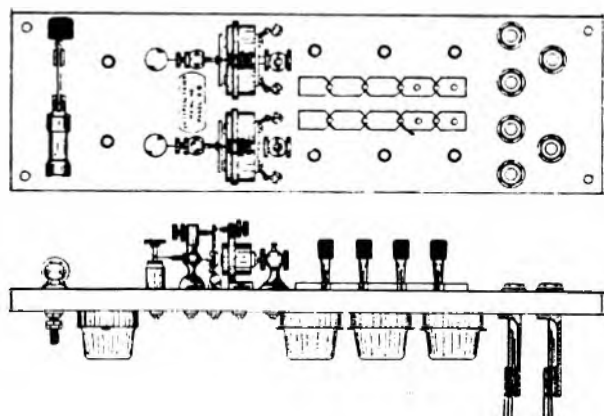


FIG. 5—SWITCH AND TYPE RELAYS.

mitter stopped. The connections for the main line are shown in Fig. 6 and need no explanation.

The amount of current used on the ticker line is 300 milliamperes. Any number of these circuits can be worked from one transmitter. The second transmitter shown is for reserve. This Universal ticker is used by the Western Union Telegraph Company very extensively for reporting baseball matter and for market quotations.

Like the self-winding ticker, the Universal can also be worked over a long-distance, single-conductor circuit. The connections for the long-distance panel at the transmitting stations are shown

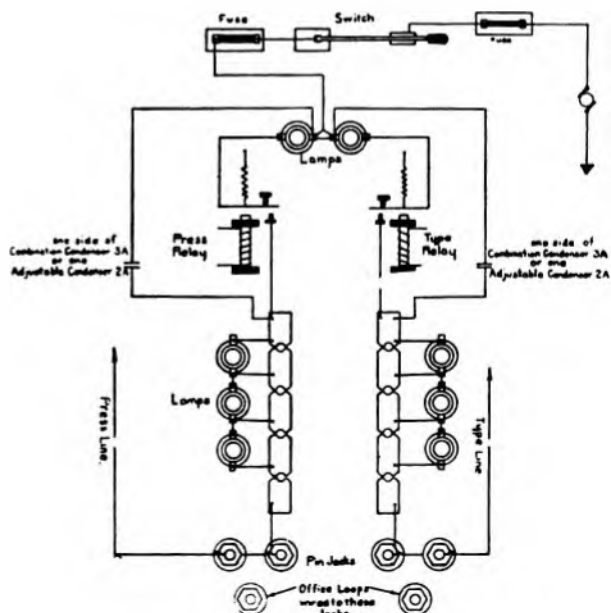


FIG. 6—MAIN LINE CONNECTIONS.

in Fig. 7, and at the distant or branch station in Fig. 8.

An alternating current of fifty to sixty milliamperes is sent over the wire and this vibrates a polar relay in the branch station. A local battery connected to points of this polar relay operates the type wheels of the tickers. When the operator

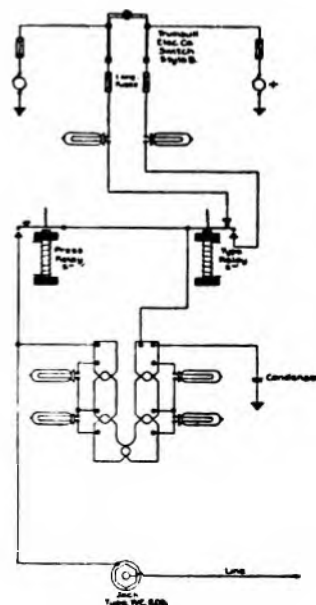


FIG. 7—CONNECTIONS OF LONG-DISTANCE PANEL AT TRANSMITTING STATIONS.

which increases the current in the long-distance line to about 110 milliamperes and thereby closes the

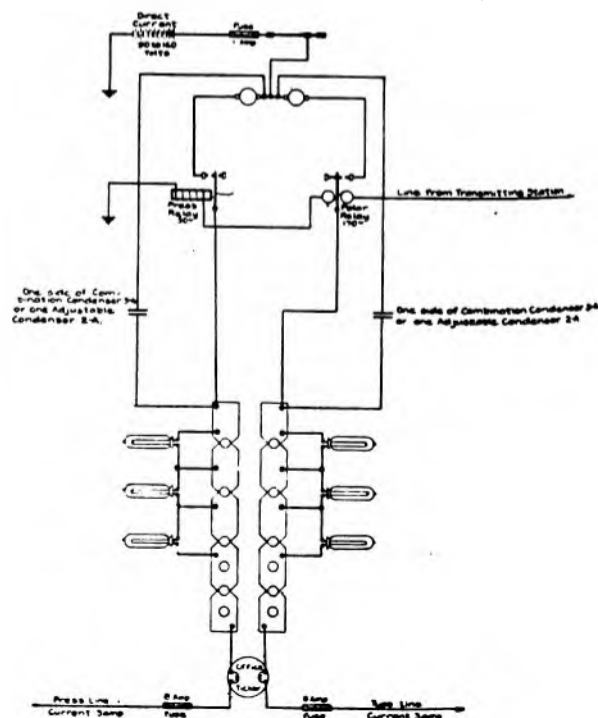


FIG. 8—CONNECTIONS AT DISTANT OR BRANCH STATION.

press relay in the branch station; the local battery then closes the press relay of the tickers and prints the character. This press relay should be adjusted to stand open on the fifty or sixty milliamperes that operates the polar relay. This is easily done, for the polar relay is wound to 170 ohms, while the press relay has only fifty ohms.

The equipment in several towns can be operated on one long-distance circuit, and the circuit can be repeated to other circuits. Long-distance circuits of this kind have been worked 100 miles or more, and then connected by repeaters in three or four directions to from fifteen to twenty other towns, making some of the circuits over 300 miles long. The speed of the type wheels is from seventy-five to eighty revolutions per minute, equal to eighteen to twenty cycles per second.

Unison on all of these tickers is maintained by a small unison worm on the type wheel shaft and a unison arm which follows around in the worm to a lockpin. This stops the wheels until the operator presses the unison key and that throws up the unison arm and allows the wheels to again revolve.

Telegraph and Telephone Patents.

ISSUED FEBRUARY 16.

- 1,128,279. Electric-Wave Amplifier. To H. De F. Arnold, East Orange, N. J.
- 1,128,280. Thermionic Detector. To H. De F. Arnold, East Orange, N. J.
- 1,128,292. Electric-Wave Amplifier. To E. H. Colpitts, East Orange, N. J.
- 1,128,422. Printing Telegraph Receiver. To A. F. Dixon, Newark, N. J.
- 1,128,469. Automatic Telephone Exchange. To G. W. Lorimer, Piqua, Ohio.
- 1,128,600. Electrical Type Telegraph. To F. C. Grasmé, Hoboken, N. J.
- 1,128,646. Telephone-Exchange System. To J. L. Wright, Washington, D. C.
- 1,128,660. Call-Distributing Telephone System. To H. P. Clausen, Rochester, N. Y.
- 1,128,701. Central-Station Switch Apparatus for Automatic Telephone Systems. To A. F. Linquist and J. J. Brownrigg, Chicago, Ill.
- 1,128,777. Telephone System. To C. E. Hague, Rochester, N. Y.
- 1,128,817. Valve-Detector for Wireless. To G. W. Pickard, Amesbury, Mass.
- 1,128,857. Selective Signaling System for Party Lines. To E. B. Craft, Hackensack, N. J.
- 1,128,927. Telephone Repeating Device. To D. H. Wilson, New York.
- 1,128,930. Telephone System. To F. V. Young, Lyndhurst, N. J.
- 1,128,943. Telephone Relay. To S. G. Brown, London, England.
- 1,128,944. Electrical Relay. To S. G. Brown, London, England.

ISSUED FEBRUARY 23.

- 1,129,087. Telephone Receiver. To E. Grisinger, Buffalo, N. Y.
- 1,129,357. Lightning Conductor for Telephone Lines. To M. G. Mitchell, South Bend, Ind.
- 1,129,543. Automatic or Semi-Automatic Telephone-Exchange System. To G. A. Betulander, Södertörns, Villastad, Sweden.
- 1,129,821. Wireless Telegraphy. To L. Tronchon, Paris, France.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on March 10:

American Telephone and Telegraph Co.	120½
Mackay Companies	75
Mackay Companies, preferred	67
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	23¾
Western Union Telegraph Co.	63¾

PERSONAL.

MR. W. J. JOHNSON, formerly with the Western Electric Company, and later with the Stentor Electric Manufacturing Company, New York, has severed his connections with the latter company to engage in other business.

MISSSES AGNES L. AND SUSIE L. HORNER, of Lynchburg, Va., daughters of Mr. R. W. A. Horner, chief operator of the Western Union Telegraph Company at that point, together with Miss Margaret Gilkeson, of Staunton, Va., were recent New York City visitors, and called on many of their father's telegraph acquaintances while in the city.

MR. JAMES HARVEY NICHOLS, the well-known old-time and military telegrapher of Denver, Col., in commenting on the recent death in Nice, France, of Mrs. G. B. McClellan, gives some interesting reminiscences regarding the telegraphing he did for General McClellan while the latter was in the command of the Army of the Potomac. The general, who had at the time been married only a year or two, sent telegrams every day to his wife, to whom he was very much devoted, detailing all the events of the day. Mr. Nichols sent hundreds of such messages. Mr. Nichols was also the sender of the telegram from General Grant to President Lincoln, announcing the surrender of Lee and the close of the war.

Meeting of Joint Committee on Line Construction.

The fifth meeting of the National Joint Committee on Overhead and Underground Line Construction was held on Wednesday, February 24, in the rooms of the American Institute of Electrical Engineers, New York. The committee devoted practically all day to continuing the work of revising the present power-wire crossing specifications, and dividing the work up into sections to be apportioned to various sub-committees for revision.

The committee would greatly appreciate advice as to desirable requirements, and also detail criticism of any of the clauses of the present standard power-wire crossing specifications.

The meeting adjourned to meet March 31. Mr. R. D. Coombs, 30 Church street, New York, is secretary of the committee.

ELECTRICAL SHOW IN NEW YORK.—The ninth consecutive electrical show will be held at the Grand Central Palace, New York, from October 6 to October 16. Mr. Arthur Williams is president.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. EDWARD REYNOLDS, vice-president and general manager, and Mr. C. F. Leonard, superintendent, New York, made a trip of inspection through the state of Connecticut during the first week of this month.

MR. W. I. CAPEN, vice-president of this company, is spending a month's vacation in Tampa, Fla.

ROANOKE OFFICE.—This company's office at Roanoke, Va., is being enlarged and remodeled in a handsome manner. The improvements will be completed in April. Mr. E. Clyde Cooksey is manager.

NEW LINE IN FLORIDA.—This company is building a new line from Tampa to Jacksonville, Fla., by way of Dade City, Leesburg and Ocala. Mr. G. W. Ribble, superintendent at Atlanta, Ga., was in Ocala recently in connection with the construction work. The company is also rebuilding its line between Jacksonville and Tampa, which runs via Palatka and Orlando.

CONGRATULATIONS BY DIRECT WIRE TO SAN FRANCISCO.—At the celebration of the opening of the Panama-Pacific exposition, held by the California Society in New York, on the night of February 20, telegrams of congratulation were exchanged between the officers of the exposition and the members of the society over a direct Postal wire. Mr. Clarence H. Mackay is president of the society.

DAMAGES FOR BROKEN CABLE.—A decree has been granted by the United States District Court, New York, for damage to a submarine cable of the Postal Telegraph-Cable Company by a dredge of P. Sanford Ross, Inc. The dredge, while working in the Arthur Kill, between Staten Island and New Jersey, caught and broke the cable with its anchor. The cable connected Staten Island with the New Jersey main land in New York harbor. The principal question in the case arose from the objection to the jurisdiction of the court, upon the theory that the cable was a land structure, and that no maritime damage occurred of which jurisdiction could be had by an admiralty court. The plea to jurisdiction was overruled and the libellant was awarded a decree as stated.

FORMER OPERATORS IN THE MINISTRY.—Many former telegraphers have graduated from the telegraph key to the pulpit. Rev. Henry G. Budd, now president of the Wilmington, Del., Conference Academy, a divine of the Methodist Episcopal Church, began his business career as a telegraph operator and train dispatcher.

WILLING TO LEARN ITALIAN.—A newly appointed manager in a small town received a notice that hereafter cablegrams will be accepted in the Italian language. The manager immediately reported to his superintendent that he was not familiar with the Italian language, but if the matter was of sufficient importance, he would take lessons.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

MR. H. C. WORTHEN, general manager, Southern Division, Atlanta, Ga., announces the following changes in his division: The fifth district, comprising the states of Alabama and Mississippi, has been created, with Mr. J. F. Wilson in charge as district commercial superintendent, at Meridian, Miss.; the second district will comprise the state of Georgia; the fourth district will comprise the states of Kentucky and Tennessee; the second district, district commercial superintendent, Atlanta, Ga., will continue to be the office of record for the state of Alabama; the fourth district, district commercial superintendent, Nashville, Tenn., will continue to be the office of record for the state of Mississippi.

SUPERINTENDENT W. A. SAWYER has returned from a business trip through his district.

MR. E. D. STONE, commercial agent, New York, gave a lecture on "The Story of the Telegraph" before the Men's Club of St. Stephen's Church, Jersey City, N. J., on the night of February 24.

MR. S. R. CROWDER, of the plant department, New York, has been transferred to the traffic department as equipment lay-out engineer.

MR. J. H. OTEY, former district plant superintendent at St. Louis, Mo., has been transferred to New York on valuation work.

PRESENTATION TO MR. A. C. TERRY.—The managers and other employees of the commercial department of offices in New York state transferred from the third to the new seventh district, presented Mr. A. C. Terry, superintendent of the former district, with a mahogany case chime mantel clock, as a token of respect for his kind and thoughtful efforts in the past.

MR. R. H. TUDOR, former manager at Chattanooga, Tenn., has been transferred to the staff of Mr. S. L. Burts, division traffic superintendent, Atlanta, Ga. Mr. H. H. Kirkpatrick, former assistant manager at Memphis, Tenn., succeeds Mr. Tudor at Chattanooga.

MR. W. A. POWERS, formerly wire chief at Detroit, Mich., has been retired on a pension.

MR. O. McCULLEN, wire chief, Washington, D. C., has been transferred to the traffic department at the same point.

MR. S. C. BRITT, formerly night chief operator at Mobile, Ala., has been appointed chief operator at Jackson, Miss., vice W. H. Sarratt.

MR. C. E. JONES, former manager at Hamilton, Ohio, has been appointed manager at Dayton, Ohio, to succeed Mr. E. D. Keyes.

MR. S. P. STEVENSON has been appointed acting manager at Yonkers, N. Y., vice A. H. Sengstacken.

A NEW INDEPENDENT OFFICE has been established at Lakeville, Conn., with Mr. Thomas Martin as manager.

A MEETING OF MANAGERS of the first district was held in the office of district commercial superintendent W. A. Sawyer in February. Among those present were the following managers: W. H. Spry, Newark, N. J.; A. J. Collier, Jersey City, N. J.; F. C. Fraser, Hoboken, N. J.; R. W. Aldrich, Plainfield, N. J.; D. L. Doran, Paterson, N. J.; W. A. Sellers, Dover, N. J.; W. H. Linder, Morristown, N. J.; C. M. Fulton, St. George, S. I., N. Y.; S. P. Stevenson, Yonkers, N. Y.; W. B. Kanoff, New Rochelle, N. Y.; C. R. Arnold, Mt. Vernon, N. Y.

THE PLANT DISTRICTS of the Western Division have been reformed on the basis of state lines, each district, however, comprising more than one state. The district plant superintendents in charge are as follows: Mr. W. W. Watt at Chicago, first district, comprising Illinois, Iowa and Missouri; Mr. G. E. Sharp at Cleveland, Ohio; fifth district, comprising Michigan (except upper peninsula), Indiana and Ohio; Mr. A. Young at Minneapolis, Minn., eighth district, Wisconsin, Minnesota, North and South Dakotas.

SOUTHERN DIVISION.—Managers have been transferred in the Southern Division as follows: J. B. Pinkston, of Wadesboro, N. C., to Cheraw, S. C.; vice H. B. Boles, transferred to Washington, N. C.; J. F. Price, from Washington, N. C., to Henderson, N. C.; vice C. P. Dickson, resigned.

MANAGERS have been appointed in the first district, Southern Division, as follows: L. H. Curry, of Richmond, at Tarboro, N. C.; A. W. Huntley at Wadesboro, N. C., vice Miss Eva P. Wood, resigned; Mrs. C. P. Coulter at Covington, Va., vice Miss E. B. Sutton, resigned.

GULF DIVISION.—The following appointments have been made in the Gulf Division: F. W. Brett, assistant manager at Fort Worth, Tex., as district commercial manager at Dallas, Tex.; M. A. Bravo, manager at Orange, Tex.; H. T. Palmer, chief operator at Fort Smith, Ark.; B. P. Howard, Galveston, night chief operator at Fort Smith, Ark., and D. R. Snodgrass wire chief at Shreveport, La.

DAVENPORT, IOWA.—This company will move into new quarters at Davenport, Iowa, on April 1. The new office is being fitted up with modern equipment, including a new motor-generator plant and an emergency gas engine and generator. There will be accommodations for twelve operators.

LITTLE ROCK, ARK.—The employees of the commercial department at Little Rock, Ark., have organized the "Western Union Benefit Club," for the purpose of discussing rules and other subjects connected with the service.

LECTURES ON THE TELEGRAPH.—Mr. J. W. Gaffey, commercial agent, New York, lectured on "The Story of the Telegraph" at the Board of Trade and Egan's Business College, in Hoboken, N. J., on March 9, and before the high school at Meriden, Conn., on March 15. He will deliver the same lecture before the high school at Jersey City, N. J., on March 17. Mr. A. Lister, of the office of Mr. J. F. Nathan, commercial superintendent, New York, will deliver a similar lecture before the Royal Arcanum in Brooklyn, N. Y., March 22.

INTERESTING FIND IN BURLINGTON OFFICE.—In the work of renovating the Western Union office at Burlington, Iowa, some curious records inscribed on the walls were revealed by the workmen in removing the old wall paper. One of the memoranda was dated April 21, 1865, and recorded a bet that the volunteer army of the United States would not be discharged in four months. This, with other records, indicated that the "books" of the establishment were kept, in like manner, on the walls. The Western Union Company has occupied the room for about thirty years, and the office is now being entirely remodeled and equipped in a modern manner. Mr. E. E. Sweetser is manager of the office.

BOWLING.—On Friday evening, March 5, a bowling contest between five men teams representing the treasurer's office and the commercial general manager's office, New York, was contested on Brooklyn alleys, in the presence of a large number of enthusiastic "rooters." The treasurer's team consisted of J. A. Dierks, Wesley Drake, Thos. Fleming, E. Dierks, Geo. Bosch and W. Egan, while Edward Everett, George Brigot, N. Giffen, H. Durland, W. C. Merly and W. S. Fowler represented the commercial's. Although the "Treasurers" had trained assiduously for the occasion, and were assisted by an able scorekeeper, in the person of Mr. Joseph Connolly, the assistant treasurer of the company, they proved to be no match for the progressive "Commercial's," who carried off the first and third games by ample margins. Mr. Fowler, who substituted in the third game, rolled the high score of the evening, with 180, while E. Dierks made the best average, 167. The team scores was as follows: Treasurers, 632, 719, 653. Commercial's, 708, 650, 779. The match is the forerunner of others now being arranged between the various departments at 195 Broadway, and a spirit of better fellowship is insured.

Panama-Pacific Exposition Exhibit.

This company has a booth at the Panama-Pacific exposition, San Francisco, of classic design. The booth covers an area of twenty-four by eighty-eight feet and was designed by William Welles Bosworth, of New York, the architect of the new Western Union headquarters at 195 Broadway. In the booth will be found a complete telegraph office having an equipment such as is used in a regular office of similar size and forming in itself an interesting exhibit.

The chief feature of the display is the new multiplex equipment recently developed for the company's service. A complete outfit of apparatus for one end of a circuit will be shown which will comprise the synchronous line unit and four complete sending and receiving channels. One of the four channels will be used for handling the regular business of the local office, one for handling the Commercial News Department service and the other two for demonstrating purposes. The other exhibits are a complete ticker outfit and a complete set of apparatus for ocean cable operation. The booth is in the Liberal Arts Palace.

THE CABLE.

MR. A. E. POWELL, engineer of station equipment, Western Union ocean cable system, London, England, is in New York on business connected with the service.

THE COMMERCIAL CABLE COMPANY has issued a sheet containing additions and corrections to its 1915 book of cable rates.

THE CUBAN GOVERNMENT advises that code and cipher in messages to be sent by way of Cuban wireless stations to the Isle of Pines will not be accepted, and that the text of messages must be of a strictly neutral character.

NEW JAPAN-CHINA CABLE OPENED.—The new submarine cable between Nagasaki and Shanghai, the laying of which has been in progress for the last two years, has been completed and opened for the transmission of messages between Japan and China.

EARTH'S MAGNETIC FIELD IN CABLE LAYING.—On cable-laying ships during rough weather the effect of the earth's magnetic field sometimes makes it extremely difficult to take the galvanometer readings which are watched continuously to detect faults in the cable insulation. When the sea is rough and the ship rolls, the cutting of the lines of force of the earth's field by the many miles of cable coiled in the tanks produces an electromotive force in the cable which causes the galvanometer to swing in synchronism with the vessel, necessitating the application in bad weather of a high-resistance shunt to damp out the effect.

The War and German Cables.

The fact that the German submarine cables were cut by the British navy at the beginning of the war, says the *London Electrical Review*, is keenly felt in interested circles on the other side of the North Sea, the two cables connecting with the United States having been severed off the Azores as early as August 5. Professor Meister, of the Munster University, Westphalia, who recently delivered a lecture on the "English Cable War," stated that Germany has been isolated from all ex-European telegraphic traffic in a way that would not have been regarded as possible prior to the war. It will therefore be necessary, in his opinion, for that country to protect itself in the future by the adoption of a systematic policy for the prevention of such isolation. For this purpose he declares that all that is required is a single direct American cable from the United States to Germany, without any intermediate landing place, which would belong to the United States and which Great Britain would guard herself against cutting. The professor thinks, however, that a safer scheme would be for the establishment of an American-owned cable between the United States and a neutral country, as, for instance, Denmark or Sweden, and thence onwards to Germany. At any rate, it is considered that a solution must be reached as soon as possible by the creation of a German world's cable system which would be independent of that of Great Britain.

As to the objection that submarine cables could be replaced by wireless stations, Professor Meister remarked that it is also possible to destroy the latter in time of war, as in the case of the stations at Togo, the Cameroons and in East Africa, whilst the wireless system in the present stage of science is unable to afford a complete substitute for submarine cables, which now, as in the future, must act as a complement of the former.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to March 10, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914.

CANADIAN NOTES.

MR. C. F. SISE, president of the Bell Telephone Company of Canada, Montreal, has retired from the presidency and has been appointed chairman of the board.

MR. L. B. MCFARLANE, managing director of the Bell Telephone Company of Canada, Montreal, has been appointed president of the company, vice C. F. Sise, retired. Mr. McFarlane is an old-time telegrapher, and a gentleman in every sense of the word. He is one of the most prominent citizens of Montreal, and his elevation to the head of the chief Canadian telephone interest comes as a reward for genuine ability and merit. His many friends on both sides of the "border line" will be pleased to know of the distinction placed upon him.

THOMAS SWINYARD, aged eighty-four years, president of the Dominion Telegraph Company, died in New York February 25. Mr. Swinyard was prominent for many years in the railway and telegraph circles of England, Canada and the United States. He was born in England and went to Canada in 1862.

SIR HENRY M. PELLATT has been elected president of the Dominion Telegraph Company to fill the vacancy caused by the death of Thomas Swinyard, and Sir John Gibson was appointed to fill the vacancy on the board of directors. Mr. Aemilius Jarvis was elected vice-president of the company.

MR. THOMAS AHEARN, of Ottawa, Ont., has been elected a director of the Bell Telephone Company of Canada.

THE AMALGAMATION of the Winnipeg offices of the Great North Western Telegraph Company and the Canadian Northern Railway took place March 1, the Great North Western office being closed and the whole merged into the former Canadian Northern office. Chief electrician Clark and electrician Brett, of the head office, carried out the work, assisted by

the local men. With this amalgamation direct-wire connection with Calgary, Edmonton, Regina, Saskatoon, Fort Williams and Port Arthur is made possible. Superintendent H. McConkey had charge of the outside work. Mr. J. Padington is superintendent of the Winnipeg district and B. S. Rounds chief operator of the Winnipeg office.

FIELD PRACTICE FOR CANADIAN SIGNAL MEN.—The signal company and field companies of the Canadian Divisional Engineers are engaged three days a week in field training at Lansdowne Park, Ottawa. Telegraph lines are erected and cables run across country to supposed headquarters of brigade divisions and trenches. Signaling by flags and the heliograph is also practiced. The work is done as under actual service conditions in all sorts of weather, and the men frequently work all day in the rain. Fifteen telegraph operators from McGill University science students at Montreal have joined the Second Contingent and are preparing for active service.

THE BELL TELEPHONE COMPANY OF CANADA, in its annual report for 1914, shows net earnings for the year ended December 31, of \$2,212,617.24, as opposed to \$2,215,257.74 in the year 1913, a decrease of \$2,640.50. The company now owns and operates 460 exchanges, an increase of eight during the year, while 13,402 subscribers have been added. The total number of telephones now in use under this management is 237,068. To the long-distance system 4,202 miles of wire were added. The long-distance lines now owned and operated by the company comprise 75,371 miles of wire on 9,304 miles of poles, and 3,913 miles of wire in underground and submarine cables. The company now has arrangements for exchange of business with 585 local organizations, serving over 72,762 subscribers.

THE TELEPHONE.

MR. J. J. CARTY, chief engineer of the American Telephone and Telegraph Company, New York, made an address on "The Status of the Engineer," at the midwinter convention of the American Institute of Electrical Engineers, in New York, on February 17.

MR. F. P. VALENTINE, formerly with the American Telephone and Telegraph Company in Boston, is now located in the commercial engineer's office of the same company in New York.

WIRE THIEVES CONVICTED.—The detective department of the Keystone Telephone Company, Philadelphia, Pa., had two wire thieves convicted and sentenced to eighteen months in jail, recently.

SOUTHERN BELL ELECTION.—At the recent annual meeting of the Southern Bell Telephone and Telegraph Company, Messrs. N. C. Kingsbury and G. D. Milne, of New York, were elected to the board of directors. The present officers were re-elected, Mr. W. T. Gentry being president.

REFERRED.—Telephone girls are forbidden to "answer back," no matter how abusive a subscriber may be. Sometimes they get around these hard conditions in a very clever way. For instance, the

subscriber, after vainly trying for ten minutes to get the number he had asked for, shouted: "What the deuce is the matter with you telephone girls, anyhow—are you all crazy?" The answer came with exasperating sweetness: "I don't know. Ask Information."

NEW TELEPHONE RATES IN NEW YORK.—The new schedule of rates proposed by the New York Telephone Company, now under consideration by the Public Service Commission, for telephone service in Greater New York, provides for a reduction in the company's income of at least \$2,700,000 annually, and will soon amount to more than \$3,000,000. The schedule eliminates tolls between Manhattan and Brooklyn, and provides for five-cent base rates and many reductions in various classes of service rendered. The new schedule will take effect July 1, if approved by the commissioners.

Review of Principal Articles in Contemporary Telephone Publications.

PHILADELPHIA'S TRANSCONTINENTAL TELEPHONE CELEBRATION.—*The Telephone News*, Philadelphia, dated February 15, gives an excellent account of the official opening of transcontinental telephone service between Philadelphia and San Francisco. The article is illustrated with photographic views showing the distinguished guests present, etc. A particularly interesting illustration shows the method employed to concentrate and transmit to San Francisco the sound of the liberty bell struck by a hammer in Philadelphia.

UNDERGROUND CONSTRUCTION IN PHILADELPHIA.—In our March 1 issue we inadvertently gave credit in this department to *Telephony* for the article there reviewed regarding the difficulties encountered in underground construction in Philadelphia, as described by Mr. J. I. Kinney. The original article appeared in *The Telephone News* of Philadelphia and was contributed to that paper by Mr. Kinney, of the Bell Telephone Company of Pennsylvania.

"PROTECTION OF AERIAL CABLES FROM CHAFING IN TREES" is the title of an article by W. M. Van Dusen in the February number of the *Telephone Review*. Mr. Van Dusen states that the basic fault of the usual methods of protection from chafing is that the "protection" is attached to the cable. The new methods developed by the Long Island plant department differ fundamentally in that all attachments are made to the strand and none to the cable, which is left freely suspended in the rings.

HOME STUDY AND ITS RELATION TO THE TELEPHONE BUSINESS is the subject of an instructive paper read by Mr. Stanley R. Edwards at the recent Illinois Independent Telephone Convention, and printed in the February 27 issue of *Telephony*. Mr. Edwards discusses the value of education to employe and employer, the earnings of the salaried man and wage earner, the value of a knowledge of economic principles and schools organized by large corporations.

POLICE PATROL TELEPHONE SYSTEM IN NEW YORK.—The February number of the *Telephone Review* of New York, contains an interesting illustrated article describing the development of the police patrol telephone system in Manhattan, New York. Since the first boxes were installed the system has been gradually extended and there are now in service in Greater New York, in connection with this system, forty-eight monitor switchboards and 836 police box stations. The system is, in fact, a collection of systems, each independent of the other. The switchboards are located in the precinct station houses. Telephone lines extend from them to the police boxes located at convenient points throughout the several precincts. The principal function of the patrol system has been to provide a means for patrolmen to communicate with precinct headquarters without leaving their posts to use public or private telephones. As the boxes were provided with bells which were uncertain as a means of signaling patrolmen an experimental flashlight system is being installed as a supplement to the existing patrol system. The new flashlight will make it comparatively easy for the precinct commander to call the patrolmen in any zone equipped with the system. A special call button is provided on the boxes which anyone can operate, and thus light the signal lamp to summon a policeman.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, with a party of Marconi officials, has completed an inspection of the transatlantic wireless stations now under construction for the Marconi Company in Massachusetts and New Jersey.

MR. F. B. PILLSBURY, general superintendent, Marconi Wireless Telegraph Company of America, New York, sailed on March 13 for New Orleans on a vacation trip.

MR. W. Y. NOLLEY, for many years manager of the Mackay Telegraph and Cable Company at Dallas, Tex., and well known in telegraph circles throughout that state, has been appointed manager of the Federal (wireless) Telegraph Company at Honolulu, Hawaii.

MR. M. R. HUTCHISON, chief engineer of the Edison Storage Battery Company, Orange, N. J., on February 8, delivered a lecture at the Custom House, New York, on the use of Edison storage batteries for various purposes, particularly in connection with wireless telegraphy on ships. Mr. George S. Davis, general superintendent of the Tropical Radio Telegraph Company, New York, also gave an account of the wireless system used on the ships of the United Fruit Company. The audience was largely made up of wireless operators and engineers of various coastwise and transatlantic steamers in port at the time.

TUCKERTON STATION.—The accumulated traffic at the Tuckerton, N. J., wireless station has been cleared up, and messages for Germany and Austria-

Hungary are now being accepted subject to the former restrictions, including liability to considerable delay.

OWNERSHIP OF THE TUCKERTON STATION.—Vice-Chancellor Stevens, in Newark, N. J., has granted an extension of time to March 19 in the legal controversy over the ownership of the Tuckerton wireless station at Tuckerton, N. J., over which there is some question. Reference was made to the case in our February 1 issue.

DIRECTION FINDER.—The Marconi-Bellini-Tosi wireless direction finder, installed on the new Canadian Pacific Railway steamer "Missanabie," is giving satisfactory results and promises to be a valuable aid to navigation during fog, especially on the St. Lawrence route, on which there are so many shore wireless stations, and with which cross bearings may be taken.

WIRELESS DISTRESS CALL.—Fire started in one of the holds of the French line steamer "La Touraine," on March 6, when the steamer was 700 miles off the French coast. Wireless distress calls brought half a dozen steamers to her relief, and British warships prepared to render aid, but were notified that their services would not be required, as the fire was under control. "La Touraine" steamed for Havre at top speed, accompanied by the steamer "Rotterdam" of the Netherlands line, arriving there later.

MARCONI CANADIAN COMPANY.—The annual report of the Marconi Wireless Telegraph Company of Canada states that the company now operates in all forty stations in the Dominion, in New Foundland and in Labrador. Ninety-three steamers of Canadian register are equipped with the Marconi system. With the completion of the duplex system the Louisberg transatlantic receiving station has been brought into operation, in addition to the installation for high-speed transmission at Glace Bay.

Institute of Radio Engineers.

The March meeting of the Institute of Radio Engineers was held at Columbia University, New York, on March 3, at which Mr. Edwin H. Armstrong read a paper on "Recent Developments in the Audion Receiver." The paper gave the results of a careful research into the use of the audion as a detector, amplifier, beat receiver, oscillating generator and partial static eliminator.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

Dr. Edouard Branly, well known in the wireless world through his electrical researches, particularly those associated with intermittent electrical conductivity of radio-conductors, is the subject of a personal sketch in the *Wireless World* of London.

"From Continent to Continent" is the title of an interesting and well-illustrated article in the February number of the *Wireless World*, London. It describes the work of linking Norway with the United States for high-speed, duplex wireless

operation. The illustrations show the work on the receiving station at Chatham, Mass. The transmitting station is at Marion, Mass., which is forty miles from Chatham. The buildings at the American end are nearing completion and the masts are more than half completed.

The properties of crystals used as detectors in wireless telegraphy are described in the *Wireless World*. Carborundum, bornite, zincite, copper pyrites, tellurium, galena and silicon are considered, and the properties and the methods in which they are employed in connection with detectors are briefly described.

The ultraudion detector for undamped waves, is the title of an article by Dr. Lee de Forest in the *Electrical World* for February 20. This instrument is a modification of the audion, which makes of it an extraordinarily sensitive instrument for the purpose and offers great possibilities for high-speed wireless records. It is in use at the United States naval radio station at Arlington, Va., where messages are received daily from the fifty-kilowatt arc station at Honolulu, H. I. At the Washington Bureau of Standards daylight signals are also received from Eilvese, Germany, with several hundred times audibility.

The "proceedings" of the Institute of Radio Engineers, dated March, contains three valuable and interesting papers, viz.: "The Naval Radio Service, Its Development, Public Service and Commercial Work," by Captain W. H. G. Bullard, United States Navy; "A Direct-Reading Decimeter and Wave Meter," by Frederick A. Kolster, and "Radio Frequency Changers," by Alfred N. Goldsmith. The two latter papers are liberally illustrated by diagrams. Each of the papers is followed by the discussion which followed.

OBITUARY.

F. GRAFF, a well-known operator on the Pacific Coast, died in Spangle, Wash., February 13.

JAMES MEAGHER, age seventy-one years, an old-time and military telegrapher of Columbus, Neb., died on March 1.

JOHN M. SULLIVAN, a well-known and popular operator of Boston, died in that city February 19. He was better known to the fraternity as "Steve" Sullivan, and had been in the employ of a leading brokerage house for many years.

W. R. WILLIAMS, aged sixty-four years, a well-known old-time telegrapher, and of late years in the insurance business in Seattle, Wash., died in that city recently. He was born in Painesville, Ohio, and was manager of the Ogden, Utah, office of the Western Union Telegraph Company when he left the service in 1888.

JAMES J. RAFTER, superintendent of telegraph of the United Press, New York, died of a complication of diseases at his home in Brooklyn, February 28. He was forty-three years old and has been con-

nected with the United Press since 1907. He was well known to the telegraphic fraternity throughout the country as one of the star press operators.

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 care should be given to a storage battery in order to keep it in the best of condition?

What color should the positive plates be, and the negatives?

What are the indications that the charging of the battery is nearly completed?

Does an experienced battery man place much dependence upon gassing and the color of the plates?

Before connecting a battery, what precautions should be taken to avoid reversing it?

When one of the poles of the battery is dipped in acidulated water, how can it be determined whether it is the negative or positive pole? (Page 123)

If the positive pole of one cell is connected to the negative pole of another cell, what is the effect upon the electrical pressure?

If the two cells are connected in parallel, is the pressure raised? If not, what is the effect?

State some of the reasons why the current for a telephone exchange cannot be supplied direct from a generator.

What is the simplest method of supplying current where only a few instruments are concerned?

In large exchanges, what is the method employed to supply current for the instruments?

What are the advantages of supplying current from a central energy system?

How may a small battery be charged from a direct-current lighting circuit? What is the objection to such a method of charging?

What other method obviates these objections?

What is a charging machine?

What is a retardation coil used for in connection with a charging machine?

What other method is used for charging small branch exchange batteries?

Answer all of the review questions on pages 124 and 125.

(To be Continued.)

THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS will hold its next meeting at the Hollenden Hotel, Cleveland, Ohio, March 18 and 19, under the auspices of the Cleveland section.

DEATH AND SAUSAGE.—A manufacturer of sausages got things painfully mixed when he telegraphed to a customer in a distant city: "Mr. Jones is dead. Will ship sausage next train."

Census of Telephone and Telegraph Systems.

The following interesting statistics are taken from the forthcoming report of the Bureau of Census on telephone, telegraph and municipal electric fire alarm and police-patrol signaling systems in the United States.

Telephone wires in use increased from almost 13,000,000 miles in 1907 to more than 20,000,000 in 1912, or about 54 per cent. Commercial telegraph wire, including ocean cable, increased in the same period from over 1,624,000 miles to nearly 1,882,000, or 15 per cent. Statistics as to telephone calls are available only for companies with \$5,000 annual income or more; these operated in 1912 about 94 per cent of the wire mileage and 84 per cent of the telephones. They reported 13,735,000,000 calls, an increase of about 32 per cent over the 10,400,000,000 reported for 1907. In the same period telegraph business—land, ocean and wireless combined—increased from approximately 103,949,000 messages to 109,663,000, or about 5½ per cent. Capitalization of the telephone companies with income of \$5,000 or more increased from \$758,000,000 in 1907 to \$991,000,000 in 1912, or more than 30 per cent. Telegraph company capitalization decreased from \$253,000,000 to \$232,000,000, or 8 per cent; this was due entirely to a reduction of \$23,000,000 in wireless capitalization. Excluding wireless capitalization, an increase of \$2,200,000 in capitalization, or about 1 per cent, is shown. Net income of telephone companies with income of \$5,000 or more increased from \$41,200,000 in 1907 to \$51,300,000 in 1912, or nearly 25 per cent. Net income of telegraph companies in the same period decreased from \$9,650,000 to \$6,400,000, or about one-third. Telephone companies with income of \$5,000 and over increased their employees from approximately 131,000 in 1907 to 183,000 in 1912, or more than 39 per cent. Telegraph employees rose from 28,000 to 38,000, an increase of nearly 36 per cent.

The wire mileage of the Bell system increased from 8,947,000 miles in 1907 to 15,133,000 miles in 1912, or more than 69 per cent. The wire mileage of all other systems combined increased from 4,052,000 to 5,115,000, or a little over 26 per cent. Telephones in use—exclusive of railway, governmental or private telephones not connected with public exchanges—increased from 6,118,000 in 1907 to 8,730,000 in 1912, or nearly 43 per cent. Bell and independent telephones, respectively, were 3,132,000 and 2,986,000 in 1907 and 5,087,000 and 3,643,000 in 1912, the former having increased 62 per cent and the latter 22 per cent. Bell calls increased from 6,401,000,000 in 1907 to 9,133,000,000 in 1912, or nearly 43 per cent. Calls of other companies having annual income of \$5,000 or more increased from 3,999,000,000 to 4,602,000,000, or 15 per cent.

Twenty-one land telegraph companies had 247,500 miles of pole line and 1,814,000 miles of wire, exclusive of wire wholly owned and operated by railroads; 222,000 miles of line and 1,206,000 miles of wire were along railway lines, and in addition 314,000 miles of wire were owned and operated by railroads. The number of messages, not including

press dispatches, was 106,500,000, an increase of 5 per cent over 1907. Six United States ocean cable companies have eighty-three cable offices and 44,860 miles of cable. They handled 2,845,000 messages, an increase of 20 per cent over 1907. In addition the Western Union Telegraph Company operated 22,800 miles of cable and handled nearly 3,000,000 cable messages.

From 1907 to 1912 the number of commercial wireless telegraph companies decreased from five to four, the number of tower stations from 117 to 74, and capitalization from \$32,700,000 to \$9,600,000. The number of messages sent increased from 154,617 to 285,091, or 84.4 per cent. A net deficit of \$53,538 was shown in 1907 and a net income of \$4,738 in 1912. Employees increased from 176 to 958, or 444 per cent. The government maintains seventy-three wireless stations, a number of which are open for public business. Ships of the navy have wireless equipment for receiving messages without relay at 3,000 miles and a sending radius varying from 400 miles in daytime to 1,000 miles at night.

Municipal electric fire-alarm and police-patrol signaling systems increased from 1,157 in 1907 to 1,397 in 1912, or 20.7 per cent. Miles of single wire increased from 70,800 to 90,300, or 27.5 per cent; boxes or signaling stations, from 62,500 to 81,300, or 30 per cent, and fire alarms received from 120,700 to 175,500, or more than 45 per cent.

The report, based on returns for the calendar year 1912, was prepared under the supervision of Mr. William M. Stewart, chief statistician for manufactures.

Promotions.

BY AN OLD-TIME TELEGRAPHER.

In regard to the telegraph business of the present day there is one point that looms up as important, and that is the matter of promotion of employees. We read frequently of a man dying or retiring from the service after having spent twenty, thirty or even more years in the same position.

Why is it that so many men leave the telegraph business and take up other vocations? The claim is made that many good men spend their lives in the service and do not get anywhere.

The matter of promotions appears to be conducted without any system. One of the large telegraph companies has inaugurated a generous pension system, but this same company is years behind the times in the matter of promotions. It appears to select the men who happen to be in sight, while many others equally as good, or better, never get a chance just because they are not in the limelight.

Let the general managers look over the lists of old employees who have filled one position for, say, ten years or more, and then start an inquiry to see why these men have not moved higher up. If they are entitled to promotion, justice should be done them.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, MARCH 16, 1915.

Popularizing the Telegraph.

One of the reasons why the telegraph is not more generally used by the public is that, excepting the business community, comparatively few outside of those engaged in it understand its usefulness. The masses know it in a general way as a means of rapid communication between distant points, but beyond that all is shrouded in mystery.

The popularization of the telegraph is one of the aims of the telegraph companies in these days of intensive business methods, and the growth of the business must necessarily depend largely upon educational means. An effective way of promoting public interest, as adopted by one of the telegraph companies, is found in the delivery of public lectures throughout the country, by competent speakers, on the subject of the telegraph.

Much interest is manifested by the general public in these lectures. In one case a prominent citizen remarked that he had learned more about the telegraph at one of the lectures than he had learned in all his life before. This remark reveals the true cause of public apathy toward the telegraph. The cause is ignorance, and in order to remove ignorance on any subject the truth must be told. This is just what the telegraph company is undertaking to do by means of these lectures, and there is no doubt that its efforts will be amply rewarded in time by substantial increase of business.

Of all the means employed by the telegraph companies to popularize the telegraph the lecture idea seems to us to be the best of all.

Wireless Rescues and Safeguards.

The world at large little realizes the debt it owes to wireless telegraphy for the great measure of safety in ocean travel. Rescues at sea through the

instrumentality of wireless are of such frequent occurrence that people on land would raise a vigorous cry if a disaster should occur with no means of calling for help. Perhaps ship captains themselves, in many cases, do not fully appreciate the importance of having wireless equipment on their vessels, but it is hoped that there are few such skippers navigating the seas in these enlightened days.

The most recent instance of wireless appeal for help is that of the French steamer "La Touraine," on which fire broke out while the vessel was 700 miles from her home port. Her distress signals were promptly received by half a dozen other steamers which offered their assistance, but as her captain was fairly able to handle the situation with one vessel standing by, they were so notified and not diverted from their course. "La Touraine" reached her destination finally, accompanied by the steamer which stood by for action in case of emergency.

In this connection it is interesting to call attention to an item published elsewhere in this issue regarding the success of the wireless direction finder for ships. Fogs are among the greatest dangers to navigation. Under such conditions it is difficult, and frequently impossible, for a vessel to determine her position with reference to the shore, but this direction finder comes to the rescue, and in one sense lifts the fog so her captain can tell where he is. It robs navigation on the high seas of one of its greatest terrors.

Increasing Efficiency of Telegraph Service.

In the telegraph, as in other lines of business, there are many avoidable little time-consuming leaks, which, apparently trifling in a single case, amount to a great deal in the aggregate, and which, expressed in dollars and cents, mean a considerable loss to the company in the course of a year. Intelligence and care on the part of employees are the principal antidotes for such defects.

In an article, printed elsewhere in this issue, Mr. S. S. Scothorn points out one common cause of needless delay in the handling of telegrams which can be easily avoided by the exercise of vigilance on the part of the receiving clerk.

Obscure writing is one of the chief causes of error in the transmission of messages, and yet it is one that can be easily remedied at the start. Receiving clerks should exercise the greatest care in reading written telegrams in the presence of the writer and correcting any defects in poor penmanship. By writing misspelled and illegible words plainly the operators will lose no time in transmission, and the message will reach its destination with a high degree of probability that it is correct. On the other hand, if these precautions are not observed at the receiver's desk, there is sure to be trouble all along the line, with the result that the accuracy of the message, as received, is largely a matter of chance. It can be readily understood that it does not require many hindrances of this kind to cut down the speed of a busy wire to a serious degree, and the illustration presented by Mr. Scothorn emphasizes the importance of doing things right at the start.

The Morkrum Telegraph Printers.

As the Morkrum telegraph printers are being quite extensively used, and through their performance attracting general attention, a description of the system will be of interest.

The inventions involved in this system are the joint work of Mr. Charles L. Krum, a mechanical engineer, and Mr. Howard L. Krum, an electrical engineer, and the development of the system is due to Mr. Joy Morton, a capitalist of Chicago, the name Morkrum being a contraction of Morton-Krum.

As its name indicates, the apparatus is designed to operate a typewriter over a telegraph line. An operator working on a keyboard, similar to that of a standard typewriter, sends out over the line signals, which actuate a typewriter at the distant end of the line. All the functions of the typewriter

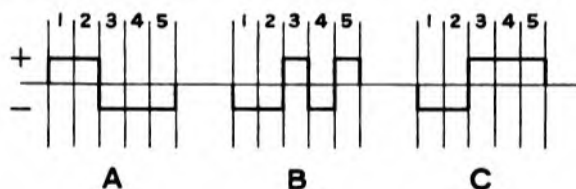


FIG. 1—LINE SIGNAL.

which are normally controlled by hand, such as turning up a new line, or bringing the carriage back to start a new line, are controlled from the keyboard at the sending end of the line, and all this is done over a single wire, which is also operated duplex; that is, the transmission of messages in both directions over the wire can be accomplished simultaneously.

Very early in the development of the system it was determined that upon the simplicity of the line currents used would depend the ability of the printer to operate successfully under the varying conditions of weather and line interference, and that to meet these requirements it was essential that the signaling current should be of single strength and with no zero position. Accordingly, it was made identical with the Morse polar duplex, securing all the reliability of that system, with its ability to work duplex successfully over long lines, and also making it possible to repeat through direct point repeaters.

Two methods of transmitting are used in the Morkrum system; first, the direct-acting keyboard system, in which the operation of the keyboard at the sending end actuates the printing mechanisms at the receiving end directly, without any intermediate operations; and, second, tape transmission, in which the messages are first prepared on a perforated tape by means of a keyboard perforator. This tape is then used to automatically transmit the signals over the line at a high rate of speed. The printing mechanism at the receiving end is identical in either case, whether the transmission is accomplished by means of direct keyboard operation or by the use of the perforated tape and automatic transmission.

The selective system is based on a five-unit alphabet. That part of the line signal which controls the printing of letters, or the operation of the other

functions of the typewriter, is divided into five time intervals, and the selective signaling is accomplished by combinations of reversals of polarity of the current sent to the line during these five time intervals. This allows thirty-two selections to be made over the line, and by using a shift of the typewheel, fifty-three letters, figures and characters can be printed.

Fig. 1 illustrates this method of signaling. In the letter "A," positive current is sent to the line for the first two time intervals, and negative current for the last three time intervals. These signaling currents operate the polar relay at the receiving end, and the currents of negative polarity are used to control the selective mechanism.

As in this system there is never to exceed three, and an average of only two, signaling currents sent to the line for each letter, the frequency of the line signal is very low. This is important, as the higher the frequency of the signals and, consequently, the shorter the duration of the signaling currents, the greater becomes the difficulty of actuating the selective mechanism in a positive manner. The low frequency, which is considerably below that of Wheatstone and other automatic apparatus at equal capacity, has given great reliability, particularly in bad weather; and there have been numerous instances where the Morkrum has been able to work through severe storms that have made the



FIG. 2—KEYBOARD AND HOME RECORDER.

working of wires extremely difficult. This feature, combined with the reliable synchronizing system, has made the Morkrum valuable for long line printer work heretofore considered impracticable. There are a number of long circuits in duplex operation, with from two to five repeaters.

Fig. 2 shows a printer unit mounted on a keyboard for direct transmission. When a letter on the keyboard is depressed it sets up five pole-changers in the combination which corresponds to that key. The transmission of the signal thus set up is accomplished by a brush revolving on a commutator. When the key is depressed a clutch is

released which allows the brush to make one revolution and transmit the signal to the line.

The keyboard action is very light, requiring only a slight touch to start it, the stroke being completed by an electromagnet, and it can be operated all day with much less fatigue than an ordinary typewriter. It also has a key lock which holds the key down until the complete signal has been sent, and also prevents any other key from being depressed until the signal for the preceding letter has been completed.

In the keyboard system the selection at the receiving end is accomplished by means of a bank of relays, which successively connect five lock relays, which control the printing mechanism, to the contact point of the main line relay. Before sending out the selective signal the motor transmitter sends out a starting pulse, which starts the action of the receiver bank.

The direct keyboard system is not synchronous in the ordinary sense of the word, but is roughly isochronous; that is, the receiving mechanism is adjusted to run at approximately the same speed as the transmitting mechanism, and a governing rheostat is provided to regulate the speed of the receiving mechanism. With this arrangement, any difference in the transmitting and receiving speed is not cumulative, as the receiving mechanism and the transmitting mechanism start together at the beginning of each letter. The receiving mechanism is arranged so that it connects the selective locks to the line relay for only a short portion of the duration of each time interval of the transmitted

that of a Wheatstone tape, an ordinary message requiring but eighteen inches of tape.

Fig. 3 shows the Morkrum keyboard perforator, which has a keyboard similar to that of a standard typewriter. There are six rows of holes on the tape. The continuous row of small holes is used to feed the tape in the transmitter. Different combinations of holes in the five remaining rows, which are placed

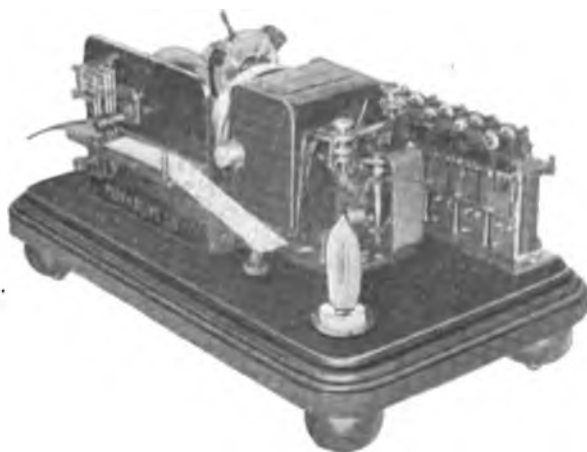


FIG. 4—MORKRUM DISTRIBUTOR.

two in front of and three behind the feed row, represent the different signals to be transmitted and control the polarity of the five selective impulses which are sent over the line for every signal.

In the tape system, as in the keyboard system, the selective mechanism is controlled by different combinations of polarity of five time intervals.

The five pole-changers used in transmission, instead of being controlled directly by the keyboard, are controlled by the arrangement of the holes in the perforated tape. At the transmitting end a brush revolving on a commutator transmits the signals set up by the tape to the line, but instead of being controlled by a clutch, as in the keyboard system, this brush revolves continuously. At the receiving end there is a similar commutator to which the five selective locks are connected, and there is also a continuously revolving brush.

It is apparent that the brushes of the transmitter and the receiver must be over corresponding segments at the same instant. To accomplish this means are provided for keeping them in unison. The brush at the receiving end is run at a speed which is slightly faster than that of the brush at the transmitting end. The transmitter brush sends out a correcting pulse every revolution and this operates a correcting mechanism at the receiving end which will retard the receiver brush sufficiently to keep the two ends in unison.

The typewriter used in connection with the system was specially designed for the purpose. A revolving typewheel is used, and the five selective impulses control a mechanical selecting device which regulates the rotation of the typewheel and stops it opposite the proper letter.

The platen of the typewriter is stationary, and the printing mechanism moves, which is the reverse



FIG. 3—MORKRUM PERFORATOR.

signal; in other words, only the peak of the wave is used by the receiving mechanism, and this fact allows of considerable distortion of the wave form without affecting the action of the selecting mechanism.

For tape transmission, a tape a little wider than a Wheatstone tape is used, and the various combinations are formed by a series of holes punched crosswise on the tape instead of lengthwise, as in the Wheatstone tape. This reduces the length of tape required for a message to about one-sixth of

of typewriter practice. The printer accommodates all standard telegraph blanks, and the stationary platen is of considerable advantage in feeding blanks, also when it is desired to use a large roll of paper in the printer.

With the direct keyboard system it is customary to use a home recording printer with a roll of paper. In tape transmission the tape is the home record and no home printer is required.

With this system it is not necessary for the operator to understand the Morse code, as anyone who can operate a typewriter keyboard can do the work. This system also greatly increases the capacity of the telegraph lines.

The direct keyboard and tape transmission systems each have their special uses, depending upon the length of the line and on the character and volume of business to be handled.

The direct keyboard system operated duplex has a capacity of about eleven hundred commercial messages in a nine-hour day. The tape operated system has a capacity of about two thousand commercial messages in a nine-hour day.

The Morkrum printers were first introduced in regular service by the Postal Telegraph-Cable Company between New York and Boston. That circuit has been in regular operation for several years, and a number of other circuits have been installed by that company.

The Western Union Telegraph Company is using the Morkrum tape system quite extensively on its main lines all over the country, the longest circuits being those in operation between Chicago and San Francisco, and Chicago and Los Angeles, about twenty-three hundred miles, with four repeaters each. A circuit from New York to San Francisco, a distance of thirty-six hundred miles, with six repeaters has also been successfully operated duplex.

The Morkrum printing telegraph system is extensively used in Canada by both the Canadian Pacific Railway and the Great North Western Telegraph Company, the latter having several circuits working with Western Union offices in the United States. A number of principal railroads in the United States are using the Morkrum system, among which the Chicago, Burlington and Quincy, the Rock Island Lines, New York Central, Lake Shore, and Baltimore and Ohio. The Morkrum system has also been installed by the Associated Press for the delivery of news to the newspaper offices.

Transferring the Cost of Inefficiency.

BY S. S. SCOTHORN, POSTAL TELEGRAPH-CABLE
COMPANY OF TEXAS, DALLAS, TEX.

The improvement in first handling of telegrams by counter clerks continues conspicuous on account of its absence.

Failure to properly check or make marginal corrections of illegible and obscure words merely means that the burden of such careless and inefficient methods is shifted to the traffic department. To attempt to figure the loss due to the decrease in revenue-carrying capacity of circuits through the re-

sultant lost time and service messages, to say nothing about the cost of complaint investigation, would be a difficult if not impossible task.

Assuming each individual handling of a message passed in error to the operating room as a unit of lost time, it will be found that from three to ten, and sometimes a much greater number of units, will have been consumed in each instance. For example, the counter clerk passes an obscure or improperly checked message to the operating room. This calls into action tube attendants and check clerks, who respectively pass the message to the sending operator of a high-speed duplex circuit. Unable to decipher an illegible word because of obscure reading or having been challenged by the receiving operator at the distant end of the circuit, or on account of wrong check, the sending operator is, after a considerable pause, forced to attach a "Returned-for-Correction" slip, and return the message to the counter for correction of the check or confirmation of a word. In the latter case the counter clerk too often takes a chance and writes his "guess" on the correction slip and returns the message to the wire, where practically the same number of lost-time units are consumed in completing the sending. It is safe to say that from three to ten minutes of combined time is lost by the two teams of operators on the duplex circuit alone, the time varying according to the length of the message in each case.

It will readily be seen that similar carelessness by operators in relay offices will double, if not quadruple, the lost-time units.

Very little if any thought on the part of employees is given to the serious and costly results of such inefficiency, and if it is brought to their attention, they too often console themselves with the mistaken idea that "What can't be cured must be endured."

THE ELECTRICAL COMMITTEE of the National Fire Protection Association will hold its twentieth annual meeting in New York, March 24 and 25, at which recommended changes in the "National Electrical Code" will be considered. The meetings will be held at the rooms of the New York Board of Fire Underwriters, 123 William Street. Mr. Ralph Sweetland, 141 Milk Street, Boston, Mass., is secretary of the committee.

INSULATING PROPERTIES OF SOLID DIELECTRICS.—The Bureau of Standards, Washington, D. C., has issued a pamphlet (No. 234) on the insulating properties of solid dielectrics. It is a valuable contribution to this important subject. Copies may be obtained of the Superintendent of Documents, Government Printing Office, Washington, D. C., at fifteen cents per copy.

WHITE ANTS AND POLES.—The U. S. Department of Agriculture, Bureau of Entomology, Washington, D. C., has issued a pamphlet on "Insects Injurious to Forests and Forest Products." It is a biology of the termites of the eastern United States, with preventive and remedial measures. Termites, or "white ants," are the most destructive insects to telegraph and telephone poles, etc.

Batteries.*

BY J. F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER,
POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

(Copyrighted.)

[The present "talk" is the second of a series which Mr. Skirrow has prepared on the application of electricity to the telegraph. The first "talk" was on the subject of "Electricity," and appeared on page 110 of our March 1 issue.—EDITOR.]

In the first article on "Electricity" the endeavor was made to explain something of the nature and characteristics of the so-called electric fluid and to indicate possibilities of utilizing it for transmitting signals over a wire.

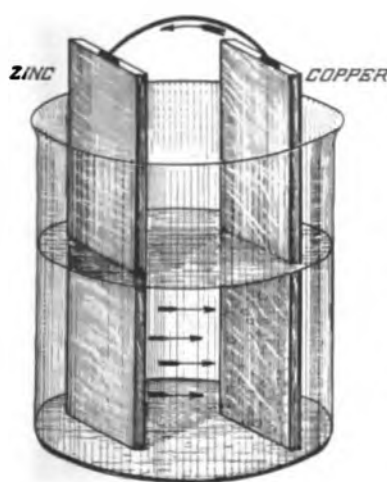
The methods of producing electrical results described in that article, while good enough for experi-

From the copper plate the current flows through the connecting wire back to the zinc plate.

Similar results may be obtained with other metals and acids. Zinc and copper and zinc and carbon are the most commonly employed elements for use in primary batteries. Various chemicals are used.

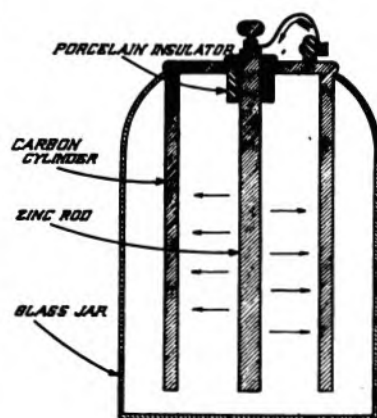
If a cell of battery should be set up just as described the continuous transfer of gas bubbles to the copper plate would eventually cover the immersed portion of that plate and thus prevent further action. The cell is then said to be "polarized." It is necessary, therefore, to provide means to prevent polarization so as to keep up the action of the battery.

The simplest way of overcoming this trouble is that used in the carbon cylinder battery, which is made of a pencil of zinc surrounded by a circular wall of carbon. The surface of the carbon plate is



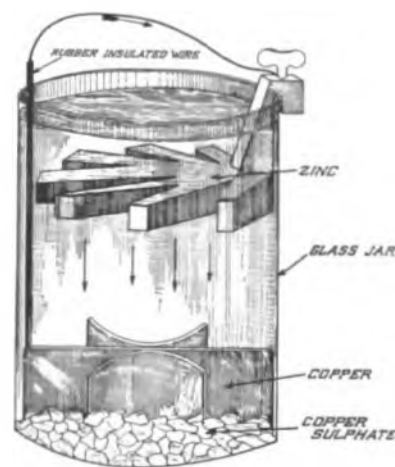
SIMPLE CELL (1)

FIG. 1.



CARBON CYLINDER CELL (2)

FIG. 2.



GRAVITY CELL (3)

FIG. 3.

mental purposes, would be quite unsuitable for commercial use.

To provide an electrical current which can be employed to flow over a wire continuously it is necessary to use dependable and economical means. The simplest of such means is the primary battery.

If one end of a plate of common zinc is immersed in a jar containing diluted sulphuric acid, bubbles of gas will form on the immersed part of the zinc and the zinc will gradually dissolve. If a plate of copper is similarly placed in the same jar, but out of contact with the zinc, no effect will be observed. If, however, the ends of these metal plates outside the liquid are joined together by a wire it will be noticed that the bubbles of gas formed at the zinc plate pass through the liquid to the copper plate and are deposited upon it. This action continues while the plates are joined together as indicated but stops when they are disconnected.

What happens is that a current of electricity is started, so to speak, at the zinc plate by the action of the acid upon it, and this current flows to the copper plate and carries the gas bubbles with it.

so tremendously greater than that of the zinc that the gas bubbles work up to the top of the liquid and dissipate before they can collect in sufficient quantity to cover the carbon plate and thus stop the flow of current.

In the gravity cell, so called because the chemicals used are separated by gravity only, the copper plate is placed in the bottom of the jar and is covered with blue vitriol (copper sulphate). A wire is attached to the copper plate and brought to the top of the jar. This wire is covered with rubber (an insulator) from where it leaves the copper plate. The zinc plate, in the form of a casting, is hung from the top of the jar. The jar is filled with water until the zinc plate is covered. When the wire from the copper plate is connected to the zinc plate a current flows from the zinc to the copper in the liquid and from the copper to the zinc through the wire. Polarization is prevented by chemical changes that occur in the liquid, and the current is, therefore, continuous until the zinc or chemicals need renewal.

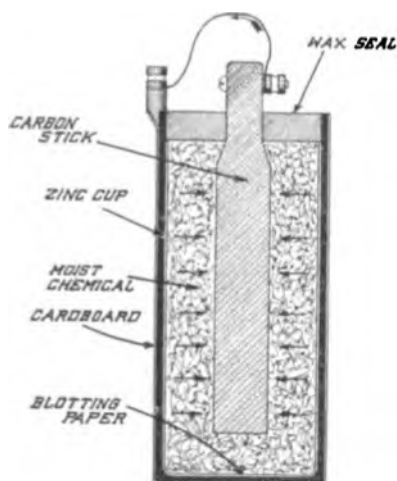
The so-called dry battery is formed from a cup made of zinc with a stick of carbon inside. Be-

*From Postal Telegraph.

tween the two is packed a moist chemical which acts on the zinc and which prevents polarization. When the chemical no longer acts the cell becomes polarized and must be replaced.

We call the plate at which the current comes out of the battery the positive pole and the plate at which the current returns to the battery the negative pole. Let us say that one cell of battery would give us current with a pressure of 1. If we lengthened the wire between the copper and the zinc until it was, say, 100 miles long, the pressure would be so low that practically no current would flow. This would be something like having a waterpipe a hundred miles in length with a reservoir only a foot high to feed it.

Now let us build up the pressure. If we connect up 100 cells of battery so that the current starting from the positive pole of the first cell goes to the



DRY CELL

FIG. 4.

negative pole of the second cell, and on through from the positive of the second to the negative of the third, and so on, we will build up until we have a pressure of 100 from the 100 cells, or enough to push the current through the 100 miles of wire between the positive and negative poles of the battery. We can do better than this. If we connect the negative pole, say, of the battery to the earth by attaching it to a metal plate sunk in the ground or to water mains, and carry a wire from the positive pole of the battery to a distant point (say fifty miles away), and there similarly connect that end of the wire to the earth, we will find that a return wire is not necessary—the current will flow along the wire without it. Here we have an analogy to the water-pipe and reservoir. We may consider that we have raised the pressure to 100 at the battery end of the wire and that it flows down to zero at the distant end. This shows how a single wire between two points may be supplied with a constant flow of electricity.

Are you a regular reader of TELEGRAPH AND TELEPHONE AGE?

Correspondence School Lessons in Book Form.

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 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 telegraphy and during its publication in the columns of this journal great and wide interest in the subject was manifested by telegraphers all over the country. The study of these lessons 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 of the book 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

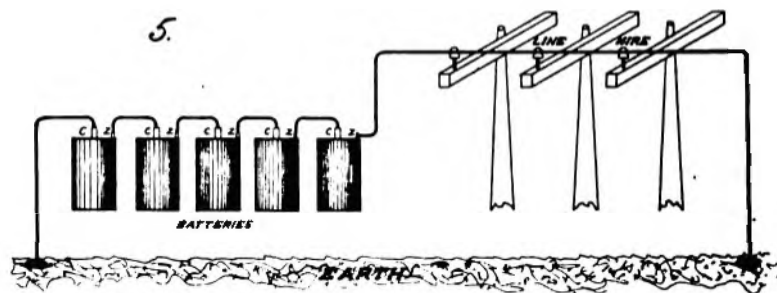


FIG. 5—BUILDING UP PRESSURE BY ADDITION OF BATTERY CELLS.

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. 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 by 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.

Mr. L. D. Firman, of Philadelphia, in remitting to cover his subscription for another year, writes: "TELEGRAPH AND TELEPHONE AGE is the one journal by the aid of which I can keep in touch with the advancement in the telegraph business."

A Simple Repeater.

BY J. B. DILLON, WESTERN UNION TELEGRAPH COMPANY, DALLAS, TEX.

While the efficient engineering department of the telegraph company is providing standard instruments for most every want, there are times when an emergency circuit is desired, and standard sets are not on hand. The repeater described and illustrated may be used quite handily when no standard repeater set is available. The relay may be of the neutral type of the Western Union Telegraph Company, with the local points and the insulated back-stop reversed. The transmitter may be either an Atkinson, or Weiny-Phillips, but the diagram (Fig. 1) shows an Atkinson. When all keys are closed the only current in the relay will be that of the main

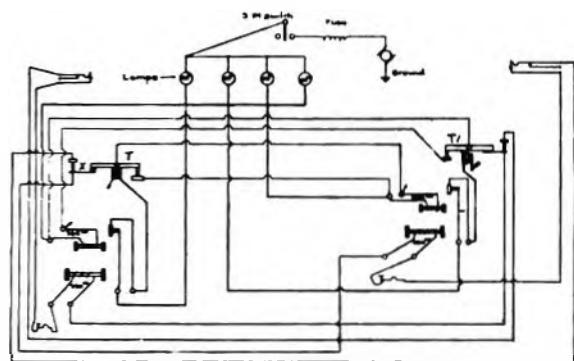


FIG. 1.—DILLON REPEATER WIRED FOR FULL SET.

line, for it is seen that the transmitter on the left, when closed, shunts out all current that might otherwise magnetize the right-hand upper, or holding coil, and vice versa.

Now suppose the left-hand relay, in Fig. 1, is opened. Transmitter T breaks the opposite main line at its main point X. The opening of T also

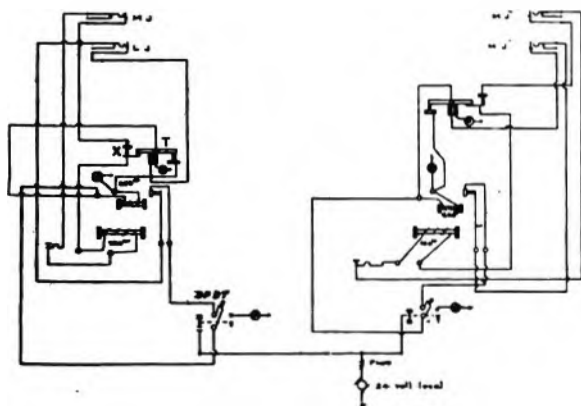


FIG. 2.—REPEATER WIRED FOR TWO HALF SETS OR ONE FULL SET.

removes the shunt from the right-hand relay holding coil, allowing it to be magnetized, thereby preventing the opening of transmitter T'. In working from the opposite direction the action is the same in every respect.

Fig. 2 shows the repeater wired for two halves, or one full set. M J represents the main line jack,

and L J the local jack. To operate the repeater as two half-sets, throw the double-throw, double-pole switches to the right, using a green cord (standard board). This connects the main line wire to M J, and the repeater relay is magnetized and closed.

A green cord from the duplex set brings the pole-changer to the tip of jack L J, thence to the repeater relay local points, through the double-pole, double-throw switch, lamp and ground. The polar relay local points are carried to the sleeve of the jack, through the local magnet of transmitter T, thence to lamp and ground. With all keys closed the only current in the repeater relay is that of the main line, the holding coil current being shunted out by the circuit shown at the local points of T.

It will readily be seen that the opening of the repeater relay will actuate the pole-changer of the duplex. Now, if the duplex relay is operated, the moment the local points are opened transmitter T opens, and the shunt is removed from the holding coil, which permits of the coil engaging the armature of the repeater relay, thus preventing any kick-back to the duplex.

To work the two half-sets as a full set throw the switches to the left, connect M J and M J' with a red cord (standard board), or with a double-wedge reversible cord used on the old spring jack board.

The advantages of this repeater are its simplicity and efficiency, and only one relay armature works during a transmission, a feature which all repeater men will appreciate.

Valuable Book on the Telephone.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings is one of the best books 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.

Mr. C. A. Johnson, manager of the Postal Telegraph-Cable Company, Meadville, Pa., in remitting to cover his subscription for another year, writes: "The value of your publication cannot be overestimated. As a proof of this, I noticed that during the year I spent in Italy, that TELEGRAPH AND TELEPHONE AGE was among the regular periodicals received at the Superior Institute of Posts and Telegraphs in the city of Rome."

MUNICIPAL ELECTRICIANS.

Death of James M. Gardiner.

James M. Gardiner, aged ninety-six, identified with the Gamewell Fire Alarm Telegraph Company, New York, for over fifty years, but who was retired on a pension a few years ago, died at his home in New York on February 25. The funeral ceremonies were attended by many old-time associates, and interment was at Hackensack, N. J. Mr. Gardiner was well known to the fire alarm and police telegraph superintendents throughout the country, with whom he had business relations at one time or another in the past. He was held in the highest regard by those who enjoyed his acquaintance. He was born in Scotland in 1819. His unusually long life was a peculiarly useful, successful and honorable one, and the results of his mechanical and inventive genius have been for the past fifty years a very important factor in the protection of life and property through the fire-alarm telegraph service.

When he was three years of age his parents settled in Charleston, S. C., where his boyhood and early manhood were spent. He entered the watch-making and jewelry business in that city and soon made the acquaintance and formed the friendship with John N. Gamewell, which later brought about his connection with the fire-alarm telegraph business that continued until his death.

Mr. Gardiner possessed inventive and mechanical ability to a great degree, and his name will ever be associated with the art of fire-alarm signaling as one of the foremost of its founders in the early days of its history. The first practical non-interfering fire-alarm box was a product of his genius, and for a generation the "Gardiner" fire-alarm box was almost exclusively used throughout the United States.

THE INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS has just issued a revised list of its members. Mr. Clarence R. George, city electrician, Houston, Tex., is secretary of the association.

THE GAMEWELL FIRE-ALARM TELEGRAPH COMPANY has completed and equipped with new machinery a new concrete building at Newton Upper Falls, Mass., which will be used exclusively in the manufacture of fire and police signaling apparatus.

MR. W. J. NEAVE, who was superintendent of fire telegraph at Scranton, Pa., and a prominent member of the International Association of Municipal Electricians, has been appointed superintendent of the fire telegraph systems of the Lackawanna Railroad, with headquarters at Scranton.

LARGE PRIVATE FIRE ALARM SYSTEM.—The Gamewell Fire Alarm Telegraph Company is to install a private fire alarm system at the plant of the Victor Talking Machine Company, Camden, N. J. The system is so arranged that in the daytime when a box is pulled for a fire the gongs in only that zone are sounded and the city fire alarm system is notified over a private circuit, as is also the Victor Company's private fire department. At night a box alarm rings all the gongs in the various zones. This notifies the watchmen all over the plant.

Fire Alarm Box.

Messrs. J. H. Bunnell and Company, New York, have placed upon the market a new non-interfering-pull fire alarm box.

Opening the outer or protecting door exposes the pull-lever for transmitting alarms. When this lever is pulled down to its stop and released the alarm signal giving the special box number will be transmitted four times and cannot be interfered with by any further manipulation of the lever.

If the handle is not pulled all the way down to its stop the signal will not be repeated four times, but a perfect signal will be sent once when pulled one-quarter the distance; twice when pulled half and three times on being pulled three-quarters of the way to stop, and these signals cannot be interfered with after releasing the pull-lever.

A broken or imperfect signal cannot be sent no matter to what point the lever may be pulled and released from.

By means of a special key a test of either the electrical circuit or the box mechanism can be made without sending in an alarm.

The mechanism and box are thoroughly insulated from any possible contact with the current-carrying parts so that all danger of shocks is entirely eliminated and the box is dustproof.

WESTERN ELECTRIC MEETING.—The managers and sales managers of the distributing houses of the Western Electric Company throughout the United States will meet in Chicago, on March 16, for a sales conference, which will last the entire week. All the officials from New York, headed by Mr. Gerard Swope, vice-president of the company, will be in attendance.

POLES AS SUPPORTS.—A movement is on foot in Wheeling, W. Va., to prohibit tacking cards on telegraph and other poles about the city. It is claimed that many men are injured by the tacks and nails with which the poles bristle. Probably night wanderers have learned that wooden poles are not so cold as iron lamp posts.

PHILADELPHIA ELECTRICAL AID SOCIETY.—The Electrical Aid Society of the City of Philadelphia has just issued two pamphlets, one containing the proceedings of the twenty-seventh annual session, held January 15, and the other giving the constitution and by-laws, also a list of members and statistical information regarding the association. Mr. A. G. Strickland is president and W. E. Vanardsdall recording secretary.

A correspondent, in renewing his subscription, suggests that TELEGRAPH AND TELEPHONE AGE be made a weekly publication at \$5.00 per year. While we appreciate our correspondent's estimation of the worth of the paper, his suggestion, we fear, would be impracticable to carry out. Five dollars for a year's subscription would be prohibitive, since very few would be willing to pay such a price. The advertising in a publication like TELEGRAPH AND TELEPHONE AGE is limited and we doubt very much if enough could be obtained to support a weekly paper.

American Telegraph Practice

A Complete Technical Course in Modern Telegraphy, Including Simultaneous Telegraphy and Telephony.

By DONALD McNICOL, A. M. A. I. E. E.

MEMBER OF THE ENGINEERING STAFF,
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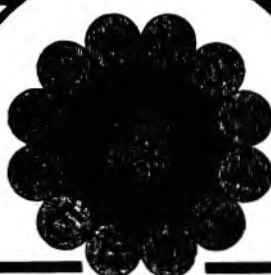
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15

THE RAILROAD.

TRACY W. NILES, aged sixty-four years, a former telegrapher, train dispatcher and railroad official, died in Buffalo, N. Y., February 27.

CHARLES N. CHEVALIER, aged sixty-six years, a retired official of the Grand Trunk, New York and New England and Boston and Maine Railroads, and a former telegrapher and train dispatcher, died in Medford, Mass., February 20.

Wedding Anniversary Celebrated.

Mr. Wm. Bennett, superintendent of telegraph, Chicago and Northwestern Railroad, Chicago, and Mrs. Bennett celebrated their twentieth wedding anniversary at their home in Wilmette, Ill., on February 7, and the occasion was most thoroughly enjoyed by all those present. Mrs. Bennett provided a splendid banquet and the time was so completely enjoyed and so pleasantly occupied that the guests were loth to return to their homes. Appropriate presents were made to Mr. and Mrs. Bennett as a remembrance of the occasion, and all their guests extended them their heartiest congratulations.

Meeting of Western 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 17 and 18. There will be a session in the morning of each day and in the afternoon the members will have the opportunity to visit the exhibit of the National Railway Appliance Association, which will be held at the Coliseum and Armory Building. Three papers will be read at the meeting, viz.: "Pole and Wire Maintenance," by E. H. Ward, of the Western Union Telegraph Company; "Modern Testing Facilities and Their Relations to Railway Wire Plant Efficiency," by W. Rogers, telegraph engineer, Missouri Pacific, St. Louis, Mo., and "Shall Inside Maintenance be Handled by Linemen or Special Equipment Men?" by L. M. Jones, superintendent of telegraph, Atchison, Topeka and Santa Fe, Topeka, Kan. Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific, St. Paul, Minn., is chairman of the Western Division.

Rochester Convention of Railway Telegraph Superintendents.

The business programme so far as arranged for the Rochester, N. Y., convention of the Association of Railway Telegraph Superintendents, June 22, indicates a successful and profitable meeting. Some valuable papers are promised by well-known engineers and authorities, including Mr. John J. Carty, chief engineer, American Telephone and Telegraph Company, New York; R. E. Chetwood, plant engineer, Western Union Telegraph Company, New York; W. H. Hall, superintendent of telegraph, Missouri, Kansas and Texas, Denison, Tex.; N. E. Smith, superintendent of telegraph, New York, New Haven and Hartford, New Haven, Conn.; G. W. Nelson, of the Gordon Primary Battery Company, New York, and E. E. Hudson, of Thomas A. Edi-

son, Inc., Orange, N. J. The fact that the association is able to secure papers from such high authorities as those mentioned is positive evidence of its growing importance as a power in the railway world.

Train Dispatching by Wireless.

In our March 1 issue reference was made to the paper on "Train Dispatching by Wireless," read at the New York Railroad Club, on February 19, by Mr. L. B. Foley, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York, but the treatment was necessarily brief on account of space limitations. The following further extracts from Mr. Foley's paper will be read with general interest:

"The wireless apparatus aboard the train is of one kilowatt rating, and similar in principle and operation to that at the fixed stations. The motor-generator on the train is operated on thirty volts direct current from the car-lighting generator, which carries on its line a set of storage cells. This motor-generator draws about forty amperes, and provides 500 cycle 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 about thirty-five amperes.

"We can," Mr. Foley said, "communicate from a moving train to a fixed station a distance of 130 miles. Owing to the low antenna of the passenger cars, however, we have not as yet been able to transmit a greater distance from the train, but are able to receive messages on the train from a fixed station a distance of 200 miles. On the train the aerial or antenna is formed of phosphor bronze wire arranged in four rectangles, one on the roof of each of the four forward cars lengthwise, with an additional wire lengthwise, and all parallel with the top of the car, each rectangle being carried on porcelain insulators at the corners and center of each car, with wire link connections between the cars. The wires clear the top of the cars about eighteen inches, being low on account of bridges and overhead interferences; therefore the radiating power is limited. The lead is taken from the middle of the train antenna through the side of the car, near the roof, into a compartment two by four feet, which contains the wireless telegraph apparatus and the operator.

"The required voltage was obtained from the train lighting system, and after the first trip on the train it was found that the operation of the train installation did not in any way interfere with the track signals. The speed of the train, or its change of direction while enroute, does not have any effect on the transmission or reception of signals, and communication to and from the train is not retarded while the train is passing through tunnels.

"The train radio service has been used for various purposes, such as reporting the number of passengers on board destined to connecting lines, for providing additional, or cutting out cars at divisional points, in ordering an ambulance at next train stop for persons taken ill on the train. Commercial telegrams for passengers are handled. In

one instance, a telegram was filed by a passenger on the train for a resident in the city of Scranton, the message transmitted to destination, delivered, and the reply received by the sender in twenty minutes.

"The wireless telegraph can be depended on between fixed stations, and between moving trains and fixed stations. There are many uses for the wireless telegraph in railroad train operation. It enables the dispatcher to communicate direct with the train, and train orders can be transmitted as accurately and reliably as by telegraph or telephone. The wireless, together with a selective device, can also be used for setting signals at distant points.

"The wireless telegraph serves as an auxiliary method of communication, in addition to the telegraph and telephone, in the event of interruption to wire facilities, and has already proved its practicability and efficiency under such conditions, not only between fixed stations, but also between a moving train and fixed stations, and the results obtained by the Lackawanna during the past year have been valuable in many ways. It is the company's intention to extend the service over the entire system.

"We have not found it necessary to go outside of our own organization," he continued, "to obtain operators that can handle wireless equipment and wireless messages. Our wireless office at each divisional point is located within a few feet of the dispatcher's office; and in the event of total wire failures on any part of the road, the wireless is immediately resorted to, operators at divisional headquarters being instructed to listen for a period of five minutes, and if no one is calling, then to call the nearest wireless station for a period of five minutes. This results in the various stations getting into communication with each other in a very few moments. We no longer fear sleet storms, which are becoming more frequent, and which annihilate pole lines of the strongest construction.

"The fact that we are obliged to carry a telegraph operator on each train equipped with wireless telegraphy, or employ a trainman that is a telegrapher," said Mr. Foley in conclusion, "led us to take up the development of the wireless telephone. We have obtained some favorable results, having talked from a fixed station to a moving train a distance of fifty-three miles."

Mr. G. W. Jett, of the telephone department of the Norfolk and Western Railway Company, at Roanoke, Va., in remitting \$4.00 to cover his subscription for two years, writes: "I take great pleasure in recommending TELEGRAPH AND TELEPHONE AGE to all telegraph people. I have been reading your paper for a number of years and consider it a necessity."

Mr. O. C. Greene, at present residing in Washington, D. C., formerly superintendent of telegraph of the Northern Pacific, St. Paul, Minn., writes: "You did the correct thing in renewing my subscription, as I shall want it as long as my eyes hold out to read it; after that, I hope to have somebody read it to me."

How to Make Our Advertising Columns Yield Results to Those Who Patronize Them.

We invite correspondence on this subject. The first gentleman who was asked to express his opinion stated that he had placed several orders with advertisers whose names and addresses he obtained from the columns of this publication, but had failed to mention the source of his information. He states that he recognizes now that this oversight worked to our disadvantage.

Another man writes: "I am a train dispatcher. I wished certain information some months ago, covering train dispatching circuits. You referred me to two manufacturing concerns, which advertised in your publication, for their descriptive matter. I wrote them and obtained the necessary information. I failed to mention your publication in this connection. This was, in reality, an injustice to you, for the reason that I had occasion later to recommend the purchases of goods from each one of the houses."

These are examples of the replies we are constantly receiving from those sending inquiries in regard to the value of advertising. Everyone who takes the names and addresses from our publication should, in all fairness to the owners of the paper, as well as the man who pays the advertising bills, mention the source of his information. No man has any idea of the good effect this has with the advertiser. It convinces him at once that the writer of the letter, being a reader of this journal, must necessarily have a good business standing in the community in which he resides. His inquiry, therefore, would receive more prompt and careful attention than it otherwise would.

It may be mentioned that we do not accept any advertisement that has not back of it a first-class establishment. During a single year we reject many thousand dollars' worth of advertising business which we do not think measures up to the standard of the requirements of a paper such as ours. We do, however, hope that hereafter anyone who has occasion to write for even a catalogue or the price of goods advertised in these columns will take the trouble to inform the advertisers that their names and addresses were obtained from this paper. This is the only way an advertiser has of ascertaining the true value of a publication as an advertising medium.

So certain are we that the concerns advertising in our paper are strictly reliable, that we do not hesitate to say that we will stand behind any business transaction had with concerns patronizing our advertising columns.

THE ARGENTINE GOVERNMENT TELEGRAPH DEPARTMENT, Mr. Agustin Sal, inspector general, is using the Baudot printing telegraph system with excellent results. Mr. Sal was in New York just a year ago, enroute to Buenos Aires, after an extended trip to Europe, where he looked into the merits of the various telegraph systems in use on the Continent. The selection of the Baudot is, no doubt, the result of his observations.

The San Francisco Tournament.

Arrangements for the telegraph tournament, to be held in San Francisco, on May 27, 28 and 29, are progressing favorably, and it is expected that a definite programme will be announced shortly. The preparatory work has been so great, that the final plans are still incomplete, but the committee is struggling manfully with its task and is now seeing daylight. In the meantime interest is enthusiastically sustained in the fraternity throughout the country and much training is being prosecuted in many of the principal cities. What is being done, of course, cannot be announced at this time; the contest will prove things and some surprises may be looked for. Atlanta, Ga., seems to be making special efforts to capture the prizes, as there is much quiet training going on there.

Mr. P. J. Faulkner, chief operator, Southern Pacific Company, New York, writes as follows regarding the competition of hand sending with machine sending at the San Francisco tournament:

"The old hand-sending contingent seems to be very much afraid they will have to compete with machine-senders, but I think they are needlessly alarmed. I do not believe there are many operators who can use a sending machine in competition with Gibson, McClintic, Catlin or Conkling, and beat them by sending faster and better Morse. I feel that I am qualified to express an opinion on the subject, because there was a time when I could send over fifty words a minute by hand, and I can now do the same thing with a Vibroplex, but it requires so much practice and effort to do it, that I think it entitles one to just as much credit as the fifty-word-a-minute hand-sender receives. In order to satisfy the latter, however, I agree with the suggestion of one of your recent correspondents that there should be separate classes for hand senders and machine senders, the winner of each class, however, to compete for the championship. The judges are usually out of sight of the contestants and base their judgment on the speed and quality of the Morse alone, and I repeat that if there are any machine senders who can, under those circumstances, get the decision they are justly entitled to it.

"I have seen some reference to machine senders making "st" for "V" and six dots for "P." There are hand senders who do the same thing. But such senders are out of place in a tournament, and as such mistakes count as errors against them, they would be eliminated from consideration early in the contest.

"The Vibroplex marks one of the biggest advances in telegraphy that we have ever seen, and I trust those in charge of the San Francisco affair will not see fit to discriminate against its use. They might, with almost equal propriety, object to the use of typewriters."

Dot and Dash Club Annual Meeting.

Prominent Philadelphia telegraph officials were chosen to fill the offices of the Dot and Dash Club at the annual meeting of that club, held in Philadelphia, March 1. Mr. S. S. Garwood was re-elected president, while F. W. Griffin, of the American Telephone and Telegraph Company; J. W. Reed,

of the Western Union Company; C. E. Bagley, of the Postal Telegraph-Cable Company, and Chas. B. Wood, the retiring secretary of the club, were chosen vice-presidents. Messrs. W. W. Donnelly and J. H. Wilson were elected secretary and treasurer, respectively. The governing board, representing all companies, consists of the following: A. S. Weir, chairman; E. C. Boileau, F. E. Maize, J. C. Johnson, J. J. Mishler, E. W. Miller, S. M. Custer, F. R. Webb, I. D. Maize, R. A. Black, J. A. Chapman, A. G. Strickland.

An increase of more than fifty per cent in the membership was reported during the year. Life membership in the club by the payment of \$20 was provided for.

After finishing the business of the meeting the members enjoyed a "Get Together" buffet lunch provided by the club.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. R. Raphael has been appointed manager at Ellis Island, New York harbor, vice H. Hermann, who died on February 15.

Messrs. F. Chenkin and H. Tait have been assigned to the Syracuse quadruplex in the main operating room in recognition of their excellent records for efficiency.

Mr. H. A. Emmons, of the engineering department, recently addressed the Western Union Educational Society on the subject of printer systems.

Miss Harriet M. Lane, one of the most pleasing and gentle ladies it has been our good fortune to know in the service, and a well and favorably known operator in the New York office for many years, passed away at West Cornwall, Conn., February 21. Miss Lane had been away from the office for more than a year and was on the Western Union pension roll, due to an illness which finally proved fatal. During this time she manifested the resignation and fortitude which follow a truly Christian life and spirit, and, viewing the future with hope and without fear, she passed peacefully away. The remains were buried in Greenwood Cemetery, Brooklyn, February 24, attended by her pastor, a number of relatives and friends, including representatives from the office, as a tribute to one whose gentle character had gained their love and respect.

PHILADELPHIA POSTAL.

Mr. J. P. O'Donohue, division electrical engineer, New York, was a recent visitor.

I. A. Inselman has been transferred to Trenton, N. J.

A credit list has been established by chief operator E. W. Miller, and a record kept of all errors detected by employes.

All-night chief operator F. P. McElroy wishes to thank the office force, through the AGE, for the expressions of sympathy on account of the recent death of his mother, and for the floral piece.

Miss Mildred E. Jones, of the telephone staff, has resigned and was married on March 10.

Work on our new quarters in the Finance Building is progressing rapidly. This building is one of

the most modern of its kind, and overlooking the main gateway of the city, as it does, promises to become a great telegraph centre.

Through the special kindness of "Billy" Sunday, six hundred telegraph employes and their families were granted a special reservation at the Sunday Tabernacle on the evening of March 10.

BUFFALO WESTERN UNION.

Mr. John A. Pferd, who retired from the managership of this office, was very much surprised upon his arrival home to find there a very nice testimonial from his co-workers, a large leather easy chair and a beautiful cabinet containing choice cigars and liquids, with best wishes for all comforts and happiness.

Miss Jennie Lannon, the popular operator for the Larkin Soap Company, while sending a message was instantly killed by an arch stone, weighing over a ton, falling upon her from a height of sixty feet. Two other lady clerks were slightly injured. Miss Lannon was to have been married in June.

The many friends of Mr. John Lapey, who recently retired after fifty-one years' service with the Western Union Company, will be pleased to learn that he has returned to his home almost fully recovered from a six weeks' detention at the hospital, after a very delicate surgical operation.

Mr. Harry E. Williamson, a stock broker, died at his home, February 10, of Bright's disease. He had been for many years assistant to all-night manager Joe Anderson, retired.

The report of the Buffalo Electrical Aid Association shows a membership of 332. During the year 1914 claims amounting to \$2,384.00 were paid; balance in banks, \$6,017.06. The officers are: Jos. J. Kennedy, president; R. B. Ferguson, vice-president; F. J. Diener, secretary-treasurer. Executive committee: J. F. Burgdorf, E. A. Sawken, Wm. J. Quinn, John Cunningham, Wm. A. Whitehead. Miss Rose Purcell, Miss E. E. Latchford. Trustees: John A. Pferd, Jos. Drexelius, John G. McNerny.

CHICAGO WESTERN UNION.

The Western Union Messengers' Social Club has been organized here for the purpose of stimulating the interest of the messengers in their work and promoting loyalty to the company. The club will meet semi-monthly.

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.

Miss Hattie M. Hopkins, formerly manager of the Western Union office at Belvidere, Ill., and Mr. Samuel S. Wilson, of Charles City, Iowa, were married at Belvidere, February 27. The bridal pair left for Florida on an extended tour. Miss Hopkins was one of the best lady managers in the district of district commercial superintendent A. B. Cowan. She was in charge of the Charles City, Iowa, office previous to her marriage.

MILWAUKEE WESTERN UNION.

Charles Warth, aged fifty-six years, wire chief, and former chief operator in this office, died suddenly at his home, February 28. Mr. Warth was born in Milwaukee and was first employed with the Atlantic and Pacific Telegraph Company in 1875 as messenger. He learned to telegraph under Robert J. Nicoud, then manager, and now commercial agent for the New York Central Lines, and subsequently worked for the American District Telegraph Company, the American Union Telegraph Company and the Western Union Telegraph Company. Latterly he held the positions of late night chief operator, traffic chief and chief operator, and was widely known among the telegraph fraternity throughout the United States. Within the last year he was made wire chief, which position he held until his death. He is survived by his wife, three sons and a daughter. The funeral was held at his home, on March 3, with a large number of his Milwaukee and out-of-town friends present. The pallbearers were: Mark Farley, George Sickinger, F. A. Mohr, O. W. Erion, A. W. Truss, F. C. Spiller. Messrs. C. H. Finley, M. W. Rush, R. R. Wilhoit and John Campbell came from Chicago.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 60c. 30 to 35, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2.00; Half Grade, \$1.00. 45 to 50, Full Grade, \$2.50; Half Grade, \$1.25. 50 to 55, Full Grade, \$3.00; Half Grade, \$1.50. 55 to 60, Full Grade, \$3.50; Half Grade, \$1.75. 60 to 65, Full Grade, \$4.00; Half Grade, \$2.00. 65 to 70, Full Grade, \$4.50; Half Grade, \$2.25. 70 to 75, Full Grade, \$5.00; Half Grade, \$2.50. 75 to 80, Full Grade, \$5.50; Half Grade, \$2.75. 80 to 85, Full Grade, \$6.00; Half Grade, \$3.00. 85 to 90, Full Grade, \$6.50; Half Grade, \$3.25. 90 to 95, Full Grade, \$7.00; Half Grade, \$3.50. 95 to 100, Full Grade, \$7.50; Half Grade, \$3.75.

M. J. O'LEARY, Sec'y. P. O. Box 610, NEW YORK.

Telegraph and Telephone Age

No. 7.

NEW YORK, APRIL 1, 1915.

Thirty-third Year.

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The Western Union "Quadruple Duplex," or Octuplex.

Several years ago, the Western Union Telegraph Company found that in order to take care of its rapidly increasing business, it would be necessary for it to greatly increase its facilities. Two methods were available: First, more economical methods of utilizing the present wire facilities might be adopted; second, additional wire facilities could be furnished. The former was undoubtedly preferable, if practically possible. A careful study was made of all that had been accomplished in the direction of high-speed telegraphy, and a thorough investigation of the problem was instituted, the result of which was the decision to develop a system which was best suited to meet the requirements of its service. At that time, it appeared that the system should be a machine sending and page printing system, and should use an equal letter five unit code. Upon reaching this conclusion, the Western Union Telegraph Company called on the Western Electric Company to co-operate in the development with a view to having it design and manufacture the apparatus finally decided upon. The combined effort and experience of the engineers of these two companies has resulted in the development of a thoroughly practical and flexible printing telegraph system which is well suited to meet the operating and traffic requirements of large operating companies, and which is also well suited to render service in other lines of business activity.

The system is suitable for operation over open wire, underground or submarine cable of any length over which a line relay can be operated satisfactorily. Its flexibility permits of a large number

of methods of operation, the method of operation to be employed in a given case depending upon the operating and traffic conditions imposed.

Some of the various methods of operation which have been standardized are as follows:

1. *One-Way Method of Operation.* This method provides one traffic channel which may be used in either direction. The capacity of a line operated by this method is, roughly, forty-five words per minute in either direction. This system is intended for short haul traffic, and is only recommended for use over lines comparatively free from inductive disturbance and not exceeding the equivalent of thirty miles of underground cable.

2. *Two-Way Method of Operation.* This method of operation provides one traffic channel in each direction simultaneously without involving the use of duplex balancing apparatus. Its traffic-carrying capacity is equal to, roughly, forty-five words per minute in each direction, or a total of ninety words per minute for the line. This system is operative over any length of line not requiring the use of repeaters. For economic reasons, it is ordinarily not recommended for lines longer than 500 miles.

3. *Double Duplex Method of Operation.* This method of operation provides two traffic channels in each direction. Simultaneous transmission in each direction is obtained by means of the duplex balance. The traffic-carrying capacity of the circuit is, roughly, forty-five words per minute per channel, ninety words per minute in each direction, and a total for the line of 180 words per minute.

4. *Triple Duplex Method of Operation.* This method of operation provides three channels in each direction, simultaneous transmission in two directions being obtained by means of the duplex balance. The traffic-carrying capacity is, roughly, forty-five words per channel, 135 words per minute in each direction, or a total of 270 words per minute for the line.

5. *Quadruple Duplex Method of Operation.* This method of operation provides four channels in each direction, the simultaneous transmission in two directions being obtained by means of the duplex balance. The traffic-carrying capacity is, roughly, forty-five words per channel, 180 words in each direction, or a total of 360 words per minute for the line.

These methods of operation by no means represent the limit of flexibility of the system, for if line conditions will permit, the number of channels may be further increased. Moreover, it should be understood that the working speed per channel is not limited by the apparatus, but rather by economical operating conditions. Forty-five words per minute is thought to be an economical working speed. Satisfactory operation of the apparatus has been had at fifty-two words per minute per channel on a quadruple duplex, thus making a total of 416 words per minute for the line.

In the case of the quadruple duplex, triple duplex, double duplex, and two-way services, the messages are first prepared on tape by an operator using a keyboard perforator, as shown in Fig. 1. For each key of the perforator depressed, a number of holes are punched in the tape, and their arrangement determines the combination of positive and negative currents which will be sent to line when the tape is fed through a transmitter (Fig. 2) working in conjunction with a distributor (Fig. 3). The impulses thus transmitted over the line operate a polarized line relay at the receiving station, which

may be torn off and is ready for delivery. If so desired, the message may also be received in the form of a perforated tape. This is accomplished by means of a reperforator which works in con-



FIG. 2—TRANSMITTER.



FIG. 3—DISTRIBUTOR.

in conjunction with another distributor, passes the impulses along to a receiving printer (Fig. 4), which translates them into the predetermined letter or figure, and prints them in column form (see Fig. 5), so that when a message is completed, it

junction with the printer. The tape thus prepared may be used for retransmission on another line operated by any of the described methods of operation.

Ordinarily for one-way service, keyboard trans-



FIG. 1—KEYBOARD PERFORATOR.

mission is adopted, instead of tape transmission. In either case, the home printer may or may not be used to provide a record of all traffic passing over the circuit. However, when desired, tape transmission may be used for this class of service, and possesses the advantage of affording a simple and efficient storage of signals, thus keeping the speed of transmission constant. This is of particular advantage in operating over difficult circuits; for example, a line which would easily permit of a fair average speed, but which would not be capable of trans-

shown of equal length and that each consists of five units. Considering the black above the dotted line as positive and below the dotted line negative,



FIG. 4—RECEIVING PRINTER.

mitting the signals at the maximum speed of the operator.

ALPHABET.

The code used in this system is an equal letter, five unit code; that is, each signal consists of five units or current impulses, and all signals require

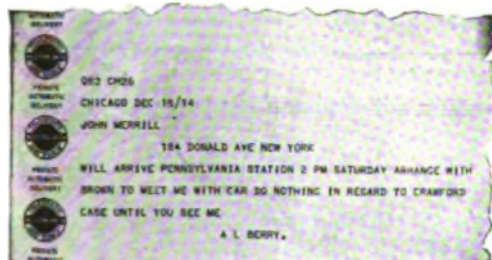


FIG. 5—MESSAGE AS RECEIVED.

the same amount of line-time for their transmission. This is true if the signal is that of a letter, a figure, or a signal which is utilized to perform some other function at the receiving end. This type of code is generally known as the Baudot code. Referring to Fig. 6, it will be noted that all of the signals are

LOWER CASE	UPPER CASE	1	2	3	4	5
A	-					
B	?					
C	:					
D	\$					
E	3					
F	CITY					
G	&					
H	&					
I	8					
J						
K	)					
L	(					
M	.					
N	.					
O	9					
P	0					
Q	1					
R	4					
S	THROUGH					
T	5					
U	7					
V	.					
W	2					
X	/					
Y	6					
Z	"					
CARRIAGE RETURN						
LINE FEED						
LETTER SHIFT						
FIGURE SHIFT						
SPACE						

FIG. 6—THE ALPHABET.

we see that the letter "A" consists of units 1 and 2 positive, and units 3, 4 and 5 negative, that letter "B" consists of unit 1 positive, units 2 and 3 negative, and units 4 and 5 positive, and letter "C" consists of unit 1 negative, units 2, 3 and 4 positive, and unit 5 negative, and so on. In a five unit code, assuming that each unit is represented by a pulse of positive or negative current, we have available thirty-one combinations which are sufficient for all the letters of the alphabet and the functions—carriage return, line feed, letter shift, figure shift, and space. The various figures and additional functions are obtained by means of another case, as is indicated. Thus the signals for A, B, C, etc., can be made to print -, ?, :, etc., by preceding these signals by the figure shift signal. Before returning to letters, it will then be necessary to send the letter shift signal, which will cause the printer to proceed in the lower case. As just pointed out, it is necessary to employ signals for figure shift and letter shift, in order to obtain all the letters, figures and symbols required. In addition to this, the column printing feature requires signals to lift the paper vertically and return the carriage for a new line. The transmission of these extra signals

over the line occupies line time, and this loss of time has been found to average about ten per cent of the working time, for ordinary telegraph traffic. In other words, the code employed in this system may be considered to average 5.5 units per character so far as line transmission is concerned. Analyzing the Continental Morse code as used in Wheatstone working on the same basis, we find that the signals for the various letters or figures occupy different lengths of line time. From an investigation of actual telegrams, it has been found that the Continental Morse code requires an average of 9.08 units per letter. As regards the economy of line time, the five unit code has an advantage over the Continental Morse code as 9.08 is to 5.5. This means that if the maximum speed of transmission over a telegraph line is 6,000 units or impulses per minute, these impulses may form 660 letters in the Morse code and 1,090 letters in the five unit code used in this system, an advantage for the latter in line transmission economy of 65 per cent. On long aerial lines and on lines which consist wholly or partially of underground cable conductors, the advantage to be derived from the use of the five unit code is considerable. On short lines where the permissible line speed is well beyond that of the apparatus or the requirements of the traffic, the shorter code will permit of duplex operation with a



FIG. 7—CONTINENTAL AND FIVE UNIT MORSE CODES COMPARED.

greater inaccuracy in the duplex balance. This means that the system can be worked duplex under less favorable weather conditions, with less supervision, than could a system using a code less economical of line time. Fig. 7 illustrates the economy of the five unit code as compared with the Continental Morse code used by the Wheatstone. In the upper line are shown the current impulses necessary to send the words "London, New York, Paris" by the Continental Morse. In the lower line are shown the current impulses required to send the same words with the five unit code. Whereas the Continental Morse requires 192 units of line time to transmit these three words, the five unit code requires only 100. This, however, is an isolated case, and does not give a true comparison of the transmission economies of the two codes when used for ordinary telegraph traffic. This is particularly true, since the transmission of these words requires none of the special function signals, such as figure shift, letter shift, carriage return, paper lift, etc.

(To be Continued.)

INSTITUTE CONVENTION.—The 1915 convention of the American Institute of Electrical Engineers will be held at Deer Park, Md., from June 29 to July 2. Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, is the nominee for president of the institute for the year beginning August 1.

Telegraph and Telephone Patents.

ISSUED MARCH 2.

- 1,129,840. Telephone. To H. A. Bates, Galesburg, Ill.
- 1,129,951. Telephone-Exchange System. To E. S. Browning, Keefeton, Okla.
- 1,129,959. System for Amplifying Electric Waves. To E. H. Colpitts, East Orange, N. J.
- 1,130,008 and 1,130,009. Audion. To A. McL. Nicolson, Tarrytown, N. Y.
- 1,130,029. Telephone Apparatus. To H. E. Shreeve, Millburn, N. J.
- 1,130,190. Telephone-Exchange Apparatus. To C. H. North, Cleveland, Ohio.
- 1,130,522. Party-Line Listening-In-Detecting Device. To C. A. Kramer, Spokane, Wash.
- 1,130,608. Telephone Attachment. To P. A. Johnson, Springfield, Ore.
- 1,130,688. Rapid-Printing Telegraph System. To C. G. Ashley, Chicago, Ill.

ISSUED MARCH 9.

- 1,130,697. Automatic Telephone-Exchange System for Subscribers' Lines with Extension Sets. To F. Aldendorff, Antwerp, Belgium.
- 1,130,784. Measured-Service Telephone System. To B. D. Willis, Chicago, Ill.
- 1,130,901. Telegraph Apparatus. To C. Henry, Edgemont, Ark.
- 1,130,971. Intercommunicating Telephone. To W. W. Henry, Wollaston, Mass.
- 1,131,006. Electric Signal System. To E. A. and H. V. Reynolds, Anderson, Ind.
- 1,131,088. Antisepic Attachment for Telephone Mouthpiece. To I. S. Rosenblatt, San Francisco, Cal.
- 1,131,140. Automatic Switch for Telephone Systems. To W. Kaisling, Chicago, Ill.
- 1,131,187. Self-Inductive Means for Electrical Oscillatory Circuits. To G. von Arco, Berlin, Germany.
- 1,131,250. Telephone-Reinforcing Circuit. To C. D. Lanning, Boston, Mass.
- 1,131,439. Telephone Recorder. To E. R. Talley and R. P. Norton, Algona, Ia.
- 1,131,447. Telegraph Repeater. To F. E. Wallace, Franklin, Cal.
- 1,131,455. Telephone System. To H. M. Wright, Darlington, Okla.
- 1,131,598. Telephone Apparatus. To W. M. Byrnes, Vail, Ia.
- 1,131,624. Telephone Apparatus. To J. Erickson, Chicago, Ill.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on March 29:

American Telephone and Telegraph Co.	122
Mackay Companies	76
Mackay Companies, preferred	67½
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2¼
Western Union Telegraph Co.	65

PERSONAL.

COL. ROBERT C. CLOWRY, former president of the Western Union Telegraph Company, returned to New York, after a month's sojourn at Jekyll Island, Ga.

MR. J. SCHANHER, formerly manager of the Western Union Telegraph Company at Mt. Clemens, Mich., a prominent druggist of that city, accompanied by his wife, is spending a vacation at Pass Christian, Miss.

PROF. GEORGE S. MACOMBER, department of electrical engineering, Cornell University, Ithaca, N. Y., has returned to Ithaca, after spending six months with the Public Service Commission in connection with the New York telephone rate investigation.

MR. JAMES R. MAYER, superintendent of telegraph of the Texas Company, Houston, Tex., became a grandfather by the birth of a grandson on March 6. The young arrival, Jack Rodney Mayer, is also a grandson of Mr. C. W. L. Mickley, superintendent of telegraph of the International and Great Northern Railroad, Houston.

Hon. E. S. Philipps, a Former Operator, Now Governor of Wisconsin.

Honorable Emanuel S. Philipps, governor of Wisconsin, began his business career as a telegraph operator. His first position as an operator was at Waunakee, Wis., for the Chicago and North Western Railway. This was in 1881. He occupied many other positions as operator, agent and train dispatcher for the same railroad company, and later became general agent for the Union Pacific Railroad Company and the Missouri Pacific Railroad Company. He then engaged in outside enterprises, becoming president of the Union Refrigerator Transit Company, and also occupied various other positions, both public and private. He has abandoned for the next two years all of his outside enterprises, which are very extensive, to devote his entire time to the duties of governor of the State of Wisconsin. His numerous friends predict for him a very successful political career. Governor Philipps is a hard worker. Whatever he undertakes to accomplish, he does well, which, after all, is the keynote to success. He was born on a farm in Sauk County, Wis., March 25, 1861.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. E. REYNOLDS, vice-president and general manager, is absent on a three weeks' trip of inspection through the middle west. He will visit the principal offices in that territory and return to New York at the end of the first week in April.

MR. W. I. CAPEN, vice-president of this company, and Mrs. Capen, who are spending their winter vacation in Florida, were in Ocala for a couple of days recently as the guests of Mr. A. F. Joyner, manager of the company's office at that point.

MR. C. P. BRUCH, vice-president of this company, has been elected a vice-president of the Ohio Society of New York. He was presented by the so-

ciety with a handsomely engrossed resolution expressive of the high appreciation of the capable and efficient manner in which he presided over the meetings of the governing committee, of which he was chairman during the past year.

MR. J. McMILLAN, manager of telegraphs, Canadian Pacific Railway Company's Telegraph, Montreal, Que., was an executive office business visitor March 26.

MR. J. F. SKIRROW, associate electrical engineer, and **MR. J. P. O'Donohue**, division electrical engineer, New York, made a trip to Columbus, Ohio, a few days ago on company business.

MR. F. E. SCHAEFFER has been appointed manager at Hastings, Neb., vice C. A. Ebert, resigned.

MR. T. F. BURKE, manager at Poughkeepsie, N. Y., has been granted a leave of absence, and **MR. H. K. PERKINS**, operator at Schenectady, N. Y., is filling the position temporarily.

GENERAL J. H. STYLES, aged ninety-one years, an employe of the bookkeeping department, died in New York, March 26. He was engaged in his duties as collector up to within two months of his death. Deceased was one of the organizers of the fourteenth regiment of Brooklyn, and served through the Civil War.

J. A. LONG, aged fifty-six years, identified with the main office force of the Postal Telegraph-Cable Company, New York, until about twelve years ago, when he left the city, died at Mobile, Ala., March 7. Mr. Long was the inventor of a heating apparatus for street cars, which possessed considerable merit. He also held many important positions in other lines of business.

The wife of **MR. F. N. ROBERTS**, for many years identified with the Chicago office of this company, in an official capacity, died on March 17. Mrs. Roberts had been ill for some time. Her remains were buried at Dunnville, Ont., her former home.

THE TROY, N. Y., office has been moved into larger and more modern quarters. **MR. S. W. SMITH** is manager.

THE MACKAY TELEGRAPH AND CABLE COMPANY is building two copper wires between McAlester, Okla., and Sherman, Tex. They will be arranged for telephone connection.

MAGNETIC CLUB DINNER APRIL 15.—A mail vote was taken among the members of the Magnetic Club recently on the question of holding a spring dinner, and a majority of them voted in favor of it. Arrangements have therefore been made to hold the dinner at the Broadway Central Hotel, New York, at 6.30 p. m., Thursday, April 15.

"A PLAN FOR THE NATIONALIZATION OF RAILROADS," by William W. Cook, general counsel of the Mackay Companies, Postal Telegraph-Cable Company and Commercial Cable Company, and author of "Cook on Corporations," is the title of a pamphlet reprinted from the *Yale Law Journal* and *New York Sun*. Mr. Cook's proposition is that four "Regional Railroad" corporations to cover the United States, be organized by Act of Congress, to place in the hands of the public the control of the railroads of America. This is to be done by these

corporations acquiring, owning and voting the stocks of the present various railroad systems. The control of the holding companies is to be in the hands of the public by control of their boards of directors. "Railroad problems," Mr. Cook says, "are too complex to be solved by a commission."

A MUTUAL INVESTMENT ASSOCIATION has been organized among the employes of this company at Des Moines, Iowa, on a plan similar to that of the association of like character conducted by the Postal employes in New York. Members purchase all household and personal supplies through the association at reduced rates, and in the first month of its existence dividends amounting to five per cent per member were credited. The officers are: A. R. Akers, president; C. F. Wright, vice-president and general secretary, and Miss M. E. Lowe, treasurer; Miss E. F. Griffith, membership secretary, and Miss Alene L. Nye, recorder.

New Postal Office at Des Moines, Iowa.

The accompanying illustration shows a view of the interior of the Postal Telegraph-Cable Com-



POSTAL OFFICE, DES MOINES, IOWA.

pany's office at Des Moines, Iowa. The office, while not doing a particularly heavy relay business, has a goodly supply of emergency repeater sets, both duplex and single—seventeen duplex sets and eight single repeater sets—that are taken advantage of by the Chicago, Omaha, Kansas City and other offices when the weather is unfavorable for good working.

The office is built on the latest concentration plan, all of the repeaters being placed in unit cabinets. Mr. H. E. Patton is manager. The operating department is headed by Mr. C. F. Wright as chief operator, Mr. Arden R. Akers, night chief operator and Mr. C. F. Schmacker all-night chief. The employes are well pleased with the new quarters and are especially appreciative of the management's efforts to safeguard the health and comfort of each one.

Mr. J. C. Duane, of the plant department, Western Union Telegraph Company, Jacksonville, Fla., in remitting to cover his subscription for another year, writes: "You may figure on me as a permanent subscriber to the AGE."

Western Union Telegraph Company. EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president, has been elected a director of the Missouri Pacific Railway.

MR. SHIRLEY M. ENGLISH, general manager of the Gulf Division, Dallas, Tex., was a New York executive office visitor last week.

MR. B. F. RAGSDALE has been appointed district commercial superintendent, with headquarters in Atlanta, vice Mr. J. E. Scofield, retired. Mr. Ragsdale was formerly assistant district commercial superintendent.

AMONG RECENT EXECUTIVE OFFICE VISITORS were Mr. M. T. Cook, assistant general manager, and T. W. Carroll, division traffic superintendent, Chicago; Charles Smith, manager, Louisville, Ky.; M. Magiff, superintendent of telegraph, Central Vermont Railroad, St. Albans, Vt., and Harry McKeldin, chief operator, Washington, D. C.

MESSRS. L. MCKISICK, assistant to the president; J. C. Willever, general commercial manager; W. N. Fashbaugh, general superintendent of traffic; Ashton G. Saylor, general manager of the Eastern Division; S. B. Haig, division traffic superintendent outside of New York City, and M. C. Allen, division plant superintendent, all of New York, made a three days' business trip through the New England states, starting March 18. The party visited Bridgeport, New Haven and Hartford, Conn.; Boston, Springfield and Worcester, Mass., and Providence, R. I. They were met in Boston, on March 19, by president Newcomb Carlton and Mr. G. M. Yorke, general superintendent of plant, where the usual conference was held. All of the officials named, together with district commercial superintendents W. A. Sawyer, of New York, and C. F. Ames, of Boston; W. S. Barker, district plant superintendent, Boston, and representatives of the commercial, traffic and plant departments, as well as the managers of the local branches and the managers and chief operators from the principal offices in Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont and Maine, were in attendance. A luncheon was served, after which president Carlton addressed the gathering, and his remarks were enthusiastically received. After the address the meeting divided up into separate conferences under the guidance of the executive heads of the commercial, traffic and plant departments, president Carlton visiting them at intervals during the afternoon.

CONFERENCE IN NEWARK.—A conference of managers of the first and seventh districts, embracing portions of New York, New Jersey and Pennsylvania, was held in Newark, N. J., March 30. Among the general officials present were Messrs. Newcomb Carlton, president; J. C. Willever, commercial general manager; A. G. Saylor, general manager, Eastern Division; G. M. Yorke, general superintendent of plant, and W. N. Fashbaugh, general superintendent of traffic; W. A. Sawyer and A. Woodle, district commercial superintendents at New York and Buf-

ialo, respectively, and S. B. Haig, division traffic superintendent outside of New York. Over 100 managers were present from the sections named.

CONFERENCE IN SCHENECTADY.—A meeting of managers in central and northern New York was held in Schenectady, N. Y., March 23. The meeting was conducted by Mr. W. A. Sawyer, district commercial manager, New York. Among the managers present were A. E. Reynolds, Schenectady; J. D. Felsenheld, Glens Falls; J. C. Shanley, Little Falls; W. Wilsey, St. Johnsville; S. Fonda, Fort Plain; J. H. Dammons, Canajoharie; Joseph Clements, Johnstown; M. J. McCarthy, Gloversville, and W. G. Waldron, Amsterdam.

MR. JAMES F. WILSON, former manager at Savannah, Ga., and recently appointed district commercial superintendent, with headquarters at Meridian, Miss., has been succeeded at Savannah by Mr. C. H. Mulford, former manager at Memphis, Tenn., and Mr. C. H. Carroll, former district cable manager at Memphis, has been appointed manager of that office. Mr. Wilson was born in Rankin County, Miss., September 12, 1881, and entered the Western Union service in 1896 as messenger at Memphis, and soon became an operator. He was with the Postal Telegraph-Cable Company for a time, but returned to the Western Union in 1910 as district manager for the state of Tennessee. He was appointed district traffic supervisor at Atlanta, Ga., in April, 1911, and in May, 1912, was made manager at Savannah.

MR. J. W. GAFFEY, commercial agent, New York, gave the lecture "The Story of the Telegraph," before the high school students at Meriden, Conn., on March 15.

JOHN A. MCINTYRE, of the Western Union Telegraph Company, St. Louis, Mo., a delegate to the annual meeting of the Telegraph and Telephone Life Insurance Association, New York, on March 17, spent a week in New York visiting old friends and was an occasional executive office visitor during his sojourn in the city.

MRS. W. J. AUSTIN, wife of Mr. W. J. Austin, of the cable abstract department, New York, died March 19.

MR. CHARLES E. JONES, whose appointment as manager at Dayton, Ohio, was noted in our issue, dated March 16, was born at Ironton, Ohio, April 15, 1870, and began his telegraphic career at Waverly, Ohio, in November, 1887. Since that time he has held positions of manager successively at Waverly, Ohio, Ashland and Catlettsburg, Ky., and Portsmouth, Zanesville and Hamilton, Ohio, which latter position he held at the time of his transfer to Dayton.

MR. B. F. RAGSDALE, whose appointment as district commercial superintendent at Atlanta, Ga., is announced elsewhere in this issue, was born in Washington, Ind., December 12, 1869, and entered the Western Union service in his native town in 1892. He afterward held various positions in several eastern cities, being appointed chief operator at Augusta, Ga., in 1911. Later he became assistant district commercial superintendent at Atlanta,

which position he held at the time of his recent promotion to the superintendency.

MR. W. J. ROSS, whose appointment as chief operator at Chattanooga, Tenn., was noted in our March 1 issue, was born in Buchanan, Mich., April 3, 1867. He first entered the telegraph service at Topeka, Kan., in 1887. During his career he has held the positions of train dispatcher of the Atchison, Topeka and Santa Fe Railroad at Newton, Kan., traffic chief for the Western Union Telegraph Company at New Orleans, La., and Louisville, Ky., and night chief operator at Memphis, Tenn., from which latter position he has just been advanced to that of chief operator in the Chattanooga office, as announced.

New Office at Fort Smith, Ark.

The new office at Fort Smith, Ark., was planned along the most modern lines and is complete in every detail. The old gravity battery has been replaced by eight motor-generators—three delivering 160 volts, three 320 volts and two twenty-six volts. The wiring on the power board is two-wire, three-phase. The 160-volt machines feed the single lines, the 320-volt machines the multiplex, and the twenty-six-volt the local wires.

The main and local board is of the Western Union's latest style pin-jack, including distributing frame.

Each of the operating tables has eight positions, and one repeater table is entirely new with instruments of the latest design.

The feature of the office is the eleven wire concentration unit with Gill selectors. This will cover all the way wires and is the first and only concentration selector unit installed in the Gulf Division.

There are four quadruplex sets, one duplex and two full sets of "combination" repeaters. It is the intention to change the route of the overland wires, which will cause them to be repeated at this point.

The emergency power equipment consists of a two-cylinder natural gas engine and a four-pole, 220-volt alternator. The work is being installed by Mr. W. D. Reams, foreman, and Mr. E. M. Luckie.

MR. H. C. STANNARD is manager of the Fort Smith office, **H. T. PALMER**, chief operator, and **B. P. HOWARD**, night chief operator.

The Telegraph Outlook.

In an interview published in the *Electrical World* president Newcomb Carlton states that business in general is yet far from satisfactory, but a steady gain in the company's earnings from a loss of eight per cent in October last to a three per cent increase in February this year is to his mind the best possible proof that the business barometer is rising.

"We want the people to think telegraphically," he said. "The use of the telephone has come to be automatic. It is no longer a mental operation; it is an impulse. The mental operation of sending a telegram is attended by the consciousness of definite cost. This is the result of old-fashioned training.

"We are trying to educate the public in the use and benefits of the telegraph and to appreciate that

often the lack of a few telegraphed words subjects a whole organization to indecision, misdirection and lost energy. An organization that does business by telegraph and one that depends on the mail illustrate about the difference between an express train and a stage coach. The obligation of the telegraph companies is to render efficient, dependable service with courtesy. Before every operator in our service we are placing the sign 'Accuracy first.' To improve speed we began by sending the filing time in code letters with each telegram. But we have improved on that, and in the last few weeks we have put the filing time in plain language on the message. If our service is bad, the customer is entitled to know it. We need the co-operation of the public to maintain dependable service. The fact that the public did not know what it was getting in the way of service has held back a freer use of the telegraph."

Regarding the company's construction plans, Mr. Carlton said: "Our theory is that the time to do construction work is when times are dull. When everyone else is shut down materials are cheap and labor efficient. We are still at work on the large reconstruction programme outlined several years ago by Mr. Theo. N. Vail. We shall continue it until we complete the reconstruction of the main arteries. This work ought to be finished by the end of this year. Our appropriation for reconstruction and repairs for 1915 is about \$8,000,000 for land lines only, and in addition we charge several thousand miles of new construction each year to capital account. Since June, 1910, we have spent \$48,000,000 on construction, reconstruction and repairs."

THE CABLE.

MR. G. G. WARD, vice-president and general manager, Commercial Cable Company, New York, has returned from Bermuda, after an absence of two weeks. He was accompanied by Mrs. Ward and Mrs. and Dr. G. G. Ward, jr.

THE PACIFIC CABLE BOARD announces that the rates from England to New Zealand and in the reverse direction have been reduced. There are also reductions in the rates between Canada and New Zealand.

THE COMMERCIAL CABLE COMPANY has applied to the Board of Trade, London, England, for the renewal of its landing licenses for submarine cables at Weston-super-Mare and Waterville, connecting these places with one another and with North America and the Azores.

NEW CABLE SERVICE TO HONOLULU.—On March 16 the Commercial Pacific Cable Company instituted a deferred cablegram service between San Francisco and Honolulu, Hawaii. Deferred cablegrams must be written in plain English and will be subject to a delay of twenty-four hours. The rate from San Francisco is eight cents per word, but no cablegrams will be accepted at a less charge than \$1.00.

THE NORTH SYDNEY, N. S., CABLE STATION.—The new cable station at North Sydney, N. S., which was opened last December, is one of the best and most modern cable stations in the world. Mr.

A. McGoey, of North Sydney, superintended the land-line outfitting, and Mr. A. E. Powell, of London, England, the Western Union Telegraph Company's engineer of cable station equipment, attended to the cable part of the work. Before removing to North Sydney, the cable staff was located at Plaister Cove, C. B., and of the old staff transferred in 1873 not one is now employed at North Sydney. The present staff consists of about eighty-six employees. Mr. C. J. Hoyt is manager; C. F. Byrne, day chief; L. W. Wilson, night chief, and D. H. Cameron, station electrician. The North Sydney station connects eastward with Heart's Content, N. F., thence to Valentia, Ireland.

MR. JAMES A. SCRYMSER, president of the Central and South American Telegraph Company, New York, has just published an interesting volume of 152 pages entitled, "Personal Reminiscences of James A. Scrymser, in Times of Peace and War." The book was published for private circulation only, and was brought out on the suggestion of numerous friends that his personal reminiscences be compiled in book form. The volume contains considerable matter of interest to telegraph people, and the pages are lightened by numerous anecdotes and stories, in addition to the more serious articles. Mr. Scrymser devotes several pages to the history of the International Ocean Telegraph Company, the Mexican Telegraph Company and the Central and South American Telegraph Company, and discusses the value of American-owned cables to the American government and the necessity of governmental jurisdiction. The articles cover a great variety of subjects of a personal and general nature and throw much light upon the characters of prominent men of the past whom Mr. Scrymser has met during his long experience.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to March 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914.

CANADIAN NOTES.

Changes in Canadian Pacific Railway Company's Telegraph Staff.

The following changes have been made in the staff of the Canadian Pacific Railway Company's Telegraph: Mr. John McMillan, general superintendent of telegraph, Winnipeg, Man., has been appointed manager of telegraphs, with headquarters at Montreal, vice Mr. James Kent, retired at his own request; W. Marshall, superintendent, Toronto, Ont., succeeds Mr. McMillan at Winnipeg, with the title of assistant manager of telegraphs, Western Lines; Mr. H. J. Lillie, chief operator at Toronto, has been appointed superintendent of the Ontario

Division, with headquarters at the same place, vice Wm. Marshall; Mr. A. C. Fraser, inspector at Saskatoon, has been appointed superintendent of the Eastern Division, with headquarters at Montreal, vice Mr. F. J. Mahon, transferred to Saskatoon, Sask.; Mr. J. F. Richardson, superintendent at Vancouver, B. C., has been transferred to Moose Jaw, Sask., as superintendent of telegraphs, Saskatchewan Division; Mr. R. N. Young, superintendent, Calgary, Alta., has been transferred to Vancouver, B. C., as superintendent of telegraphs, British Columbia Division; Mr. D. Coons, superintendent at Moose Jaw, Sask., has been transferred to Calgary, Alta., as superintendent of telegraphs, Alberta Division; Mr. H. Bott, chief operator, Montreal, has been appointed chief operator at Toronto; Mr. W. M. Thomson, Winnipeg, Man., has been appointed chief operator at Montreal; Mr. R. Russell, assistant agent at Winnipeg, has been appointed agent at that point; Mr. A. J. Masson has been appointed assistant manager at Toronto, Ont.

J. McMillan, Manager of Telegraphs, Canadian Pacific Railway Company's Telegraph, Montreal.

Mr. J. McMillan, whose appointment as manager of telegraphs of the Canadian Pacific Railway Company's telegraph, with headquarters at Montreal, is a native of England, having been born in Liverpool, November 2, 1866. He went to Canada with his parents in 1883, and in June of that year engaged in construction work on the early lines of the Canadian Pacific Railway. He also learned telegraphy. Early in 1885 Mr. McMillan served as foreman of telegraph construction of the government military telegraph lines, subsequently returning to the maintenance staff of the railway service. In 1888 he was general foreman of construction and returned to the maintenance staff at Winnipeg, Man. He became an operator in Winnipeg in 1895, and in 1896 was transferred to the Mountain Division as circuit manager, repeater chief and telegraph agent. In 1902 he was appointed inspector of the central division of the Canadian Pacific Telegraphs, with headquarters at Winnipeg. In 1906 he was appointed assistant superintendent of telegraph, and in April, 1907, became superintendent, with headquarters at Calgary, Alta., where he remained until January, 1912, when he was transferred to Winnipeg as superintendent. On July 1, 1913, he received the appointment of general superintendent, with headquarters at Winnipeg, which position he held at the time of his recent advancement to the position of manager of telegraphs.

MR. JAMES KENT, the retiring manager of the Canadian Pacific Railway Company's Telegraph, Montreal, Que., has been in the telegraph service since 1868. He is a native of Montreal, and his first position was with the Montreal Telegraph Company, with which he was identified until 1886, when he entered the service of the Canadian Pacific Railway Company's Telegraph at Montreal. He was chief

operator of the Montreal office until 1890, when he was promoted to be superintendent of the Eastern Division, and later became manager of telegraphs, from which position he has just retired.

William Marshall, Assistant Manager of Telegraphs, Western Lines, Canadian Pacific Railway Company's Telegraph, Winnipeg, Man.

Mr. William Marshall, assistant manager of telegraphs, Western Lines, Canadian Pacific Railway Company's Telegraph, with headquarters at Winnipeg, Man., was born at Garden Island, Ont., May 18, 1859. He entered the service of the Dominion Telegraph Company at Toronto in 1876 as assistant in the stores department, and later became operator and lineman at St. Catharines. From 1878 until 1880 he was foreman of line construction for the Canada Mutual Telegraph Company, and from 1880 until 1886 by the Western Union Telegraph Company at Buffalo, N. Y. In 1886 he entered the service of the Canadian Pacific Railway at Toronto as inspector, which position he held until 1906, when he became superintendent of construction. In August, 1909, he was appointed superintendent of telegraph, with headquarters at Toronto, and held that position at the time of his advancement to the post of assistant manager of telegraphs at Winnipeg, as just announced.

Mr. Marshall's preferment comes as a recognition of his ability and loyalty to the company's interests. He is well known to the members of the Association of Railway Telegraph Superintendents and is a frequent attendant at the annual conventions of that association.

MR. ALEX. C. FRASER, recently appointed superintendent of telegraph, Eastern Division, Canadian Pacific Railway Company's Telegraph, at Montreal, Que., was born at McLellans Brook, N. S., February 11, 1870. He first entered the telegraph service at Moncton, N. B., for the Western Union Telegraph Company in 1866. Up to the time of his recent appointment Mr. Fraser has held the positions of operator, traffic chief, wire chief, agent and inspector of the Canadian Pacific Railway Company's Telegraph.

MR. H. J. LILLIE, superintendent, Ontario Division, Canadian Pacific Railway Company's Telegraph, Toronto, Ont., was born in Toronto, November 16, 1867. His first entry into the telegraph business was in July, 1881, as messenger for the Great North Western Telegraph Company at Toronto. Becoming an operator, he remained with this company until November, 1886, when he entered the service of the Canadian Pacific Railway Company's telegraph at Toronto. He advanced successively through the positions of assistant traffic chief, wire chief and chief operator, which latter position he held at the time of his appointment as superintendent.

MR. W. M. THOMPSON, who has just been appointed chief operator of the Canadian Pacific Railway Company's Telegraph at Montreal, Que., was

born at Long Whatton, Leicestershire, England, May 2, 1879. Going to Canada when quite young he entered the telegraph service at Minnedosa, Man., November 1, 1894, and has since filled various positions of trust on Canadian railways at different places. He has also had extensive commercial telegraph experience, having been manager at Brandon, Man., and Saskatoon, Sask., also chief operator at Winnipeg; and was manager at Winnipeg when he received the call to go to Montreal.

TELEGRAPH BUSINESS IN CANADA.—The report of Mr. J. L. Payne, Canadian controller of statistics, shows that on a total capitalization of \$7,100,000 gross earnings of the various companies were \$5,983,204 and operating expenses, \$4,242,539. The Canadian Pacific Telegraph earned \$2,991,273, the Great North Western, \$1,252,930; Western Union (Canada), \$668,252; Canadian Northern \$264,615, and Marconi Wireless, \$239,906. Land messages totalled \$11,980,869 and cables \$983,061. In both cases this is an increase. Employees numbered 1,650 and salaries and wages totalled \$3,214,140.

THE TELEPHONE.

MR. J. J. CARTY, chief engineer American Telephone and Telegraph Company, New York, was the guest at a dinner given by past-president Gano Dunn, of the American Institute of Electrical Engineers, at the University Club, New York, on March 9. Among those present were Mr. Newcomb Carlton, president of the Western Union Telegraph Company; Dr. M. I. Pupin, inventor of the loading coil, and others of prominence. The dinner was attended by about forty friends of the host and the guest of honor. Mr. Carty is the presidential nominee of the Institute at the coming election.

MR. R. H. STARRETT, who has been acting secretary of the Telephone Pioneers of America for several months, has been appointed secretary in place Mr. H. W. Pope, who has retired on account of illness.

THOMAS HOOPER, aged fifty-two years, division supervisor of special contract service of the American Telephone and Telegraph Company, New York, died of cancer of the stomach on February 25. Mr. Hooper had been identified with the telephone service for the past twenty-two years. He was a very capable and popular official. For ten years prior to his connection with the telephone business he was identified with the telegraph service at Pittsburgh, Titusville and other points in western Pennsylvania.

TELEPHONE PIONEERS TO MEET IN SAN FRANCISCO.—The fifth annual meeting of the Telephone Pioneers of America will be held in San Francisco, September 21, September 22, and September 23, during the Panama-Pacific Exposition. The following have been appointed a committee of arrangements, with authority to appoint the necessary sub-committees: George E. McFarland, president, the Pacific Telephone and Telegraph Company, San Francisco; A. S. Hibbard, American Telephone and Telegraph Company, Chicago, and Gerard Swope, vice-president and general manager, Western Electric Company, New York City. Arrangements are

being made for a Pioneer special train between New York and eastern points to Chicago, Omaha, Denver, Salt Lake City, San Francisco, San Diego and Los Angeles, and the Pioneers will be requested to express their preference for a return route on a card which will be mailed to them for that purpose.

SONG AND MUSIC ACROSS THE CONTINENT.—The executive officials of the American Telephone and Telegraph Company and their families and friends held a long-distance reception with San Francisco over the transcontinental telephone line on March 12 at the company's headquarters in New York. Over sixty ladies conversed with telephone men in the telephone building on the grounds of the Panama-Pacific exposition. Mrs. Louis N. Comstock, at New York, sang "Annie Laurie" over the circuit. Following the song, a cornetist in San Francisco played "It's a Long, Long Way to Tipperary," which was heard perfectly in New York. The reception committee consisted of Mrs. U. N. Bethell, Mrs. John J. Carty, Mrs. N. T. Guernsey, Mrs. C. G. DuBois, Mrs. C. H. Wilson, Mrs. A. A. Marsters, Mrs. C. E. Scribner, Mrs. A. L. Salt, and others.

PACIFIC TELEPHONE.—According to the report of the Pacific Telephone and Telegraph Company for the year 1914 the company had at the close of that year 602,933 stations and 12,923 employees. The total miles of wire (aerial, underground and submarine) for the system was 1,847,410, an increase of 41,241 during the year.

DIVIDEND.—The American Telephone and Telegraph Company has declared a quarterly dividend of \$2 a share, payable April 25.

RADIO-TELEGRAPHY.

MR. E. B. PILLSBURY, general superintendent of the Marconi Wireless Telegraph Company of America, New York, returned to his office on March 29, after a visit to New Orleans on vacation.

MR. F. C. LUNNON, of the engineer's staff of the Marconi Wireless Telegraph Company, Glace Bay, C. B., Canada, sailed from New York for England on March 20. Mr. Lunnon expects to be assigned to the British government radio service owing to war conditions.

ANOTHER WIRELESS RESCUE AT SEA.—The Mallory Line steamer "Denver," while on her voyage from Bremen, Germany, to New York, was abandoned at sea in a sinking condition, 1,300 miles from New York, on March 23. Wireless distress calls brought several steamers to the rescue. The officers and crew and a few passengers on the "Denver" were rescued by the steamers "Manhattan" and "Megantic" and brought to New York.

INSTITUTE OF RADIO ENGINEERS.—The next meeting of the Institute of Radio Engineers will be held at Columbia University, New York, April 7. Dr. Irving Langmuir will present a paper on "Applications of Thermionic Currents to Radio Telegraphy and Radio Telephony." Dr. Langmuir's work with thermionic currents in very high vacuum tubes is well known. He will outline the theory of such currents in these tubes and describe several pieces of apparatus which have been built for receiving radio signals.

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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 it 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. Issues over one year old, 50 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

The Magic of Work.

Work, not magic, changes the dross of iron of monotonous toil into the gold of opportunity and success.

The Octuplex.

In this issue we print the first installment of a full description of the latest development in multiplex printing telegraphy—the quadruple-duplex, or the octuplex, as it is generally called. The system enables the transmission of eight messages over one wire, four in each direction, and is suitable for open wire circuits, underground circuits or submarine cables.

The foundation of this new system is the Baudot principle and the five unit code used by that inventor over thirty years ago. With this is incorporated the Murray multiplex, which includes machine sending and column printing. Thus it will be seen that the new system, although novel in many respects, as will be shown, is not altogether an innovation, but is rather the realization and adaptation of old principles which have been tried and proven.

A trial installation of the octuplex has been operating between New York and Boston for the past year and a half on the Western Union Com-

pany's wires, practically day and night, and a total speed of 360 words per minute has been attained.

The article will be fully illustrated and the descriptive matter will give those interested a very thorough understanding of the principles involved and the operation of the system. In the present installment the elements dealt with are the keyboard perforator, the transmitter, the distributor, the receiving printer and the code.

The subsequent installments will take up the multiplex principle, the method of synchronism, and give full descriptions of the perforator, transmitter and printer and the method of automatic control.

The Class Paper and Its Purpose.

What is a class paper, why does it exist and what are its aims? are questions of considerable interest to telegraphers.

A class paper is a publication dedicated to the interests of those engaged in some particular trade or line of work, and the reason for its existence is the desire of those interested to keep informed as to what is going on in their particular field. The aim of the paper is to supply its readers with such information, both of a personal and practical character. It is evident, therefore, that two parties are necessary to produce and support such a paper—the publishers and the readers—and the co-operation of both is essential to enable it to fulfill its mission.

Publications are highly specialized these days and each trade and profession has its own paper devoted exclusively to its particular interests. A telegrapher, for instance, would not consult an agricultural journal to learn what is going on in the telegraph field; he would naturally expect to find such information in a telegraph paper.

Telegraphers, as a class, are migratory, and in their wanderings make many friends, either in person or over the wires; but it matters not how they are made, these friendships are generally enduring.

When operators reach that point in their careers where they look upon life in a more serious mood and settle down to one habitation, their thoughts naturally turn tenderly and inquiringly to their friends of former days. They wonder how "so-and-so" and "so-and-so" are, where they are, and how time has dealt with them. Time ripens friendships and we all have a desire to keep in closer touch with our former friends. The class paper comes to the rescue. It is the connecting link; it bridges the distance between widely separated friends and through it we learn of their whereabouts and their activities. A great many operators, as they settle down to a more sedate mode of life, also acquire a longing to become more useful to themselves, to the community in which they live and to the company which employs them. This is a very natural and commendable desire, but how is it to be nourished and supported? Here again the class paper comes to the rescue. It gives aid and encouragement, and it is one of the chief aims of such a publication to supply the necessary information to enable them to achieve their purpose. The class paper therefore is charged with solemn obligations toward the craft it repre-

sents and the success with which it meets these obligations is measured by the support it receives from its readers. It is with pardonable pride that the publishers of TELEGRAPH AND TELEPHONE AGE feel that their efforts to uplift the craft, covering a period of over thirty-two years, have not been in vain. It can be truthfully asserted that the paper has fulfilled its duties and obligations to its readers in every respect with the result that telegraphers all over the country and the telegraph service in general have felt its uplifting influence. Telegraphers therefore should aid and support their representative journal to the best of their ability, remembering that while they are thus benefiting the paper, the paper is benefiting them individually and collectively.

Report of Commissioner of Patents.

The annual report of the Commissioner of Patents for the year 1914 shows that during the year there were received 67,774 applications for patents on inventions. There were issued 39,945 patents, the largest number ever issued in a single year. There expired during the year 22,098 patents; 10,022 applications were forfeited for failure to pay final fees within the time prescribed; 19,152 applications were allowed, but held awaiting payment of final fees.

Receipts of the Patent Office in 1914 amounted to \$1,993,866.34 for applications. The total receipts were \$2,251,892.82; total expenditures \$2,000,770.12, leaving a surplus \$251,122.70. This added to previous accumulated surplus earnings of the Patent Office, makes its total surplus, on December 31, 1914, \$7,548,175.16.

STUDENTS IN LARGE AND SMALL OFFICES.—It is a noticeable fact that telegraph operators in the smaller offices and in the country towns devote considerably more time to studying than do their associates in the larger city offices. The result is that those in the smaller offices are frequently selected when lucrative positions are to be filled, to the embarrassment of those in the larger offices who ought to have been qualified to fill the vacancies. Of course everyone knows that the operators in the smaller offices have more time to study and make their services more valuable to their company, but this alone should not be sufficient reason to cause those residing in the cities to neglect their future welfare.

MISUSE OF TELEGRAPH BLANKS.—A correspondent wishes to know if an imitation telegraph blank can be used for advertising purposes. It has been many times decided legally that such advertising is misrepresentation and telegraph blanks cannot be used for this purpose.

CAPTAIN WILLARD L. CANDEE has retired from the presidency of The Okonite Company for a well-earned rest after thirty years' service. He becomes vice-president and continues a director. H. Durant Cheever, former vice-president and treasurer, has become president.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

When iron filings are sprinkled on a cardboard held over a straight bar magnet how do the filings behave?

What is the force that prevents the lines formed by the filings from assuming the form of closer loops?

If the magnet is bent into the form of a horse-shoe, what is the effect upon the magnetic lines of force?

Is the magnetic action impeded by the interposition of wood, brass, paper, etc.?

What substance permits of the passage of magnetic lines of force with the least opposition?

If a permanent magnet or an electromagnet is brought close to a mass of iron, does the latter become magnetic?

In imparting magnetism to iron, does a permanent magnet lose any of its own magnetism?

Does soft iron retain magnetism?

Are the iron cores of the magnets of telegraph instruments hard or soft?

Why are magnet cores made of soft iron? If they were made of hard iron, what would be the effect?

Are there any magnetic lines of force in a circular iron ring as shown in Fig. 3, and is an armature attracted by such a ring? (See Fig. 4.)

If the ring is cut, as shown in Fig. 5, would an armature be attracted?

Why is the armature attracted in one case and not in the other?

Referring to Fig. 5, at what points of the circular magnet are the poles situated?

Why are the two poles called positive and negative?

Can there be two positive or two negative poles to one solid magnet?

What is the difference between a permanent magnet and an electromagnet?

Would a relay or sounder operate if its magnet were of the permanent type?

Can lines of force exist without an electric current?

As generators of electricity, is there any difference between different types of batteries?

What is the general name for chemical batteries?

What experiment led to the discovery of the galvanic battery?

Does a cell of battery generate both positive and negative electricity?

What action in a cell of chemical battery causes the two electricities?

(To be Continued.)

Annual Report of the Western Union Telegraph Company.

The annual report of the Western Union Telegraph Company for the year ended December 31, 1914, signed by president Newcomb Carlton, has just been issued.

The income and surplus accounts show the following results:

INCOME ACCOUNT.	
Gross Operating Revenues	\$46,264,776.61
Direct:	
Operating Expenses, including Repairs, Reserved for Depreciation, Rent for Lease of Plants, Taxes, etc.	40,578,750.90
Balance	\$5,686,025.71
ADD:	
Income from Loans and Investments	1,022,611.30
	\$6,708,637.01
DEDUCT:	
Interest on bonds of The Western Union Telegraph Company	1,337,242.50
Balance transferred to Surplus Account	\$5,371,394.51
SURPLUS ACCOUNT.	
Surplus at December 31, 1913	\$9,705,791.85
ADD:	
Balance from Income Ac- count for year ended De- cember 31, 1914	\$5,371,394.51
Balance of Other Surplus Reserved transferred to Surplus Account	3,451,921.72
	8,823,316.23
	\$18,529,108.08
DEDUCT:	
Amount transferred to Re- serve for Accrued Depre- ciation as representing de- preciation accrued on ocean cable plant prior to December 31, 1913	\$1,000,000.00
Miscellaneous adjustments	8,300.92
Dividends paid and declared	3,988,886.00
	4,997,186.92
Surplus at December 31, 1914	\$13,531,921.16

The value of telegraph lines and equipment has been increased since the last report by \$3,851,798; there have been added to the land line plant 2,449 miles of pole line, 27,458 miles of iron wire, 15,752 miles of copper wire, and 2,464 miles of wire in cables, a large portion of the latter being underground. At the close of the year under review there were 25,784 offices operating in conjunction with 1,581,571 miles of telegraph wire, 210,515 miles of pole line, and 26,768 miles of ocean cables, the latter having been extended during the year by the addition of 494 miles.

The company's gross operating revenues increased over those of the previous year by \$1,475,900, due to unprecedented cable business during the last five months of the year, the land line earnings remaining approximately constant with 1913.

The combined operating expenses for land lines and cables, including taxes, show a net decrease of \$588,800, or 1.43 per cent, this figure being made

up of a decrease in the land line operating expenses of \$819,300 (2.23 per cent), and an increase in the cable operating expenses of \$230,500 (5.04 per cent). The decrease in the land line expenses can, in part, be ascribed to the reclassification of accounts conforming with the Interstate Commerce Commission regulations, effective January 1, 1914, to changes in organization and various economies effected, and to improvements in the service, which have materially decreased expenses without impairing efficiency.

The amount set aside for depreciation of land lines was \$223,000 greater than that of last year, and current maintenance was carried on as usual; the cable plant and stations and the land lines were substantially improved. During the year under review, the company paid out \$493,600 in connection with the Benefit Plan to employees, covering pensions, sickness, accident and death benefits, which was an increase of \$142,850 over the amount disbursed in the preceding year. As a result of larger operations (principally cable business) and reductions in expenses, the company's net income for 1914 increased over that of 1913 by \$2,136,400 or 66 per cent.

The Western Union Company is now subject to the authority of forty-three public service commissions and twenty-three workmen's compensation or industrial commissions. Besides voluminous reports to these commissions the company has also to prepare 3,100 annual reports to tax authorities, these reports being further subdivided by taxing districts. In all, there are required not less than 17,700 statements to the public authorities. In addition, the company has now to collect and remit monthly to the government the internal revenue tax recently levied upon commercial telegraph messages.

The Western Union Company also conducts a large national and international telegraph and cable business, made up of a vast multitude of small items, the operating revenues being derived not only from various classes of message services, but also from commercial news, stock quotations, money order transfers, etc., in addition to which the company has operating contracts with 260 railroad systems, which include many subsidiary railroad lines, of an intrastate and interstate character.

For these reasons it is obvious that a satisfactory separation of revenues and expenses between interstate and intrastate business is impracticable, and, since state commissions have no authority over interstate rates, it follows that arbitrary reductions in intrastate rates made without reference to interstate rates are unfair and subversive of reasonable regulation. It would seem, therefore, to be in the public interest that a company doing a national business, like the Western Union, should be relieved of supervision by state legislatures and commissions so far as regards the regulation of rates and the preparation of accounting statements, and should report, in these respects, to the Federal commission alone.

The Interstate Commerce Commission began, in the fall of 1914, an inventory of the company's property. The work will consume several years and is estimated to cost the company about \$1,000,000.

Annual Report of the American Telephone and Telegraph Company.

The annual report of President Theo. N. Vail for the directors of the American Telephone and Telegraph Company, for the year ending December 31, 1914, was issued on March 15.

At the end of the year the number of stations which constituted our system in the United States, Mr. Vail says, was 8,648,993, an increase of 515,976, including 168,177 connecting stations. 2,885,985 of these were operated by local, co-operative and rural independent companies or associations having sub-license or connection contracts, so-called connecting companies.

The Bell telephone toll lines of the United States now reach 70,000 places, from substantially all of which messages can be telephoned to the nearest telegraph office. The extent of the system is best realized by comparison with less than 60,000 post-offices, 60,000 railroad stations and regular telegraph offices at about 25,000 places.

The total mileage of wire in use for exchange and toll service was 17,475,594 miles, of which 1,364,583 were added during the year. Of the total mileage over 15,000,000 miles were exchange wires, and over 2,400,000 toll wires. These figures do not include the mileage of wire operated by connecting companies. Of this total wire mileage 92.6 per cent is copper wire. 9,760,165 miles are underground, including 601,817 miles of toll wires in underground cables. The underground conduits represent a cost of \$90,000,000 and the cables in the conduits \$104,200,000—a total in underground plant of \$194,200,000.

Including the traffic over the long-distance lines, but not including connecting companies, the daily average of toll connections was about 799,000 and of exchange connections about 27,049,000, as against corresponding figures in 1913 of 806,000 and 26,431,000; the total daily average for 1914 reaching 27,848,000, or at the rate of about 8,967,000,000 per year.

The amount added to plant and real estate by all the companies, excluding connecting companies, constituting the system in the United States during the year 1914, was \$50,045,316.

During the year \$73,091,000 was applied out of revenue to maintenance and reconstruction purposes.

The total provision for maintenance and reconstruction charged against revenue for the last ten years was over \$504,000,000.

A comparison of revenue and expenses of the Bell system in the United States shows the following results:

	1914	Increase over 1913
Gross Revenue	\$225,952,123	\$10,379,301
Expenses—Operation ..	\$ 81,396,219	\$ 5,092,127
Current Maintenance.	31,595,388	847,591*
Depreciation	41,496,240	3,756,249
Taxes.....	12,216,997	920,760
Total Expenses....	\$166,704,844	\$ 9,821,545

* Decrease.

Net Revenue	\$ 59,247,279	\$ 557,756
Deduct Interest	18,940,641	2,288,017
Balance Net Income....	\$ 40,306,638	\$ 1,730,261*
Deduct Dividends Paid.	30,304,186	2,481
Balance for Surplus....	\$ 10,002,452	\$ 1,732,742*

During the year benefits were paid in 20,915 cases of disability or death among the employees of this company and of the associated operating companies, and at the end of the year 211 former employees were carried on the pension rolls. The total amount expended for all classes of benefits was \$1,338,201. As was true during the first year's operation of the plan, a very large percentage of the cases consisted of minor disabilities among the lower-salaried employees, to whom a loss of wages for even a short period would have been a hardship. The work of studying the information secured in connection with the operation of the plan is being continued with a view to the extension of measures for the prevention of sickness and accident.

The net earnings of the American Telephone and Telegraph Company for the year were \$40,557,977.29, approximately the same as in the previous year. The interest charges were \$8,223,163.23, and the dividends at the regular rate of eight per cent per annum were \$27,572,674.72. Of the resulting balance there was carried to reserves \$2,500,000 and to surplus \$2,262,139.34.

Although not effective until 1915, mention may be made here of the plan recently announced, by which employees of two years' service or more in the Bell System are aided to become stockholders of this company to the extent of a limited number of shares each, which they are to pay for out of their wages at the rate of \$2.00 per share per month. Over 30,000 employees, in all parts of the country, have applied for shares under this plan.

Counting these 30,000 employees, and also those persons whose stock is held for them in investment trusts and the like, there are undoubtedly more than 100,000 actual owners of stock in this company.

The report of the engineering department is quite lengthy. From 1906 to 1914 new construction work in the Bell plant cost more than \$700,000,000. In 1914 there were over 9,000,000 miles of wire in underground cable, as against only a few hundred miles in 1884. The line from New York to San Francisco is referred to. It is overhead throughout its entire extent, except for a few short stretches of cable in cities and under rivers. "The time when the telephone wires can be placed underground universally," the report says, "is still a long way off."

The report of the legal department points out that many of the most important legal questions which arise grow out of commission regulation. General regulatory powers are vested in the Interstate Commerce Commission and in state commissions in forty states. There is also a Public Utilities Commission in the District of Columbia and some limited power is exercised by the Railroad Commissions of Kentucky and Texas. Commission regulation is in the development stage.

The Ownership of Wireless Equipment.*

PART I.—SHOULD STEAMSHIPS OWN THEIR EQUIPMENTS.

When a Parisian decides that he wants a telephone installed in his home he goes to a manufacturer and buys the instrument that suits his fancy. Then he makes out an installation application on a certain prescribed government form, affixes the stamp tax, secures a written authorization from his landlord, pays at the rate of about twelve cents a yard for underground wiring, twenty to fifty dollars for his instrument, twenty dollars for the first quarter's rental, another deposit for possible long-distance and telegraphic tolls—and waits a week or more for some one to come and connect up the instrument. Perhaps the Frenchman's pride of possession compensates for the inconvenience and expense—but there are ten times as many telephones in the United States as there are in France!

In this country we get better service and better terms by renting our telephones; none of us have any desire to purchase our own instruments. Yet, in wireless telegraphy, there are users who believe something is to be gained through individual ownership of installations.

The telegraph and the telephone—our most familiar means of communication—are owned and operated by big corporations. Buying an individual telegraph key for the commercial man's personal use is an unthought of procedure; purchasing individual telephone instruments would be considered nothing short of folly. In this country we pay for our telegrams and they are sent; we use our telephone, get a bill for rent and tolls at the end of the month, and there are no repair charges added at the end of the column.

With the wire telegraph and telephone there can be no question that corporate ownership is the better plan. Are there any good reasons, then, for wireless coming outside the pale of procedure existing in other communication systems?

There are advocates of individual ownerships of wireless equipment; there are steamship companies which have purchased apparatus outright; there are others which now rent and have tried both; and still others mentally see-sawing between respective advantages. On the other side, there is the Marconi Company, which stoutly maintains a rental policy is the only one. It should be of interest to determine which is the best proposition.

A single wireless instrument is of course valueless; only as part of a system of other communicating links is it of any service. It follows, then, that the individual equipment must be considered in its full relation to other units which make possible the transmission and reception of coherent intelligence. The individual user, therefore, whether renter or owner, leans heavily on an organized whole. This we call a commercial wireless system.

That this system exists to-day and makes possible "messages received for transmission to all parts of the world"—to quote the familiar Marconi sign—is unquestionably due to the one condition which

some have thought irksome: rental of apparatus, instead of sale.

Suppose that quick profits had been looked for in the beginning and the building up of an organization considered a too laborious method of establishing a new and strange art—where would the individual owner be to-day? The apparatus on his steamships would be hopelessly out of date, and—on the supposition that progress ceases when profit ends—struggling along with coherer jamming when in crowded waters. Either that, or wrecked long since by unskilled hands.

Upon Marconi's early established and maintained general policy of renting rests the steady growth in number and efficiency of shore stations to communicate with ships and improvements in the latter type of instrument that could never have come without constant supervision over its own property. With a sales policy it would have been much as if a man built a house in a wilderness and neglected to provide a communicating highway to the civilization center. Neighbors might have been secured for the new owner by selling other houses in this wilderness, but the purchases of all would be of little value without an easy means of communication with markets and bases of supply. A neighborhood of ships connected by ether-wave paths over the watery wilderness would have followed the direct sale of equipment, but each neighbor would have been of service to the other only in cases of emergency. The connection to the shore, to the bases of supply, was only made possible by the rental feature; and it was this shore connection that made wireless indispensable.

Perhaps the land connection might have been possible without the commercial company; the owners of the steamship equipments instead providing the funds?

Look to the wilderness community simile for the answer: Would the individuals subscribe to, build and maintain an expensive communicating link if the past had known none? if it required years of organized effort to make the public use it, and the public doubted that such a means existed? Add the final obstacle, that the individuals themselves knew nothing of construction and operation, and it is readily seen what small chance there was for widespread communication ever being realized without a rental policy to pave the way to profit.

Wireless telegraphy owes its present commercial utility solely to one thing: the basic business axiom laid down by Marconi, that apparatus should not be sold and the owner left to work out his own salvation. Technical development, world-wide usage, uniformity of operation—everything that the art stands for to-day—find their foundation in this policy.

The shipowner of former days, had he purchased an installation outright, would have awaited the pleasure of some shore station to take his message, or it would not have been taken at all. Government regulation, the compulsory opening of shore stations to ship traffic—all this is new, less than four years old. When the Berlin Convention opened the doors to all, so to speak, steamship owners were

* From *The Wireless Age*.

asked to buy various types of wireless equipment. The individual ownership advocates had spent nothing to organize a system of world-wide utility, it looked as if patent license fees might be avoided by a few slight changes in construction, responsibility ceased when a sale was consummated, and with no allowance made for the expense of keeping the installation in continuous working order, an outright purchase figure could be made very attractive to the steamship man who neglected to consider operation expense and maintenance. The Marconi Company, meanwhile, had found the established rental value unprofitable and sought to raise the figure. This other apparatus thereupon found some buyers, although the greater proportion of owners stood the raise.

At first glance the sales proposition may look like a good thing. Thus: A situation arising whereby the law has opened up communication to all, the outright purchase of an individual instrument from some independent manufacturer theoretically saves a certain proportion of the tolls. The charges on a wireless message being divided three ways: ship tax, coast tax and land line forwarding charges, ownership of the ship installation should permit a figurative pocketing of the ship tax proportion of the tolls.

The natural conclusion is that if a sufficient number of messages can be secured from passengers, considerable money might not only be saved, but some made.

But to offset the theoretical profit is a material expense. Every message transmitted calls for an accounting with the wireless company owning the shore station and the telegraph company which forwarded the message. Skilled clerical labor being necessary to do this, prospective profits from the ship tax proportion of tolls dwindle and, on small scale operation, paid communication becomes a liability instead of an asset.

To comply with the laws that govern public communication systems certain records must be kept. The sender of a wireless message fills out a blank, pays the charges and considers the transaction completed when the message has been transmitted and received. But the agency or organization which makes this possible has to keep records, apportion the charges and effect the distribution, adjust possible discrepancies in international accounting and follow up the simple task of delivering a message with the clerical work which is inevitably associated with any business drawing its revenue from the general public.

Some idea of what this detail comprises may be gleaned from the supplies carried by a Marconi ship operator; these include: abstracts, message blanks, *procès verbal* (or log), inspection report, cash statements and vouchers and requisition forms. Many permanent records have to be made and forwarded regularly to headquarters if continuous and satisfactory communication is to be expected.

Take what appears as the simplest part of the transaction, the message itself. Aside from the seven special classes of wireless messages, there are thirteen regular classes, or twenty in all. The regular messages comprise: ordinary paid message for delivery, ordinary paid message for re-transmission,

government message for delivery, government message for re-transmission, master's service message for delivery, master's service message for re-transmission, franked message for delivery, franked message for re-transmission, press message for delivery, press message for re-transmission, telegraphic service message for delivery, telegraphic service message for re-transmission and ocean letter. Messages received from coast stations, as well as those from the public, must be written on the proper form and instructions and data properly filled in. When rates vary for different routes or various routes are available at the same rate the operator must arrange with the sender which shall be employed. He must know which countries do not admit code or cipher messages and the restrictions when they are admitted, must be able to distinguish between code words and combination words and make the proper charges; he must also be able to determine the separate charges for mixed messages of plain language and code and plain language with cipher groups. Without these classifications wireless message traffic would become hopelessly confused.

The necessity for uniform regulation becomes immediately apparent when ordinary conditions at sea are considered. If shipowners were possessed of their own plants and worked them when and how they willed, the possibilities for efficient communication would be extremely small. Government regulation might control matters in crowded waters, but there is no government control that could be effective in mid-ocean. And on board ship there are no telegraph superintendents to whom an appeal may be made when in difficulties. The captain, too, for obvious reasons, could not be expected to exercise supervision over this complicated branch of ship service. A central office or headquarters is an absolute necessity and fundamental economics leaves no question whether this should be under one control or scattered about the numerous shipowners' offices.

Unorganized communication between ships under the same ownership might be accomplished successfully, but what of communication between ships of rival lines or different nationalities? Without an international organization such as the Marconi Company the language difficulties, the widely varying customs of countries and nationalities and the differences in ideas of responsibility and discipline could never have been brought under control. The regulation of ship traffic by the various Marconi companies established in each country has built up a system of international clearing houses, expediting the exchange of wireless messages, simplifying the accounting, insuring uniform working conditions and materially reducing the expense of conducting the business as a whole. The universal character of present-day wireless communication could never have been possible if these matters had been left in the hands of competing steamship lines, nor would they be conducted as well or economically if controlled at this late day by a shipowners' organization or under international government direction. Increases in staff and working expenses would necessarily follow any other plan than the present corporate control, the burden falling on the public and shipowners. (To be Continued.)

Annual Meeting of Telegraph and Telephone Life Insurance Association.

The forty-eighth annual meeting of the Telegraph and Telephone Life Insurance Association was held at 16 Dey street, New York, on the afternoon of March 17, president W. H. Baker in the chair.

After the reading of the report of the committee on credentials, which showed that less than a quorum of the members was present or represented by proxy, the report of president Baker was read by the secretary. Mr. Baker referred to the continuance of the heavy mortality of 1913 in 1914, and for this reason it was found necessary to levy nearly the full number of assessments permitted by the by-laws.

The total amount paid to the beneficiaries of deceased members since the organization of the association to the close of 1914 was \$1,952,217.

During the past year earnest efforts were made to interest the membership generally in the work of the association, especially in the membership question. "In a mutual association such as ours," said Mr. Baker, "each member is expected to help. Your officers and agents should not be expected to bear the whole burden of securing new members, as well as attending to other work of management. Let every member try to secure at least one desirable new member. This should not be difficult. A little effort by each member would result in doubling our membership. Is it not worth working for?" he asked.

"Let each member devote just a little time towards getting a new member for our association. No matter how active and enthusiastic the officers and agents may be, it is the work of the individual member that counts."

Mr. Baker stated that the Internal Revenue Act requiring that a ten cent stamp be affixed to each proxy had prevented the presence or representation of a quorum of the members. As but 200 proxies had been received no election of officers could be held, therefore the present officers and committees will hold over until 1916.

The reports of the secretary, the treasurer and the auditing committee were then read. They showed that the association had, on December 31, 1914, 4,436 members in full grade carrying \$1,000 insurance, and 856 members in half grade carrying \$500 insurance, and that assets were held amounting to \$319,494.13 par value over all liabilities.

Mr. Newcomb Carlton, president of the Western Union Telegraph Company, made some remarks on the work of the association. He said that his membership in the association has had a distinctly solidifying effect on his life. He did not know just how far the association benefits would relieve the anguish of his family, but at any rate he had the security in feeling that he was in a modest way co-operating with those who are exercising a humanizing influence upon the telegraph craft. "One of the problems which confronts every man in this room," he said, "particularly those who are officers, is the great question of how to instill in the minds of our associates, and I am very glad, indeed, to include our friends of the Postal Company, the

question of pride of service. In the old days, in our fathers' time, business was carried on with a degree of personal intimacy which the larger corporation makes it much more difficult to attain. When a man knew all who were working with him by their first names, it was simple enough to engender an *esprit du corps*. The telegraph organization is necessarily spread over wide areas and one's personality becomes more or less attenuated. I believe that we have the duty and obligation to bring about a pride of service, which can only be done by personal contact. I believe that we can do much to allay the present condition of social unrest, which to a very great extent exists among the younger men of all large organizations, by coming in personal contact with them and attempting to understand their problems. I cannot imagine that there is a more solidifying, a more personal influence, than such a society as we are representing here to-day. I cannot feel that any organization which draws men together for any purpose, purposes of protection, etc., is anything more than that personal influence which is so necessary to have throughout a well-organized body of men who are working for such a worthy cause. But the thing that is principal and big to this organization is the fact that it is an organization run by employees themselves, in which men who are members have a direct and personal interest, and I only wish that its borders might be very much extended and that every telegrapher and other employee of the Western Union was a member. I believe that this pride of service would be much more intensified if it were possible to do that thing. I can only say that I am proud of my membership in this organization. I wish that I might do more for it, and I only wish to assure the gentlemen who are responsible for it that I am always on call for the services of this association."

Mr. Belvidere Brooks, past president, being called upon, stated that he was glad to know that the association was prospering, and spoke of the necessity of getting new members.

A lengthy discussion ensued on the question of increasing the membership. Mr. Bagley, of Philadelphia, stated that there was a large field from which to get new members.

The meeting then adjourned.

Those present were:

Baltimore, Md.—J. W. McLean.

Boston, Mass.—P. J. Farrell.

Chicago, Ill.—F. D. Bernike and C. A. Dortmund.

Louisville, Ky.—C. Smith.

New York.—W. H. Baker, A. R. Brewer, Lewis Dresdner, W. L. Ives, M. J. O'Leary, G. W. Fleming, T. E. Fleming, B. Brooks, Newcomb Carlton, H. T. Marks, N. Giffen, C. P. Bruch, T. R. Taltavall, J. W. English, J. L. Carroll, E. F. Howell, G. Irving, B. Bernstein, W. J. Austin, J. A. Dierks, J. W. Connolly, T. Brennan, J. McCarthy, H. W. Dealy, W. J. Quinn.

Philadelphia.—C. E. Bagley, S. S. Garwood, E. W. Miller.

St. Louis, Mo.—J. A. McIntyre.

Washington, D. C.—W. H. McKeldin.

Association of Broker Telegraphers.

At the recent general meeting of the Association of Broker Telegraphers, held at the association rooms, 52-54 New street, New York, the election of four members of the board of governors, to fill vacancies, was the principal business transacted. Messrs. T. L. Mahan, C. L. Hall and E. A. Kane were re-elected to succeed themselves, L. A. Dalton being elected to the fourth vacancy. All will serve six years, the terms expiring January, 1921.

The Board of Governors organized March 11. Mr. R. M. Irwin was chosen chairman, to succeed Mr. T. L. Mahan; Mr. W. E. Gilbert, secretary, to succeed Mr. C. L. Hall, and Mr. J. B. McKeever was re-elected treasurer. Mr. S. J. Callahan was elected vice-chairman, to succeed Mr. R. M. Irwin.

The treasurer's report shows the association to be in a flourishing condition. Several applications for membership in the association are on file despite poor conditions in the "Street," due to the European war, and the closing of the world's markets for many months last year.

THE SAN FRANCISCO TOURNAMENT.—Mr. J. Rosenbaum, manager of the telegraph department of the Union Pacific Railroad Company, New York, who is himself an old-time prize winner in previous tournaments, and who was recipient of special mention on the part of the judges in the New York 1898 tournament for his particularly fine telegraph work, has become interested in the San Francisco telegraph tournament, and expresses the hope that those who wish to use a transmitting device in competition with hand sending will not be barred. Mr. Rosenbaum, however, thinks that it would be a good idea to have the best machine and hand senders compete in a separate contest, to decide the question of superiority. Like Mr. P. J. Faulkner, who had something to say on this subject in the previous issue, he thinks it is a matter of intelligence. If an operator, whether using a machine or an ordinary key, does not exercise judgment as well as intelligence, his telegraphic work is not of the best. The tournament will take place at San Francisco on May 27, 28 and 29, in connection with the Panama-Pacific Exposition, and much interest is being taken in the affair by the telegraph fraternity all over the country. The general plan is to hold elimination contests in all cities possessing sufficient talent to warrant it, only the winners of these preliminary trials to compete in the finals at San Francisco.

WOMAN SUFFRAGE IN NEW YORK STATE.—A resolution proposing a woman suffrage amendment to the New York State Constitution passed the 1915 legislature. The vote was 40 to 1 in its favor in the Senate, and 128 to 5 in the Assembly. The same resolution has recently passed unanimously both houses of the 1915 legislature. The voters of New York State will now have an opportunity to vote on the amendment November 2. The women of eleven States vote now on an equality with men. The women of Illinois vote for president, municipal and county officers. Five or more states will decide this question during the year of 1915.

MORKRUM PRINTERS ON ASSOCIATED PRESS CIRCUITS.—The Associated Press has just finished the installation of Morkrum telegraph printers in all of the New York City newspaper offices, eight in number. There are two circuits from the Associated Press headquarters to each office, and a duplicate set of instruments is provided for each. In case of trouble on one set the other can be switched in immediately. The system is giving very satisfactory results. It was installed under the supervision of Mr. J. O. Carr, of the Morkrum Company.

A CHEAP TELEGRAPH LINE.—The proprietor of a general merchandise store in Columbia, Cal., has applied for permission to purchase a forty-five mile telegraph line from one of the telegraph companies between Columbia and Sonora, for \$1.00. The company is willing to sell, as the business on the line, which was once prosperous, has fallen off to almost nothing.

OBITUARY.

W. M. VAIL, aged eighty-six years, who was identified with Professor S. F. B. Morse in the early days of the telegraph, died at Port Jervis, N. Y., March 11.

JOHN CASSIDY, aged seventy-one years, builder of early railroad telegraph lines in California and a former associate of Dr. Alexander Graham Bell, died in Honolulu, Hawaii, on March 9.

WILLIAM E. GONSOLVE, aged seventy-three years, who was identified with the telegraph business for many years, in Providence, R. I., beginning with 1859, died in that city on March 12. Among the few who survive of those who were associated with Mr. Gonsolve at different times, are Gerrit Smith, of Amityville, N. Y.; Walter P. Phillips, of Bridgeport, Conn.; Ralph W. Pope, of Elizabeth, N. J.; William A. Harris, of New Haven, Conn.; William H. Allen, of Boston, Mass., and Charles H. Bogle, of New York.

Western Electric Convention.

The district managers, sales managers and the general officers of the Western Electric Company held a conference at the Congress Hotel, Chicago, during the week March 15 to 20. The meetings were in charge of Mr. Gerard Swope, vice-president and general sales manager. The thirty district offices of the company were represented by about sixty men. On Friday afternoon the Hawthorne works of the company were visited and in the evening a banquet was held at the Blackstone Hotel.

CREED, BILLE & CO., LTD., the well-known manufacturers of the Creed printing telegraph system, Croydon, England, have moved into more commodious quarters in a larger building adjacent to East Croydon station. The company has also acquired a good deal of the adjoining land, which will be available for building and further extension.

Mr. Daniel H. Hebner, Seattle, Wash., in remitting to cover his subscription for another year, writes: "The paper's best success in the fraternity is its clean-cut American telegraphy."

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A Complete Technical Course in Modern Telegraphy, Including Simultaneous Telegraphy and Telephony.

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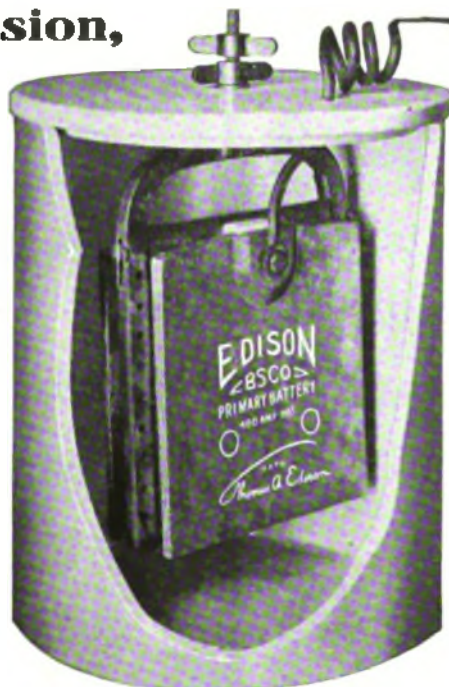
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NEW YORK CHICAGO

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 Chicago, March 17 and 18, chairman M. H. Clapp presiding. The attendance on both days was the largest of any of the divisional meetings held in recent years, there having been about 100 members, associates and guests present.

On the first day, Wednesday, after the usual routine business had been attended to, a paper on "Pole and Wire Maintenance" was presented by Mr. E. H. Ward, Western Union Telegraph Company, New York. Mr. Ward described some of the characteristics of telegraph lines and outlined methods of handling their maintenance, with the form of maintenance organization now being generally followed. He called attention to the parts of the lines that require close watching, and gave information regarding frequent causes of interruption, together with suggestions for preventive measures.

The paper was discussed by Messrs. E. A. Burkitt, Amos Young, M. B. Wyrick, E. A. Chenery, and others.

At the second day's session, Thursday, Mr. L. M. Jones, of the Atchison, Topeka and Santa Fe, Topeka, Kan., presented a paper, entitled "Shall Inside Maintenance Work be Handled by Linemen or Special Equipment Men?" He briefly described the early and present organizations and methods of handling maintenance work on his lines. It was, he said, a question of how much is being actually saved in dollars and cents by using the telephone for dispatching trains. "Railroads still maintaining the dual organization, no doubt," he said in conclusion, "can see where their efficiency is increased by doing so, while others which do not are equally sure it is an expensive way of securing the desired result."

The paper was discussed by Messrs. R. F. Finley, E. E. Dildine, M. B. Overly, Wm. Bennett, and others. The consensus of opinion was to the effect that the regular stationed lineman could be trained to satisfactorily take care of the telephone equipment at the way stations, but telephone inspectors, or specially trained equipment men should be employed to exercise general supervision and look after the larger offices.

The next paper taken up was on "Modern Testing Facilities and their Relation to Railway Wire Plant Efficiency," by Mr. W. Rodgers, telegraph engineer, Missouri Pacific Railway, St. Louis. Mr. Rodgers referred to the utility of the volt-milliammeter, the bridge testing set, the new Western Union test panel and to the use which has been made of them on the railroad with which he is connected.

The paper brought out many new ideas and confirmed the belief that the modern testing facilities are indispensable to the proper and economical maintenance of both inside and outside telephone plant. In conclusion, Mr. Rodgers made a plea for stand-

ardization of apparatus and circuits; particularly, at this time, of test-panel circuits.

The paper was discussed by Messrs. M. B. Overly, C. W. Frey, H. D. Teed, M. B. Wyrick, J. P. Church, Wm. Bennett, and others. Mr. Tallman, of the Mathews Company, St. Louis, gave the benefit of his experience in the use of the wireless test set for locating troubles, both in cables and open wire.

Mr. R. J. Meigs, valuation engineer of the Western Union Telegraph Company, New York, gave a short and interesting talk on his work, answering various questions and clearing up the minds of some of the railroad people as to how these valuation matters will be handled.

The regular meeting adjourned at 1:00 p. m., and was followed by an executive session, at which, it is understood, some important matters were discussed regarding future methods of handling business, which will receive further consideration at the annual meeting in Rochester, N. Y., June 22, 23 and 24.

After the adjournment on both days the members of the association visited the exhibition of the National Railway Appliances Association in the Coliseum, where they saw many things of interest to the telegraph and telephone world.

Mr. W. W. Ryder, general manager, Western Division, Western Union Telegraph Company, Chicago, was present and extended a word of welcome to the Chicago meeting, announcing his gratification of the progress being made by the association and his pleasure to meet with the members.

One of the interesting and pleasant features of the meeting was the lecture and entertainment to which the superintendents were invited by Mr. A. G. Francis, of the Chicago Telephone Company.

Mr. Thomas A. Watson, who collaborated with Mr. Alexander Graham Bell in the development of the telephone, being on his way back to the east from San Francisco, was persuaded by president B. E. Sunny, of the Chicago Telephone Company, to stop off and give a little talk to the employees of the Chicago Telephone Company and their guests.

Mr. Watson told how he started in as a machinist to help various inventors, and admitted working on a lot of stuff that he felt amounted to nothing. At first he had some doubts about Bell and his proposed telephone, but finally grew very enthusiastic with Mr. Bell and assisted him with the perfection of the instrument. Some of the incidents he related in connection with their failures were quite amusing.

After the lecture by Mr. Watson the audience was entertained by the Chicago Telephone Company's Employees Glee Club of about 100 voices, and orchestra of about fifty pieces, following which a company of young lady telephone operators, very neatly and appropriately garbed, gave an exhibition of fancy marching, drilling, etc., which would be a credit to any professional organization. The entertainment closed with a moving picture of an amateur show given last February by the "Triple Alliance," composed of employees of the Chicago Telephone Company. The Commonwealth Edison Company and the Peoples Gas, Light and Coke Company, for the benefit of the Chicago poor.

Letters of regret were read from Messrs. Newcomb Carlton, president; L. McKisick, assistant to the president; Belvidere Brooks, vice-president, and G. M. Yorke, general superintendent of plant, Western Union Telegraph Company, New York, and Mr. C. H. Wilson, general superintendent, Long Distance Lines, American Telephone and Telegraph Company, New York, at their inability to attend the meeting; also telegrams from Messrs. W. C. Walstrum, superintendent of telegraph, Norfolk and Western Railway, Roanoke, Va., and W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C.

Those present were:

Active members: A. C. Adams, Milwaukee, Wis.; Wm. Bennett, Chicago; F. E. Bentley, St. Louis; Geo. Boyce, St. Paul, Minn.; J. H. Brennan, Springfield, Mo.; J. F. Caskey, South Bethlehem, Pa.; E. A. Chenery, St. Louis, Mo.; J. P. Church, Decatur, Ill.; M. H. Clapp, St. Paul, Minn.; W. L. Connelly, Gibson, Ind.; P. W. Drew, Chicago; R. F. Finley, Cleveland, Ohio; P. F. Frenzer, Omaha, Neb.; E. P. Griffith, Jersey City, N. J.; H. C. Hewes, Chicago; R. R. Hobbs, Louisville, Ky.; E. D. Hubbard, Battle Creek, Mich.; C. H. Hubbell, Chicago; L. M. Jones, Topeka, Kan.; D. J. Kavanaugh, Memphis, Tenn.; E. C. Keenan, Chicago; V. T. Kissinger, Chicago; L. A. Lee, Pittsburgh, Pa.; E. J. Little, St. Paul, Minn.; R. L. Logan, Kansas City, Mo.; J. Matthews, Galveston, Tex.; Chas. McCormack, Danville, Ill.; W. P. McFarlane, Omaha, Neb.; W. S. Melton, Danville, Ky.; J. B. Murphy, Jackson, Tenn.; M. B. Overly, Indianapolis, Ind.; E. A. Patterson, Chicago; G. O. Perkins, Chicago; C. S. Rhoads, Indianapolis, Ind.; F. F. Riefel, Cleveland, Ohio; Thos. Rodger, Montreal, Que.; G. R. Stewart, Chicago; A. B. Taylor, New York; H. D. Teed, Springfield, Mo.; H. A. Tuttle, Minneapolis, Minn.; S. L. Van Akin, Jr., Syracuse, N. Y.; F. H. Van Etten, Chicago; H. A. Vaughan, Lincoln, Neb.; L. S. Wells, New York; F. T. Wilbur, Chicago.

Associate members: J. C. Binning, Chicago; W. L. Cook, Chicago; G. M. Dodge, Valparaiso, Ind.; Aug. F. Eyermann, St. Louis, Mo.; J. H. Finley, Chicago; A. G. Francis, Chicago; J. B. Harlow, New York; G. K. Heyer, New York; B. A. Kaiser, New York; J. A. Kick, Hawthorne, Ill.; H. W. Lucia, Rochester, N. Y.; L. H. Merrill, Minneapolis, Minn.; Val. B. Mintun, Kansas City, Mo.; Chas. S. Pfisterer, Cleveland, Ohio; C. S. Rhoads, Jr., Westfield, N. J.; H. O. Rugh, Chicago; H. M. Sperry, Rochester, N. Y.; A. D. Walters, New York; E. A. Woodward, Chicago; M. B. Wyrick, Chicago.

Honorary member: W. W. Ryder, general manager, Western Division, Western Union Telegraph Company, Chicago.

Visitors: W. R. Abbott, general manager, Chicago Telephone Company, Chicago; N. D. Ballantine, assistant to second vice-president, Rock Island Lines, Chicago; J. E. Barber, chief clerk to superintendent telegraph, Mobile and Ohio, Jackson, Tenn.; W. E. Bell, division commercial superintendent, American Telephone and Telegraph Company, Chicago; J. C. Browne, general supervisor

telegraph, Missouri Pacific Railway, St. Louis; L. C. Conold, chief dispatcher, Wheeling and Lake Erie, Brewster, Ohio; M. T. Cook, assistant general manager, Western Union Telegraph Company, Chicago; J. C. Deck, general foreman, New York Central and Hudson River Railroad, Cleveland, Ohio; C. W. Frey, wire supervisor, Western Union Telegraph Company, New York; W. L. Gardner, section lineman, Wheeling and Lake Erie, Brewster, Ohio; E. J. Hutchins, division plant engineer, Western Union Telegraph Company, Chicago; A. J. Kohne, chief clerk to general superintendent telegraph, New York Central Lines, Chicago; J. W. Konigsmark, wire chief, Western Union Telegraph Company, Chicago; H. C. Law, sales representative, Brookfield Glass Company, New York; A. Lockwood, secretary, Brookfield Glass Company, New York; R. J. Meigs, valuation engineer, Western Union Telegraph Company, New York; E. Parsons, division valuation engineer, Western Union Telegraph Company, Chicago; L. G. Reid, Western Union Telegraph Company, Chicago; J. A. Ritter, sales engineer, Hall Switch and Signal Company, New York; L. R. Robinson, division supervisor of lines, Western Union Telegraph Company, Chicago; W. Rogers, telegraph engineer, Missouri Pacific Railway, St. Louis; G. E. Sharp, district plant superintendent, Western Union Telegraph Company, Cleveland, Ohio; E. O. Sternberg, supply clerk, telegraph department, Illinois Central Railroad, Northern Lines, Chicago; P. Vliet, general foreman, Wheeling and Lake Erie, Brewster, Ohio; E. H. Ward, Western Union Telegraph Company, New York; W. W. Watt, district plant superintendent, Western Union Telegraph Company, Chicago; W. F. Weber, wire chief, Western Union Telegraph Company, Chicago; A. Young, district plant superintendent, Western Union Telegraph Company, Minneapolis, Minn.; Willard C. Lindsay, official stenographer, Chicago.

The Rochester Convention.

Following the meeting of the Western Division, Association of Railway Telegraph Superintendents, held in Chicago, March 17 and 18, an executive meeting was held in the office of Mr. E. C. Keenan, general superintendent of telegraph, New York Central Lines, at which were present Messrs. E. C. Keenan, first vice-president of the general association; L. S. Wells, second vice-president; M. H. Clapp, chairman Western Division, and P. W. Drew, secretary. Regular routine matters were acted upon and a report was received from Mr. J. F. Caskey, chairman of the topics committee, announcing that good papers had been secured for the Rochester meeting.

At a conference with representatives of the entertainment committee it was understood that the associate members will make no general exhibit of appliances, it having been thought that the exhibition, which occurs annually at Chicago, gives the associate members all the opportunity they want in that line.

Mr. L. B. FOLEY, superintendent of telegraph, telephone and wireless, Lackawanna Railroad, New York, has returned from his trip to San Francisco, where he inspected the Poulsen system of wireless telegraphy. His observations led him to remark that the Poulsen system was one of great speed, messages being exchanged with land stations as well as with ships at sea at the rate of fifty words per minute, Vibroplex transmitting instruments being used. The messages were received by the operators on typewriters. Dr. Lee De Forest, of New York, the wireless inventor, accompanied Mr. Foley to and from the Pacific Coast.

THE ROCHESTER CONVENTION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—The entertainment features of the Rochester convention of the Association of Railway Telegraph Superintendents will be very complete and novel and, from present indications, it will be one of the best meetings ever held by that association, as all of the superintendents have signified their intention of being present on that occasion. The dates of the convention are June 22, 23, 24 and 25, and during that time the monument recently erected on the grave, at Rochester, of James D. Reid, a former telegraph superintendent, will be unveiled, the superintendents attending the ceremony in a body.

THE PANAMA RAILROAD has put its telegraph, telephone and signal wires underground throughout the entire length of its road—forty-seven miles—at an expense of about \$450,000. Mr. W. H. Fenley is superintendent of telephones and signals.

NEW YORK TELEGRAPHERS' AID SOCIETY.—The annual election of the New York Telegraphers' Aid Society took place March 30 and the annual meeting March 31.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 583 to meet the claims arising from the deaths of C. H. Cutter at Omaha, Neb.; E. W. Nichols at Moravia, Cal.; J. L. Hendricks at Trenton, N. J.; J. Q. Logan at Provo, Utah; G. T. Williams at Cleveland, Ohio.

PHILLIPS CODE.—The new edition of Phillips' Code, price \$1.00, revised and brought up to date by E. E. Bruckner, an expert code operator, is being extensively used by stenographers in all sections of the country. One newspaper recently sent us an order for several copies, to be placed in the hands of its reporters. Notes covering events made according to the Phillips' code abbreviations have the advantage over stenographic notes in that they can be read by anyone, thus saving considerable time, which is the most important element to newspaper people. Copies of this book can be procured by addressing and remitting to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

LETTERS FROM OUR AGENTS.

PHILADELPHIA POSTAL.

The sympathy of the force was extended to Miss Margaret McCarthy, chief operator of the telephone exchange, whose father died March 23.

A new cable has been installed at Ardmore, where our wires cross the Pennsylvania Railroad's new

electric railway system. This will protect our wires from the interruptions commonly experienced by telegraph and telephone wires which cross near high potential circuits.

CHICAGO POSTAL.

Michael J. Powers, aged seventy-four years, father of Mr. T. N. Powers, manager of the operating department, and of Mr. J. M. Powers, died February 28.

Mrs. Mary E. Washburn, sixty-seven years of age, mother of Mr. W. G. Washburn, died at her daughter's home in Indianapolis, Ind., February 29. She was the wife of M. E. Washburn, a military telegrapher, who served under Colonel Robert C. Clowry.

Mr. H. H. Dengler was called to his old home at Ann Arbor, Mich., on account of his mother's death February 20.

BOSTON WESTERN UNION.

During the forenoon of March 19 president Newcomb Carlton, while in the city attending the conference, visited the operating department unattended and personally greeted every employe on duty at that time. His democratic manner and the earnestness of his greetings made a profound impression upon the force, and there have been many expressions of pleasure concerning his visit.

Mr. S. B. Haig, division traffic superintendent, New York, spent March 24 in Boston on business.

Night chief H. C. Bailey, of White River Junction, Vt., has been appointed manager of that office, vice L. E. Aarons, resigned.

Repeater chief M. C. Harrington is spending some time at the new office, at 175 Congress street, instructing his men in the operation of the new equipment.

R. E. Burditt and C. H. Smith, automatic attendants, are recent additions to the force in the automatic department.

H. G. Stickney has been appointed equipment chief, vice R. W. Hall, transferred to the office of district commercial superintendent C. F. Ames.

Wire chief C. V. Lawrence, of Bangor, Me., has accepted a similar position with the New England Telephone and Telegraph Company at that point. Chief operator J. H. Maher assumes Mr. Lawrence's duties.

Wire chief C. G. Anderson, of Springfield, Mass., has gone with the New England Telephone and Telegraph Company, being relieved by E. C. Woodward.

C. H. Stevens, wire chief at Portland, Me., has been appointed chief operator at that point, relieving P. J. McBrady, who has been appointed late-night chief in the same office.

CHICAGO WESTERN UNION.

A club has been formed among the members of the testing and regulating department force, having for its object the increase in efficiency and promotion of harmony among all employed in handling the business of the company. A meeting of the employes of that department was held Tuesday, March

16, for the purpose of discussing the proposition and a committee was appointed to form a plan of organization. The plan will include a night men's auxiliary, and instruction and demonstrations held at meetings of the day force will be repeated for the benefit of the night men, and vice versa. Later a social feature will be added. The officers and members of the committee were chosen from the rank and file of the force, but the heads of departments will be requested to act in an advisory capacity. Mr. L. O. Weems was elected president, and J. P. Kelly, secretary. Keen interest was displayed by all who attended the meeting, and the belief is prevalent that the movement will serve to raise the present high standard of efficiency of the Chicago force and prove an advantage to the members and a benefit to the company.

Miss Abbie Gregory died March 19 of typhoid fever, after about one week's illness. The remains were taken to Chatham, Ont., for burial. The deceased had worked in the Western Union office at Los Angeles. Miss Gregory was a noble example of a good woman, and her sudden departure is deeply regretted by many friends.

Mr. Roger J. Mullin, aged fifty-nine years, night manager for the Western Union at the *Chicago Examiner* office, died March 19, after a short illness of pneumonia. Funeral services were held March 21. Mr. Mullin was a member of the executive committee of the Brotherhood of Telegraphers, which conducted the telegraphers' strike in 1883. He was then located in Toronto, Ont.

In consideration of the FIRST ANNIVERSARY DAY (March 19—send for circular), we offer a limited number of shares in the MARCONI WIRELESS TELEGRAPH COMPANIES as follows:

3 shares MARCONI WIRELESS TELEGRAPH CO. of America (par \$5.00) at \$2.75
 3 shares MARCONI WIRELESS TELEGRAPH CO. of Canada (par 5.00) at 1.50
 3 shares SPANISH & GENERAL WIRELESS TRUST, LTD. (par 5.00) at 3.50
 3 shares MARCONI INTERNATIONAL MARINE COMMUNICATION (par 5.00) at 9.00
 3 shares MARCONI'S WIRELESS TELEGRAPH CO., LTD. (par 5.00) at 12.50
 3 shares MARCONI'S WIRELESS TELEGRAPH CO., LTD. (par 5.00) at 11.00
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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.

Miss Camille Morin, of the printer department, died at her residence on March 17.

Miss Mamie McLaughlin, a well-known operator at St. Louis, Mo., died March 19.

Manager Bak, of the Savanna, Ill., office, reports a temporary removal of his office to the Mutual Telephone Company quarters during the remodeling of Radke Hotel.

Mr. John S. Henderson, special agent for the Western Union Telegraph Company at Chicago, has been retired on a pension. He was born in Quebec, Que., on July 8, 1838, and has been in the telegraph service since September, 1852, beginning his career in the city of his birth. Since 1860 he has worked in various capacities in several cities in the United States for both the Postal Telegraph-Cable Company and the Western Union Telegraph Company.

SAN FRANCISCO WESTERN UNION.

Mr. S. B. Mills, night wire chief, is visiting relatives in Newark, N. J.

Mr. F. H. Wright, automatic traffic chief, and Miss Olivia Lemmer, were married recently. Mr. Wright has resigned to accept a position in New York. The best wishes of our force go with them.

Mr. C. R. Fisher, division wire chief, was a recent visitor, and assisted in preparing our exhibit at the Exposition.

Mr. G. F. Hohenschield is in charge of the automatic department during Mr. W. L. Glasheen's absence in New York for the past two months, familiarizing himself with the new multiplex system, preparatory to its installation on the Pacific Coast.

Mr. Ben F. Heathcock is in charge of our exhibit at the Exposition.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
 Secretary, EDWIN F. HOWELL

Resources \$845,000
 Surplus - 35,000

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Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

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ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE
 Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 62c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 8.

NEW YORK, APRIL 16, 1915.

Thirty-third Year.

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The Western Union "Quadruple Duplex," or Octuplex.

(Continued from page 150, April 1)

MULTIPLEX PRINCIPLE.

The equal letter code permits of the use of the multiplex principle, which is employed in the quadruple duplex, triple duplex, double duplex, and two-way methods of operation. For the sake of ex-

the same uniform angular velocity, quadrant A will be connected through the line with quadrant A¹, quadrant B with quadrant B¹, quadrant C with quadrant C¹, and quadrant D with quadrant D¹, once per revolution, the interval of each of these four connections being equal to the time of one-quarter of a revolution of the rotating brushes. If each signal consisted of one pulse of current, it would then be possible to send one signal per quadrant per revolution. If, instead of having solid quadrants, they are each divided into five segments, it will be possible to use the five segments of one quadrant at one end for the transmission of five current impulses, which constitute the signal for a given letter or figure in the code just described, and the five segments at the other end may be used for receiving these impulses and distributing them in such a manner that they may be used to select the letter determined by the combination of impulses. In Fig. 9 the quadrants are shown thus divided, each quarter of the circumference consisting of five segments, each segment of quadrant A, station Y, being connected to a contact lever so arranged as to connect this particular segment with ground or battery, depending upon its position between the fixed contacts, while the segments of quadrant A¹ at station X are connected to relays as shown. Normally all of the levers 1, 2, 3, 4 and 5 are in engagement with contacts connected to ground. If, now, any lever is moved over to engage its battery contact during the quarter of a revolution in which the rotating brush E moves over the quadrant A, a current impulse will be transmitted to the line through the rotating brush



FIG. 8—METHOD OF SECURING MULTIPLEX OPERATION.

planation we will consider the quadruple duplex as an example of the multiplex idea. We can further simplify the illustration by omitting the duplex feature and thus consider that we have four channels working in one direction. Fig. 8 shows diagrammatically the method employed to secure multiplex operation. If two metal rings, one at each station, X and Y, are each divided into four quadrants, A, B, C and D, at station Y, and A¹, B¹, C¹ and D¹ at station X, and have rotating brushes E and E₁ connected to the line as indicated, and if the contact brushes start from the same relative position and sweep over the contact segments with

E, and since the rotating brush E₁ is synchronously wiping over the segments 1¹, 2¹, 3¹, 4¹ and 5¹ at the same time that the rotating brush E wipes over its contacts 1 to 5, the corresponding relay at station X will be momentarily energized. Thus, if levers 1 and 3 are moved over against their battery contacts while the rotating brush E at station Y wipes over the contacts of quadrant A, relays 1¹ and 3¹ at station X will receive current impulses, and if all the levers 1, 2, 3, 4 and 5 are held over against their battery contacts, all the relays 1¹, 2¹, 3¹, 4¹ and 5¹ would receive impulses. Now, if provisions can be made to change the com-

bination of levers during the time that the brush sweeps over the other three quadrants, it will be seen that during each revolution a different signal can be sent from quadrant A to A'. What has been said regarding quadrants A and A' applies equally to the other quadrants. Thus it will be seen that the multiplex principle permits of sending and receiving four character signals per revolution. As will be explained, in actual operation the functions of the levers at the sending end, station Y, will be performed by the transmitter, and it will be explained that the operation of the five relays 1', 2', 3', 4' and 5' is utilized in the printer to select the predetermined letter or figure. It will also be understood that by dividing the ring into a different number of segments, it might be possible to send and receive a greater or lesser number of signals per revolution; that is, if ten segments were used, two signals each consisting of five impulses could be transmitted and received per revolution, or if thirty segments were used, six signals each consisting of five unit impulses could likewise be transmitted and received. The exact method employed for setting up the various combinations of impulses at the sending end, and for receiving and utilizing these current combinations in order to select the

the fast end once per revolution if correction is required. This was accomplished by mechanically stepping back the brushes whenever they had gained an appreciable amount on the brushes at the slow end. The practicability of this method has been demonstrated by the extensive use of the Baudot system in Europe. On the other hand, this method is wasteful of line time, since it is necessary to transmit a special signal once per revolution. Moreover, the type of motor used by Baudot does not permit of readily changing the speed, and is one in which the speed depends on a number of variable factors. It will be seen then that the ideal system is one in which no extra line time is required for maintaining synchronism, one which will permit of quickly and conveniently changing the speed of rotation of the brushes, and one in which the constancy of speed of rotation does not depend upon a number of variable factors. This has been accomplished in this system, and the means employed are briefly as follows:

Referring to Fig. 10, it will be noted that segments 1 to 5 at station Y are connected to levers 1, 2, 3, 4 and 5, so arranged that they may send to the line positive or negative current, depending upon their position. The brush E connects these

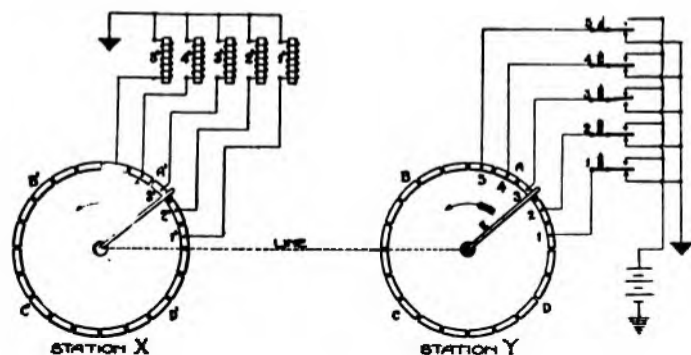


FIG. 9—QUADRANTS DIVIDED INTO FIVE SEGMENTS EACH.

proper letters to be printed at the receiving end of the line, will be explained later. What has just been described constitutes multiplex operation. If the line is worked duplex, the same can be accomplished in both directions at the same time, and we then have described the fundamental operation of a quadruple duplex, a triple duplex, and a double duplex.

SYNCHRONISM.

From what has been stated, it will be understood that an essential requirement of such a system is that the rotating contact brushes at the two ends shall maintain practically the same phase relation with respect to each other; that is, the two sets of brushes must be made to rotate in synchronism. The apparent solution of the problem is to provide means for correcting the phase relations at frequent intervals. Some thirty years ago, Baudot accomplished the result by using weight-driven motors with sensitive governors to maintain a nearly constant rate of rotation. One motor was adjusted to run slightly faster than the other, and means were provided for correcting the phase of the brushes at

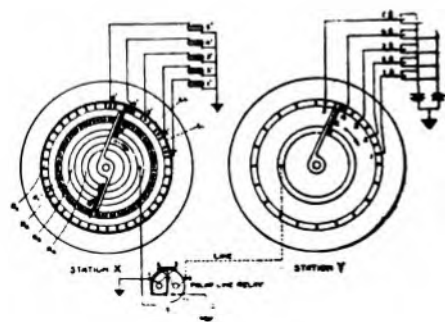


FIG. 10—METHOD OF SYNCHRONIZING.

segments consecutively with the solid ring which is connected to line. At station X the line is connected to ground through the windings 1, 2, 3 and 4 of a polar relay. The tongue T of this relay is connected to the solid receiving ring R₁. The marking contact M of this relay is connected to a grounded battery, and when negative current from the distant end is passing through the relay, the tongue rests on the spacing contact S. As the brush E₁ rotates, it connects the solid receiving ring R₁ with the receiving segments 1', 2', 3', 4' and 5' of R₁ consecutively. It will be noted here that the receiving segments are made shorter than the sending segments, so that the receiving brush E₁ picks out only the center portion of each current impulse, or of each repeated current impulse, since the signals sent over the line are repeated by means of the polarized relay. Assuming perfect synchronism between the sending brush E and the receiving brush E₁, the receiving brush should be at the point C, midway between receiving segments 1' and 2' when the sending brush passes from segment 1 to segment 2; at C₂ midway between re-

ceiving segments 2' and 3', when the sending brush passes from segment 2 to segment 3, and so on. Thus, it will be seen that for a change of polarity, which can only take place when brush E passes from one segment to another, the receiving brush E_1 should be at some point in the circumference midway between two receiving segments. In other words, reversals of the line current should take place while the receiving brush is passing between receiving segments. The receiving distributor is therefore provided with additional rings R_2 and R_3 , called correcting rings. R_2 is a solid ring connected consecutively to the segments in R_1 by the brush E_2 . These segments are half the length of the sending segments, and are therefore double in number. They are connected into two groups—"a" and "b," as indicated. The brushes are so arranged that when the receiving brush E_1 is midway between any two receiving segments, say 1' and 2', the correcting brush E_2 is just about to engage one of the "a" segments, say at d_1 . Circuit provisions are made so that a short pulse of current is generated locally at each reversal of the line current. If this reversal finds the correcting brush E_2 on an "a" segment, it causes the operation of a mechanism which automatically sets back both brushes E_1 and E_2 . Now, if the motor driving the receiving distributor is arranged to run slightly faster than the motor driving the sending distributor, the tendency will be for brushes E_1 and E_2 to be gaining, and the intermittent stepping back as already described will result in maintaining the receiving brush E_1 in the proper phase with the sending brush E at the other end of the line. It will thus be seen that at each reversal of the line current, the position of the correcting brush on the segmented correcting ring determines whether a correction of phase relation shall be made. Since the motor at the receiving end is running faster than the one at the sending end, sooner or later it will engage an "a" segment, at the time of a current reversal. This causes the brushes to be stepped back a small angle, so that the current reversals take place only while the correcting brush is on "b" segments. Thus the signaling impulses are made to provide correcting impulses, which are used to maintain synchronism.

The shortening of the receiving segments to one-half the length of the sending segments provides an ample angle for this purpose. It also possesses the advantage that only the center portion of the signal is utilized for signaling purposes, and the system is less subject to the effect of inductive disturbances. Diagram A, Fig. 11, shows the form of signals sent to line by the distributor. When the signals are received at the distant end, they are more or less distorted. Diagram B of Fig. 11, illustrates this distortion. It is near the point of reversal at the time the line current is weak that inductive disturbances are able to affect or further distort the signals. If any advantage were to be gained, the segments could be shortened still further, since the relays operated from them are connected in local circuit, and require a very short impulse for their operation. It will be appreciated then that the

shortening of the receiving segments is not a sacrifice in any sense of the word. In actual practice the line is worked duplex and the sending and receiving distributors are combined and run by one motor, means of correction of synchronism being used at only one end.

Fig. 3 [see April 1 issue] shows the distributor face with the brushes. It will be noted that this is somewhat more complex than the diagrams which have been explained. The outside ring, 1, of this distributor is the receiving ring, only alternate segments being used for selecting purposes. The intermediate segments in each quadrant, however, are used for a specific signaling purpose, as will be described later under the Printer. The second ring from the outside, 2, is the correcting ring, and corresponds to ring R_2 of Fig. 10. The third ring, 3, is the sending ring, and corresponds to the sending ring at station Y, Fig. 10. The fourth ring, 4, is called the local ring, and performs a very important function, which will be understood from

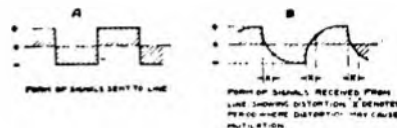


FIG. 11—FORM OF SIGNALS SENT TO LINE BY THE DISTRIBUTOR.

what follows. Referring back to Fig. 9, it will be remembered that while the brush is traveling over quadrants B, C and D, the combination of the levers 1, 2, 3, 4 and 5 should be changed to the combination of the next letter. Likewise, while the brush travels over quadrants C, D and A, the transmitting apparatus connected to quadrant B should change its combination to the signal of the next letter, and so on. At station X, the printer connected to quadrant A' receives a letter during one-fourth of the revolution, while the brush E_1 is passing over the segments of quadrant A'; but while the brush is passing over the remaining quadrants B', C' and D', the printer has time to complete its printing operation, move the paper, and clear out, so as to be in readiness to receive another signal. The segments in this local ring, 4, are used to perform these functions; that is, certain segments are used to change the signal combinations set up in the different quadrants. Likewise they are used to start the printing mechanism after selection has been made, so that it may have time to complete the printing operation in time to receive the signal for another letter. Each brush holder is insulated from the spider, and the individual brushes are made up of a number of strands of small hard copper wires.

(To be continued)

Mr. M. H. Kerner, New York, an old-time and military telegrapher, writes: "Never before have I so much appreciated the value and realized the indispensable necessity of TELEGRAPH AND TELEPHONE AGE as since my retirement from actual service. Why, without it, I should be alienated from all the companions of my life and feel like a rank outsider among telegraphers."

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on April 12:

American Telephone and Telegraph Co.	119 $\frac{3}{4}$
Mackay Companies	77 $\frac{1}{2}$
Mackay Company, preferred	67 $\frac{1}{2}$
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	25 $\frac{5}{8}$
Western Union Telegraph Co.	60

This publication is prepared to purchase for its clients one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends which in many cases will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.

Telegraph and Telephone Patents.

ISSUED MARCH 16.

1,131,673. Signaling System for Train Dispatching. To S. Brown, Brooklyn, N. Y.

1,131,811. Selector for Machine Switching Telephone Systems. To F. Allendorff, Antwerp, Belgium.

1,131,911. Call-Distributing Telephone System. To H. P. Clausen, Rochester, N. Y.

1,131,912. Telephone System. To H. P. Clausen, Rochester, N. Y.

1,132,107. Automatic Telephone System. To F. Merk, Charlottenburg, Germany.

1,132,249. Signaling Device for Party Telephone Lines. To L. Ericson, Chicago, Ill.

1,132,891. (Reissue) Telephone Exchange System. To S. H. Browne, Short Hills, N. J.

ISSUED MARCH 23.

1,132,569. Wireless Telegraphy. To R. A. Fessenden, Brant Rock, Mass.

1,132,588. Wireless Telegraph Receiving Apparatus. To S. M. Kintner and J. W. Lee, Pittsburgh, Pa.

1,132,613. Telephone Transmitter. To J. C. R. Palmer, Brooklyn, N. Y.

1,133,111. Telephone-Exchange System. To F. W. Dunbar, Chicago, Ill.

1,133,112 and 1,133,113. Telephone System. To F. W. Dunbar, Chicago, Ill.

ISSUED MARCH 30.

1,133,264. Telephony. To H. P. Clausen, Rochester, N. Y.

1,133,291. Selective Signaling System. To E. E. Kleinschmidt, New York.

1,133,373. Subscriber-Controlled Switching Apparatus for Telephone Exchange Systems. To J. Erickson, Chicago, Ill.

1,133,435. Method of and Apparatus for Reproducing Impulses. To R. A. Fessenden, Brookline, Mass.

1,133,441. Inductance Device for Wireless Electrical Signaling. To C. O. Lorenz, Port Arthur, Tex.

1,133,796. Telephone-Exchange System Impulse Transmitter. To J. Erickson, Chicago, Ill.

1,133,833. Head Support for Telephone Receivers. To C. Adams-Randall, Boston, Mass.

1,133,923. Telephony. To S. G. Brown, London, Eng.

PERSONAL.

MR. J. B. STEWART is superintendent of telegraph of the Northern Telegraph Company, with headquarters at Bangor, Me.

MR. DAVID HOMER BATES delivered an illustrated lecture on "Lincoln in the Telegraph Office," at the meeting of the Ohio Society of New York, at the Waldorf, New York, April 12.

MR. JUAN JOSE FLORES, inspector of radio stations for the government of Mexico, with headquarters at Vera Cruz, is in New York on business connected with his government.

MR. P. B. DELANY, the telegraph and electrical engineer and inventor, who has been residing in South Orange for the winter, will return to his summer home at Nantucket, Mass., April 19.

PROF. ELIHU THOMSON, the well-known electrical authority, has presented to Swampscott, Mass., his residence town, a plot of ground on which to erect a new public library, given by Mr. Andrew Carnegie.

MR. H. D. ESTABROOK.—*The National Magazine* for April prints a full-page engraving of Mr. Henry D. Estabrook, formerly solicitor for the Western Union Telegraph Company, New York, together with his speech to the business men and farmers of the country. This speech has made such a deep impression on the business community that movements have been started in many sections of the country with the object of placing Mr. Estabrook's name before the country as a candidate for the presidency in 1916. He has been associated with the Western Union Telegraph Company and other large legal interests all his life and is one of the best equipped men in the country. Mr. Estabrook has been a prominent figure in republican politics for twenty years. He is an able lawyer and a profound student of public questions, as well as a public speaker of remarkable power.

MR. J. K. BUTLER, of St. Petersburg, Fla., former line constructor of the Western Union Telegraph Company, now retired, enjoys the distinction of being the builder of the first long-distance telephone copper line in the world. This was in 1883-84, between New York and Boston. He also enjoys the further distinction of having a continuous serv-

ice record of over fifty-one years with the Western Union Telegraph Company and the telephone interests without the loss of one hour's time off duty. Between 1863 and 1867 he was employed by the Western Union in construction and repair work. In the latter year he was appointed manager at Stamford, Conn., and later transferred to Bridgeport, Conn., but later returned to Stamford, where he remained until 1882. In 1883 he put up the first copper long-distance telephone circuit, between New York and Boston. Mr. Butler was manager of the Philadelphia long-distance office for some months in 1886, and was then transferred to New Haven, Conn., as special agent. In 1888 he built a second line for the Long Distance Telephone Company between New York and Boston. After this he was employed by the New England Telephone and Telegraph Company and the American Telephone and Telegraph Company. In 1898 he was appointed superintendent of the New England Telephone and Telegraph Company, and held that position until 1909, when he retired. While living in Connecticut Mr. Butler was prominent in civic and state affairs, being a legislator at Hartford from 1885 to 1886. He spends his winters in St. Petersburg, Fla., and his summers in Hebron, Nova Scotia.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. E. REYNOLDS, vice-president and general manager, returned to New York, on April 6, from a three weeks' trip of inspection through the mid-west.

MR. E. REYNOLDS and Mr. E. W. Collins, general superintendent, Chicago, testified at the meeting of the United States Commission on Industrial Relations in Chicago, the former on April 13 and the latter, April 14.

MR. C. C. ADAMS, vice-president, New York, met with a very painful accident at Cedarhurst, L. I., while going to a train in his automobile on the morning of March 29. His car was run into by another and Mr. Adams received injuries about the face which confined him to the house for a week. He has entirely recovered and is again at his desk.

MR. C. P. BRUCH, vice-president of this company, was one of the many prominent Ohioans whose congratulations were printed in the Canton, Ohio, *Repository* of March 30, on the occasion of the one hundredth anniversary of the existence of that publication.

MR. W. I. CAPEN, vice-president, has returned to his office from his vacation trip to Florida.

MR. J. J. WHALEN, manager of the operating department at 253 Broadway, New York, who is on a trip of inspection through the Western and Pacific Coast States, is in San Francisco at the present time. He has visited many of the principal cities in the territory west of Chicago, and will stop at other points along the coast before returning to New York. He left New York January 18.

MR. J. G. HANDFORD, manager at Brooklyn, Iowa, has been transferred to Grinnell, Ia.

MANAGERS have been appointed as follows: G. A. Clemens, Moline, Ill.; O. M. Maxwell, Elgin, Ill.; Frank Wallace, Waukegan, Ill.

LONG-DISTANCE TELEPHONE SERVICE is being instituted by the Mackay Telegraph and Cable Company in the southwest. The first line, between Little Rock and Pine Bluff, Ark., was opened on April 10, and extensions are being made to other important points in the state, also between Dallas and Houston, Dallas and Paris, Texarkana, Memphis and other points in Texas.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

ELECTION OF OFFICERS.—At the annual meeting of the stockholders of this company, held April 14, Mr. Donald G. Geddes was elected a director, to fill a vacancy. The rest of the board was re-elected. At a subsequent meeting of the directors the present officers were re-elected, as follows: Newcomb Carlton, president; G. W. E. Atkins, Belvidere Brooks and A. R. Brewer, vice-presidents; Lewis Dresdner, treasurer; W. H. Baker, secretary; E. Y. Gallaher, comptroller.

PRESIDENT NEWCOMB CARLTON and vice-president Belvidere Brooks testified before the United States Commission on Industrial Relations in Chicago, on April 12, regarding the wages and working conditions of commercial telegraphers.

AMERICAN DISTRICT CHANGES.—At a meeting on April 14 Mr. Newcomb Carlton resigned as president of the American District Telegraph Company of New Jersey and was elected chairman of the executive committee. Mr. W. L. Jacoby, vice-president was elected president of the company.

MR. J. C. WILLEVER, general commercial manager, returned to his office, April 12, from a ten days' business trip to Havana, Cuba.

MR. A. G. SAYLOR, general manager, Eastern Division, New York, made a short trip through New York state recently.

MR. W. W. RYDER, general manager, Western Division, Chicago, was a recent executive office visitor.

MR. J. J. WELCH, traffic engineer, New York, and several operators from New York and southern points, were sent to Havana, Cuba, and Key West, Fla., to handle the large volume of business in connection with the championship prize-fight between Willard and Johnson, April 5.

MR. GEORGE E. SHARP, district plant superintendent, Cleveland, Ohio, is a Canadian by birth, and was born October 7, 1867. He entered the telegraph service as lineman at Standish, Mich., in 1888, and has filled positions as foreman, city foreman, general foreman and district foreman.

SUPERINTENDENT W. A. McALLISTER, of the Central Cable Office, New York, is proud of the record made by three members of his staff during the recent contest between Johnson and Willard at Havana, Cuba. J. Lister and A. B. Fiske, of the

Central Cable staff, were sent to Havana to assist in the work. Mr. Lister sent the description of the fight direct to the Central Cable Office, New York, using the Continental alphabet and Phillips' Code, Mr. J. Kearney being the receiving operator. The work accomplished gave general satisfaction.

MR. W. E. STIMPSON, efficiency engineer, New York, operating department, recently addressed the Western Union Educational Society, New York, on the subject of "Wire Loads."

MR. JOHN P. COSTELLO, wire and traffic chief at Binghamton, N. Y., has been retired on pension.

MR. J. L. COFFEY, manager at Bristol, Tenn., succeeds Mr. C. S. Lyne as manager at Middlesboro, Ky., Mr. Lyne having been transferred to the Pacific Division.

MR. A. G. CAUDLE, former manager at Clarks-ville, Tenn., has been appointed manager at Henderson, Ky., vice S. H. Heilbronner, resigned.

MR. CHARLES B. DUNHAM, manager of the Bay Roberts, N. F., office of the Western Union Telegraph Company, has been retired on pension, after a service of fifty-three years.

CAPT. J. B. INMAN, manager at Springfield, Ill., was appointed by Governor Dunne of Illinois a delegate to the annual convention of the Navy League of the United States, which was held in San Francisco, March 25.

MR. E. J. TOWNLEY, former manager at Grand Island, Neb., has been appointed chief operator at Billings, Mont., and is succeeded by Mr. W. C. Fountaine, from Fremont, Neb. Mr. C. A. Ebert succeeds Mr. Fountaine at Fremont.

MR. W. L. JACOBY, vice-president, American District Telegraph Company, New York, is on a business trip, which will take him to the principal cities of the Pacific Coast States and Texas. He will be absent about three weeks.

MR. C. P. POLLAK has been appointed general superintendent of the American District Telegraph Company, at New York, and Mr. R. C. Baker, general superintendent at Chicago. Mr. Pollak's territory will be east of Chicago, including Memphis, Tenn., and New Orleans, La., and Mr. Baker's, Chicago and west, including the Pacific Coast cities.

EIGHT-HOUR DAY FOR WOMEN EMPLOYEES.—On April 10 an order went into effect, providing that eight hours, instead of nine, will constitute a day tour of duty, without decrease in pay, for all female employees of the traffic department in functional main and functional branch offices. Approximately 2,000 employees are affected by this order.

JOURNAL OF THE TELEGRAPH DISCONTINUED.—After an existence of forty-six years the *Journal of the Telegraph*, published by the Western Union Telegraph Company, has been discontinued. The tariff feature of the old paper is continued in a new form, entitled "Tariff Circular," while the news is now taken care of by the *Western Union News*. The first issue of the *Journal of the Telegraph* was dated November 1, 1868, under the editorship of James D. Reid.

THE CABLE.

MR. A. E. POWELL, engineer of cable station equipment, Western Union Telegraph Company, London, England, sailed from New York for home, April 3, on the steamer "Lusitania."

CANTON'S CHANGE OF NAME.—The Chinese Telegraph Administration announces that, for telegraph and cable purposes, the city of Canton will be known hereafter as Shameen.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to April 12, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7, 1914.

CANADIAN NOTES.

MR. G. D. PERRY, general manager, the Great North Western Telegraph Company, Toronto, Ont., recently made a business trip to Winnipeg, Man., and Saskatoon, Sask.

MR. GEORGE PATON has been appointed local agent of the Canadian Pacific Railway Company's Telegraph at Toronto, Ont. Mr. Paton was formerly assistant local agent and was promoted to succeed Mr. H. A. Shambrook.

THE TRAFFIC DEPARTMENT of the Great North Western Telegraph Company of Canada was represented by thirty-seven officials at a gathering held at Toronto, Ont., on April 2. Much matter of interest to the company was discussed and methods looking to a betterment of the telegraph service were considered. A very excellent group picture of those present at the meeting was taken.

Canadian Pacific Telegraph Officials.

The official personnel of the Canadian Pacific Railway Company's Telegraph is as follows:

John McMillan, manager telegraphs, Montreal, Que.

W. J. Camp, assistant manager telegraphs, Montreal, Que.

W. Marshall, assistant manager telegraphs, western lines, Winnipeg, Man.

W. M. Godsoe, superintendent, Atlantic Division, St. John, N. B.

A. C. Fraser, superintendent, Eastern Division, Montreal, Que.

H. J. Lillie, superintendent, Ontario Division, Toronto, Ont.

D. H. Bowen, superintendent, Lake Superior Division, Sudbury, Ont.

E. M. Payne, superintendent, Manitoba Division, Winnipeg, Man.

J. F. Richardson, superintendent, Saskatchewan Division, Moose Jaw, Sask.

D. Coons, superintendent, Alberta Division, Calgary, Alta.

R. N. Young, superintendent, British Columbia Division, Vancouver, B. C.

THE TELEPHONE.

MR. THOMAS A. WATSON, who was associated with Dr. Alexander Graham Bell in the development of the telephone, lectured before the New York Electrical Society on the evening of April 14, on "The Birth and Babyhood of the Telephone." Musical selections were rendered by a full orchestra early in the evening.

B. J. THROOP, aged sixty-six years, manager of the Hamilton, Ont., office of the Bell Telephone Company of Canada, died in Toronto, February 24. He was a member of the Telephone Pioneers of America.

NEW RATES IN NEW YORK.—The New York Telephone Company has announced its acceptance of the new schedule of telephone rates fixed by the New York Public Service Commission. The new rates go into effect July 1 and involve a reduction of about \$3,000,000.

GERMAN WAR TELEPHONES.—The German central military telephone office now serves not less than 306 connections. Not only is there a connection with the commanders of the German troops all along the line, but also with the various governmental departments in Berlin.

A. T. & T. Meetings.

At the special meeting of the stockholders of the American Telephone and Telegraph Company, held March 29, the number of directors was decreased from twenty-five to seventeen. At the annual meeting, held March 30, the vacancies occasioned by the resignations of Rudolph Ellis and Robert Winsor were not filled, and six directors retired, namely: T. B. Bailey, C. R. Bangs, H. H. Brigham, A. E. Holcomb, J. J. Mitchell and H. B. Thayer.

At the election of officers, vice-presidents B. E. Sunny and H. B. Thayer retired. The other officers were re-elected, and W. J. Stout was appointed an assistant treasurer.

Public Service Enterprises.

With his annual report to the stockholders of the American Telephone and Telegraph Company, president Theo. N. Vail addressed a letter to the directors and security holders of the company, in which he discussed the future of public service enterprises for intercommunication and interchange.

The United States of to-day, in all its magnificence, he says, has been created—its latent possibilities made tangible, its prosperity maintained, its growth continued—by or because of these means of intercourse and interchange. The maintenance and continued growth of this prosperity will be in a great measure dependent upon the maintenance and continued growth of the utilities which furnish these facilities. All other utilities or industrial or commercial enterprises are subordinate to and dependent upon them.

Until proper relations are established between the public and the public utilities, there cannot be too many repetitions of their importance, no effort should be spared to emphasize it and guide the pub-

lic to right conclusions. Until some popular misunderstandings are corrected it will be difficult to establish proper relations.

It is the generally accepted belief that utilities are dependent on the public rather than the public dependent on them; while neither could exist without the other, means of intercourse and interchange are the advance agents. Competition, control, regulation and legislation have been looked upon as the causes or forces which have enabled or compelled industrial enterprises to improve and extend their service; to increase production; to pay increased wages and taxes; and at the same time to decrease charges for service rendered. While these have been to some extent a stimulus, the wonderful improvement which has been made has been coincident, and indissolubly connected with the replacement of the old "rule-of-thumb" methods, by methods of scientific operation. Investigation, research and the application of the results to both operation and production have produced "much more" and "much better" from the same or less effort and expenditure, and have obtained valuable products from what had heretofore been wasted; much to the benefit of the worker, the public served, and of those responsible for the work. There is a lack of consistency in the understanding respecting enterprise and initiative, and the relations between capital and labor, the employer and the employee. There are many ideals and beautiful theories which in time we hope may be realized. But commerce and industry are dependent upon the purchaser and consumer and so long as the human factor of self interest as it now exists controls them in their dealings, so long must the effect of that same existing human factor be taken into consideration by commerce and industry in their relations with both producer and the worker.

Review of Principal Articles in Contemporary Telephone Publications.

THE EITEL FREIDRICH.—Miss Emma J. Grady, chief operator of the Hampton, Va., telephone office, gives an interesting account of the scenes that attended the sudden arrival of the German converted cruiser "Prinz Eitel Friedrich" at Old Point Comfort, Va., March 10. The Hampton exchange was a busy place after the event became known.

UNDER THE HEAD. "Facts Every Employee Should Know About the Telephone," Mr. E. B. Tuttle, assistant engineer, contributes an article to *The Telephone News* on the subscriber's station as a unit. In former articles Mr. Tuttle described the individual pieces of apparatus used on a telephone line; in the present contribution he proceeds to put them together and consider their relations to one another in a subscriber's station.

"**FUNDAMENTAL PRINCIPLES OF THE TELEPHONE BUSINESS**" is the title of an article in *Telephony*. The article, which will be continued serially, will give a reading course designed to present logically the principles which underlie successful organ-

ization and operation of telephone properties. The first section, which appears in the March 20 issue, was written by Mr. James H. Shoemaker, and is on the subject of the economics of telephony.

"THE TELEPHONE IN SAN SALVADOR, BRAZIL," is the subject of an interesting and well-illustrated article in *The Telephone News* for March. The difficulties of installing a telephone system in the tropics are described. All kinds of destructive insects and bugs are to be contended with, such as the white ant, which is very destructive to woodwork of all descriptions. The office furniture and switchboards have to be treated with a solution of cyanide of potassium to kill the insects.

THE DELAWARE METHOD OF BUILDING MULTI-PARTY LINES IN UNDEVELOPED TERRITORY is described in the *Telephone News* for March. The problem of furnishing telephone service in a locality more or less sparsely settled has been solved to a great extent on the Atlantic Coast Division, the article states, by the application of what has been termed the "Delaware method" of building multi-party lines. The article explains the method that has furnished telephone service in territory hitherto barred from development on account of the cost involved under the regular methods of plant extension.

RADIO-TELEGRAPHY.

MEDAL FOR MR. MARCONI.—The Albert Medal of the Royal Society of Arts was presented to Mr. William Marconi in London, April 12. The medal is awarded annually for distinguished merit in promoting arts, manufactures and commerce.

MR. GEORGE S. DESOUSA, traffic manager of the Marconi Wireless Telegraph Company of America, New York, is in Chicago on business of the company, and will visit several lake cities before his return.

WIRELESS ON LIGHTHOUSE TENDERS.—Wireless equipment is being placed on five United States lighthouse tenders, two on the Atlantic and Pacific coasts and one in Alaska.

CANAL ZONE WIRELESS STATION.—The new wireless station in the Panama Canal Zone has been completed. It will be controlled and manned by the navy department. The station has three six-hundred-foot towers and a capacity of 100 kilowatts.

SMALL WIRELESS OUTFIT.—Tests were recently made on Bedloe's Island, New York harbor, with a wireless telegraph instrument weighing eight pounds that can be carried in a hand satchel and operated from an automobile. The instrument is the invention of Dr. Otto F. Reinhold, of Newark, N. J.

AUDIPHONE.—The De Forest Radio Telephone and Telegraph Company, New York, has recently developed an audion amplifier or audiphone, which is designed to relay or amplify minute pulsating or alternating electrical impulses from five times to 600 times their original intensity, without lag or distortion. It is stated that the wire telephone and

telegraph rights have been acquired by the American Telephone and Telegraph Company.

ENGLISH MARCONI DIVIDEND.—The directors of the Marconi Wireless Telegraph Company, Ltd., London, England, have declared a dividend of seven per cent, less income tax, upon the seven per cent cumulative participating shares for the year 1914, payable April 19.

THE UNIVERSAL HIGH-POWER TELEPHONE COMPANY, Tacoma, Wash., has been making tests of a new wireless telephone between an experimental station at Algona, a few miles from Tacoma, and Walla Walla, a distance of about 300 miles. It is stated that the voice carried with much clearness. Mr. Charles S. Wangelin is manager of the company.

THE FEDERAL TELEGRAPH COMPANY, San Francisco, Cal., which operates the Poulsen system of wireless telegraphy, publishes a paper on the ships of the Oceanic Steamship Company running between San Francisco and Sydney. The name of the paper is *Federal Radio News*. Following are the names of the managers of the principal offices of the Federal Telegraph Company: T. S. Cunningham, San Francisco, Cal.; W. Y. Nolley, Honolulu, H. T.; R. D. Gould, Portland, Ore.; W. R. Powell, Seattle, Wash.; A. Wakeman, Los Angeles, Cal.; A. F. Krenke, San Diego, Cal.; J. P. O'Leary, Phoenix, Ariz. Mr. H. L. Burross is superintendent, with headquarters at San Francisco.

THE MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA has leased commodious quarters in the Edison Building, corner of Elm and Duane streets, New York, which will be occupied May 1 for the offices of the superintendent of the Eastern Division, the school of instruction, the supply store and machine shop. The building is a fine one and has up-to-date plumbing, including shower baths, filtered ice water fountains, etc. A large front room will be provided for the use of operators waiting assignment to ships, which will be comfortably furnished and supplied with reading matter. The new quarters will be in all respects superior to those now occupied on Cliff street.

MEMORIAL TO WIRELESS HEROES.—A granite monument erected in Battery Park, New York, to the memory of nine wireless operators who have lost their lives at sea within the last four years, was dedicated on April 15. The expense of the monument was met by contributions from wireless operators. The memorial, which is a fountain, bears the inscription, "In Memory of Wireless Operators Lost at Sea at Their Post of Duty." The names of the lost operators are: Jack Phillips, S. S. Sczpanek, G. Eccles, L. A. Prudhunt, D. C. Perkins, F. J. Kuehn, W. E. Reker, C. J. Flemming and H. F. Otto.

CONTINUOUS WAVES.—Mr. L. F. Fuller read a paper, entitled "Continuous Waves in Long-Distance Radio Telegraphy," at the meeting of the American Institute of Electrical Engineers in New York, April 9. The ability to predetermine the probable normal daylight sending radius of high-powered

radio stations, he said, is of prime importance in their design. The final conclusions drawn from a comparison of empirical transmission, formulated for continuous and for damped waves, are that the transmission efficiency of continuous waves is somewhat higher than that of damped waves on wave lengths of approximately 3,000 meters or above, and that this advantage increases with the wave length.

OPENING SAN FRANCISCO EXPOSITION.—When president Wilson opened the Panama-Pacific Exposition by closing an electric circuit at the White House, on February 20, the signal was carried over a telegraph wire to the radio station at Tuckerton, N. J., which is operated by the United States Navy Department. At Tuckerton the signal automatically operated a relay which set electric waves into action and the wireless signal was instantly received at the Tower of Jewels on the fair grounds at San Francisco, causing another relay to operate. This latter relay closed circuits throughout the grounds, and on receipt of the signal the main door of machinery hall was opened, and the "Fountain of Energy" at once began to play. The wireless apparatus employed was that of the Federal Telegraph Company of San Francisco, which uses the Poulsen system.

The Naval Radio Service.

The paper of Captain W. H. G. Bullard, U. S. Navy, on "The Naval Radio Service," which appeared in the March proceedings of the Institute of Radio Engineers, has been reprinted in pamphlet form. Captain Bullard describes the development of the service, its public service and commercial work.

The work this service is performing in the interests of shipping in general is fully set forth. This service welcomes traffic through its stations and assures all concerned in the forwarding of such traffic that it will receive prompt and careful attention.

Annual Report of the Marconi Wireless Telegraph Company.

A preliminary report and statement of accounts for the fiscal year ended December 31, 1914, has been issued by the Marconi Wireless Telegraph Company of America, over the signature of Mr. John Bottomley, secretary. The report says:

"The results of the year 1914, as shown by the profit and loss account, will, we believe, be found perfectly satisfactory to the stockholders. We feel, taking into consideration the conditions prevailing during the latter part of the year, that the showing is exceptionally good.

"The net earnings of the company show \$271,888.71; and after placing in reserve \$59,511.24 against depreciation of apparatus, plant, etc., through obsolescence or inadequacy resulting from age, physical change or supersession by reason of new inventions and discoveries, as described by the Interstate Commerce Commission; and \$50,000.00 toward the creation of a reserve fund which we expect to add to from time to time against amortization of the amount standing to the account of patent rights, good will, etc.; and an additional amount of

\$12,500.00 for contingencies; making a total of \$122,011.24; there is left a balance of \$149,877.47 as net earnings, which is carried over and placed to the credit of the profit and loss account, and which, added to the balance on hand January 1, 1914, gives a surplus of \$364,571.01.

"The foregoing does not include any operations affecting the transoceanic high power stations, the operation of which we were about to begin when the European war was declared. The war has interfered with and, until its conclusion, will continue to interfere with our transatlantic service and, to a considerable extent, with our transpacific service."

A full report of the operations of the company will be submitted at the annual meeting, which will take place in Jersey City, N. J., April 19.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

DR. LUIGI LOMBARDI, the famous Italian scientist, is the subject of a biographical sketch in the March number of *The Wireless World* (London). Dr. Lombardi is an enthusiastic wireless investigator and has erected a fine wireless station at Naples, Italy.

THE WIRELESS WORLD of London, in its March issue, contains a summary of the typical prominent cases which have recently come before the English courts regarding the possession of parts of wireless apparatus. From these some useful advice is deduced for the benefit of amateurs.

"AT THE FRONT WITH WIRELESS" is the title of an interesting article in the March number of *The Wireless Age* (New York). It is an operator's story of the naval battle off the Chilean coast, and contains, besides, an account of the use of wireless in the fight between the Germans and the Allies for possession of a station in German New Guinea. Other details of the European war are set forth.

CONDITIONS AFFECTING THE VARIATIONS IN STRENGTH OF WIRELESS SIGNALS is the title of a paper read by Prof. E. W. Marchant before the Liverpool meeting of the Institution of Electrical Engineers, and abstracted in *The Wireless World* for March. After mentioning the results of the investigations made by other scientists and referring to the fact that the stations between which most measurements have been recorded are Liverpool and Paris, lying in a plane northwest-southeast with respect to one another, professor Marchant discusses his own work from the Liverpool centre.

"S O S BY FLASHLIGHT." The story of how the crew of the steamer "Chester" was rescued at sea recently by the steamer "Philadelphia" by means of a flashlight in the hands of the wireless man on the "Chester" after the wireless equipment had been carried away, is told in an interesting manner in *The Wireless Age*. The appeal for aid was spelled out on the flashlight in the darkness by operator Waale on the "Chester," and received by operator W. V. Moore, second operator on the "Philadelphia." Various illustrations accompany the article.

The Ownership of Wireless Equipment.

(Continued from page 162, April 1.)

The steamship owner who elects to purchase wireless equipment outright must first perfect an organization to carry on the business properly. Whether his fleet be large or small the executive head of the wireless department must be possessed of administrative and technical knowledge, understanding thoroughly the conduct of this method of communication in all its ramifications. The salary of this department manager is the first added item of expense.

Since it is obvious that the owner of one, two, or three ships could not reasonably expect by outright purchase to effect any appreciable saving—even a theoretical one—over rental charges, it at once becomes plain that the manager's time would be exhausted by preparing regulations for the ship operators, acquainting them with new traffic methods and government requirements, issuing communication charts, supervising cash accounts and message apportionment of tolls, recruiting efficient operators and providing for eleventh-hour desertions and vacancies through illness, adjusting complaints with government inspectors and refund claimants on undelivered messages, effecting settlements with foreign ship and shore stations and supervising staff requisitions, salary and bonus requirements.

No time could be devoted to inspection of apparatus and determining what is necessary for proper maintenance. At least one assistant would be necessary to attend to this branch of the work and he would have to be an engineer or a practical man of wide experience. Thus, a second salary expense would be incurred.

Where the ships visited foreign ports, arrangements would also have to be made for inspection and repairs there, for which, of course, adequate payment would have to be made to some organization.

By employing only operators with engineering training these inspections might be done away with, but the saving would be absorbed by the added expense on the operating payroll.

Another expense, and a very material one in some cases, would be the charge for master's messages relating to matters of navigation. The ship which owned its apparatus would have to pay full message rates for every communication with vessels of other lines, both for direct and for re-transmission. This would also apply to shore stations not under the same individual ownership.

Various other items of additional expense might be included here, but the ones instanced will serve to determine that, taking it by and large, the passenger carrying vessels are better and more economically served by paying a flat rental sum. Aside from the investment of considerable sums in outright purchases, the expenses of inspection and repair, administrative salary charges, carrying reserve operators, depreciation and similar considerations, inharmonious working is a factor which would have to be given grave consideration both for the public's protection and owner's satisfaction. Under the Marconi Company's control, the burden of these problems is lifted off the shipowner's shoulders and

universal wireless communication made practicable by an executive staff having the experience which qualifies it for the task.

Since many of the disadvantages originate with passengers' messages, it would appear that the cause of outright purchase is materially benefited where passengers need not be considered. Cargo vessels, for example, have the problems considerably simplified, it might be advanced. Government regulation is not so exacting, message accounting needs little consideration and expenses may be kept down in administrative quarters. But, as with the other types of vessel, depreciation and master's service messages still remain, inspections and repairs must be made and the supply of operators provided for.

Service is the one vital consideration in the freight carrying trade. The value of wireless equipment lies in keeping owners and captains in touch with each other, saving perishable cargoes by quick relief and permitting changes in destination to take advantage of favorable market conditions. Association with organized operation and its efficient service thus becomes a particularly valuable asset.

Mention of cargo vessels serves to recall another condition which the individual ownership advocates must not overlook, whether the equipment is for cargo vessels or for passenger ships. Marconi is the inventor of wireless telegraphy and apparatus of other manufacture may involve the purchaser in legal complications.

Illustrating this point is the recent utterance of Judge Hough, of the United States District Court in New York, which forced a prominent steamship company to discontinue use of infringing apparatus and turned these shipowners to reinstatement of Marconi equipment on term contracts at the raised rental figure. When the Marconi Company had represented to the court that it had acquired and was now maintaining a large number of shore stations and that neither the competing wireless company nor the steamship owners had contributed to their cost Judge Hough maintained that the apparatus purchased was a deliberate attempt to evade patent rights and, furthermore, the Marconi Company's raised rental figure was a reasonable one. The opinion informed the co-defendants that the defence had taken "an infringing set of apparatus and so arranged or co-ordinated it as to avoid infringing."

Buying other apparatus then generally means trouble of more kinds than one; a long series of Marconi patent victories has well sustained the validity of this company's rights, and purchases from other manufacturers are almost certain to result in a court decision unfavorable to the steamship owner. Judge Hough indicated decided disapproval of such purchases in these words: "I am convinced that down to the present time the expense of operation (and of litigation) has been so enormous that complainant (Marconi Company) has received no fair return from the invention which under decisions now ruling I must hold to be of the greatest value and worthy of praise and reward."

(Continued on page 192.)

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

Improvement in the Morale of the Operator.

The introduction of the typewriter and of the mechanical transmitting machine as parts of telegraph operating equipment has done more for the good of operators than most of us realize, not only physically, but morally.

One of the greatest curses that ever afflicted the telegraph fraternity up to a few years ago was the liquor-drinking habit. It made men unreliable and ruined them, body and soul. But that day has passed; light has come and drunkenness is practically eliminated; not through any organized temperance movement, however, nor pressure from employers, but through the innate good sense of the great body of American telegraphers.

The typewriter has been largely instrumental in bringing about these changed conditions. The great exertion of copying with a pen from a fast wire in former days caused a nervous strain upon the operators, and this was frequently given as an excuse for their over-indulgence in intoxicants. How much truth there was in such a belief we cannot say, but it is now apparent to all that the disappearance of intoxication among telegraphers has been coincident with the extending use of typewriters.

The employment of the mechanical transmitter has likewise exerted an uplifting effect. In former

days writers' paralysis and loss of grip were common afflictions among operators and to many others the fear of being stricken at any moment was a constant source of worry. Working under such conditions naturally kept men from doing their best. But now things are changed; these fears no longer exist and the working conditions are much superior in every way to what they were formerly. Shiftless and unworthiness have been largely eliminated and the fraternity is now enjoying a greater degree of mental and physical freedom than ever before.

Marconi Company's Prosperity.

The annual report of the Marconi Wireless Telegraph Company of America for the year 1914 shows a net gain from operations. This is the first time in the history of the company that a balance has been shown in its favor, and the fact reflects great credit upon the present management. The statement, however, does not include any operations affecting the company's transoceanic high-power stations, the operation of which was about to begin when the European war was declared, but when it is considered that the business of the company has been seriously interfered with, by reason of the war, the financial showing is all the more remarkable.

The net earnings from operation were \$121,614, and the total applied to reserves was \$122,001. It will be pleasing to the stockholders, therefore, to know that their interests are being so carefully guarded, and that the company is being placed on a substantial financial basis, in spite of adverse influences.

Improving the Service.

Telegraphers are noted for the keen development of their perceptive faculties and are quick to detect errors that the average person would overlook. This alertness of mind is largely due to the fact that their training has been in dealing first with the small things rather than the large; to be specific, with dots and dashes which form letters, and with letters which form words. Thus dealing with units they naturally develop a quick eye and acquire, unconsciously, the habit of detecting small irregularities.

It has been noted recently that great improvement in service has resulted through the detection and correction by operators and other employees of errors in telegrams before and during transmission. To use a paradox, the errors are corrected before they are made, and this means a great deal to a telegraph company. By keeping records of such corrective work managers are enabled to determine the worth of employees, and the publication of them naturally acts as an incentive to others to do their best. The public, as well as the company, gets the benefit of this, while at the same time the employee comes in for proper credit. This service on the part of the employees is certainly to be commended and encouraged, as it is in the line of efficiency about which we hear so much these days.

Service messages, which are an absolute loss to the companies, and which have hitherto been regarded as a necessary evil, are being greatly reduced

in number by this exercise of vigilance and intelligence on the part of the employees, and the lesson to be learned from this is that nothing in the telegraph business is too trifling to be overlooked.

Success of Telegraphers in Other Occupations.

It is often remarked that former telegraphers engaged in other lines of business have generally been successful. The reason for this is easily accounted for. The experience and knowledge acquired in the telegraph service is in itself a liberal education, and fits a man for other occupations where breadth of knowledge is essential. A telegrapher is familiar with every city and town in his own country; he learns men's characters through their telegraphic correspondence and knows a great deal about the vast business interests at home and abroad. A wide-awake telegrapher is not narrow minded.

We are in frequent receipt of letters from former telegraphers now engaged in other vocations acknowledging that their success was largely due to the encouragement received through the columns of this journal, which has always emphasized the importance and advantage of employees improving their opportunities and making themselves more useful to their employers. By thus increasing their knowledge and usefulness their qualifications for larger work has become known outside of their immediate environments and their services have been sought by other interests. It is a fact that eight out of every ten who have left the telegraph business to take up other lines of activity have scored success, and they all concede that their early telegraphic experience was the corner-stone of their later success.

Telegraph Oddities.

The manager of a telegraph office in one of the smaller cities has resigned to become a barber.

The cause of the death of a Mexican operator, as announced recently, was an overdose of a proprietary headache medicine.

A man with the euphonious name of Sinsix entered a New Jersey telegraph office one afternoon recently for the purpose of taking a nap and when denied the privilege he fought the operator on duty with a pair of pliers. What his other five sins were is not known.

A telegraph operator, on his way home the other night, in a Western city, was held up by three bandits at the muzzles of as many revolvers. The highwaymen, after thoroughly searching the victim, secured fifty cents. When the robbers ascertained that he was a telegraph operator, they sneaked away in disgust.

An operator in Nashville, Tenn., instead of spending his good money in purchasing a transmitting device bought a bottle of what is known as Vitalitas and, according to a newspaper report, after he takes a dose of the medicine, all of the operators on his wire break to inquire what he has done to increase his speed.

A small New England town recently imposed an annual tax of \$4,000 on a telegraph company for the

privilege of doing a telegraph business within the town limits. The total telegraph receipts of the town do not amount to \$40 per month. When the telegraph company threatened to close its office the town officials eagerly endeavored to have the State authorities compel the company to maintain an office and thus be yearly robbed of \$3,500. The imagination of the average politician as to the amount of money taken in in a small town by a telegraph company must savor of curiosity.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

If the positive and negative poles of a battery are connected by means of a short wire, what action takes place in the wire?

Under what name is this action generally known?

How is the electric current conveyed from the battery to the point where it is desired to utilize it?

Speaking in a general way, how many times would electricity travel around the earth in one second, if a wire of sufficient length could be provided?

Is the earth a conductor of electricity? Is it ever used to form part of a telegraph circuit? If so, why?

What is a grounded circuit?

What is a metallic circuit?

Is electricity generated in any other way than by an electric battery?

In walking over a carpet, for instance, is electricity generated?

What is the difference between electricity developed by friction and by chemical action in a cell of battery?

Is there any electricity in a cell of battery if the poles of the battery are not connected by a wire?

From what pole of a battery does the positive electricity proceed, and what pole the negative?

What is the common name given to the metal plates in a cell of a battery?

What are the metals generally used as the electrodes of a telegraph battery?

When the copper and zinc elements are placed in the jar, does any chemical action occur while the plates are not connected externally?

What is the effect upon the electrolyte when the plates are connected by an external wire?

Into what elements is the water of the cell decomposed? Name the gases.

If these gases are allowed to collect upon the plates of the battery, what is the effect upon the current output? If the gases are allowed to escape or are otherwise disposed of, what is the effect upon the current?

(To be continued.)

The Assassination of President Lincoln, as Told by Eight Survivors of the United States Military Telegraph Corps.*

BY DAVID HOMER BATES, MANAGER AND CIPHER OPERATOR, WAR DEPARTMENT TELEGRAPH OFFICE, 1861-1866.*

The first time I saw Abraham Lincoln was on April 27, 1861, two weeks after the fall of Fort Sumter, having been called to Washington with three other telegraph operators by a message from Andrew Carnegie, assistant general manager of military railroads and telegraphs. The last time I saw the martyr president was on the day of his death four years later.

Between those two dates, while serving as operator, cipher operator and manager of the war department telegraph office, I saw Lincoln nearly every day, sometimes several times a day, and on rare occasions all night long while battles were impending and the president and some of his cabinet waited in the cipher room for news from the front.

During the Civil War, the Executive Mansion (or White House, as it is called) was not, as now, connected by telegraph, and all the president's telegrams were handled at the war department.

Indeed the president spent more of his waking hours in the war department office than in any other place except the White House.

Of Lincoln's official family not one survives, and of the leading generals there remains only one—my old business friend General Granville M. Dodge. Of the war department telegraph staff on duty the night of the assassination, there are eight survivors whose several accounts of the tragic incidents of that fateful time are here recorded.

Although fifty years have gone by, I still remember with more or less distinctness, that long night of Good Friday, April 14, 1865, that black night in our country's history, when the hate and cruelty embodied in four years of bloody war culminated in a stroke of madness, aimed at the life of one who had only "charity for all with malice toward none." Although on duty in the cipher-room that evening, I have no particular remembrance of anything that occurred prior to the moment when some one rushed into the office with blanched face saying, "There is a rumor below that president Lincoln has been shot in Ford's theater." Before we could fully take in the awful import, other rumors reached us, horror following fast upon horror; the savage attack upon secretary Seward, and the frustrated efforts to reach and kill vice-president Johnson, secretary Stanton and other members of the government. As the successive accounts crystallized, a fearful dread filled our hearts, lest it should be found that the entire Cabinet had been murdered. After an hour of this awful suspense, we received word from major Thomas T. Eckert, who had gone quickly to secretary Stanton's house on K street, and from there to secretary Seward's house on Fifteenth street, and then to the Petersen house on Tenth street, opposite the theater, to which the

president had been carried after having been shot by the assassin. This message merely assured us of the present safety of Stanton, while confirming our worst fears concerning the president. Two of my comrades were in the audience at the theater, Thomas A. Laird, now of Buffalo, and George C. Maynard, now curator of the National Museum at Washington. Laird ran first to the house of major Eckert, our chief, on Thirteenth street, near F, to give him the news, while Maynard came direct to the war department, followed a little later by Laird. Both men remained on duty all night with Albert B. Chandler, John H. Dwight, since deceased, with several others and myself, George A. Low, now of Pittsburgh, coming in about dawn.

A relay of mounted messengers in charge of John C. Hatter was immediately established by major Eckert, and all night long they carried bulletins in Stanton's handwriting, addressed to general Dix, New York City, which were at once given to the Associated Press and flashed over the wires throughout the country. As these bulletins were spelled out in the Morse telegraph characters, our hearts were stunned and yet they seemed to be on fire. The awfulness of the tragedy hushed us into silence. As the hours slowly passed, hope revived fitfully as some sentence in the dispatches offered faint encouragement that perhaps the precious life might be spared to complete its chosen work, but at last, about 7.22 a. m., April 15, the dreaded end came, the tension gave way and we knew that our beloved president was gone from us forever.

Meantime, the wires leading from the war department telegraph office were kept humming all night long, inquiries for details of the tragedy and the very latest news from the president's bedside being received from Baltimore, Philadelphia, New York, Pittsburgh and other points with which we were in direct connection, and also from military telegraph offices at the arsenal, navy yard and Alexandria and other places near by. These inquiries were answered as fully as possible out of the meagre information at hand from time to time, and at intervals the operators in that cipher room to which Lincoln had come so often during the four years of war, discussed in lowered tones and with anxious hearts, the dreadful news of the night. Youth is ever hopeful, and while mourning the now certain loss of the president and our personal friend, as indeed he was, and with the wickedness of treason brought vividly to our senses, and with its culminating crime rankling in our breasts, we still were able to console each other by the suggestion that Andrew Johnson, our new leader (if indeed he were not also slain) would not allow mistaken mercy to stay the hand of punishment. We reasoned also that our stricken president, during his lifetime, had been so patient and lenient with his enemies, that if he had been spared perhaps he would have adopted a policy of condonation that would deprive us of the real fruits of the war, and lead to the return to political power of those who had helped to cause it.

One minor incident is recalled which reveals the undercurrent of rebellious sentiment still prevalent

* From *New York Sunday Herald*.

in the capital at that time when the war was in fact over. My comrade, Albert B. Chandler, and I left the war department after news of the president's death was received on our way to breakfast. Just before reaching our boarding-house on the corner of Eleventh and G streets, we saw the hearse with the president's body passing up the street and a young girl about twelve years old on the opposite corner cried out in mocking tones, "Oh! There's the undertaker, Merry Abraham must be dead." We were shocked at the cruel utterances, but our hearts were too sad even for words of rebuke.

I still have in my possession the original manuscript of secretary Stanton's order, dated April 16, 1865, addressed to lieutenant-general Grant, announcing the death of Abraham Lincoln, President of the United States and Commander-in-Chief of its armies, and directing appropriate honors to be paid to his memory.

I also have one of the last-known autograph signatures of John Wilkes Booth, the assassin, dated April 8, 1865, cut from the register of the National Hotel, Washington, respecting which I was subpoenaed as a witness at the trial of John H. Surratt, in July, 1867. I also have an autograph signature of Boston Corbett, Sixteenth New York Cavalry, who shot Booth in the barn at Garrett's farm, on April 26, 1865.

Although I was in Lincoln's company almost every day for four years, even until the very night of his assassination, and often heard him discuss the vital questions of the Civil War, and on many occasions took from his hands telegrams in his unique handwriting, with never a blot or erasure, yet I was too young to form a matured, intelligent opinion of his many-sided character. The crystallized opinion of the generation since Lincoln's death is that his official papers, as well as his letters and speeches, are models of clear, undefiled English. Some of them, notably his Gettysburg speech and second inaugural address, are recognized classics to which coming generations may turn for patriotic inspiration and education in the best forms of expression for great thoughts. No ruler of millions, since King David, the Psalmist, ever clothed noble thoughts in sublimer language.

But, beyond all beauty of form, cogent words and irresistible logic, inherent in the body of all his utterances, whether oral or written, there was something more—there was the spirit of the simple, great man, the throb of a human heart that had malice for none and charity for all, and loving all, sought to protect them from the injustice and wrong. He never allowed force of logic or beauty of diction in choice or arrangement of words to obscure his one great purpose—to lead men always to hate tyranny and love freedom.

The following extract from my war diary, under date of April 15, 1865, the day of Lincoln's death, is the best expression in a few words of my opinion of that character in its dominating features:

"First pure, then peaceable, gentle and easy to be entreated, full of mercy and good fruits, without partiality and without hypocrisy."—James 3-17.

A careful study of his speeches and writings, and

a perusal of many of his biographies since that brief record was made, has only served to confirm my youthful estimate of his simple and altogether lovely character which has now become the object of wonder and admiration of the civilized world—combining with its innate gentleness a marvelous tact in the handling of men and in the settlement of complex questions of national importance—a faculty of leading.

ACCOUNT OF GEORGE COLTON MAYNARD, CIPHER OPERATOR, WAR DEPARTMENT TELEGRAPH OFFICE, 1865, NOW CURATOR, SMITHSONIAN INSTITUTION, WASHINGTON, D. C.

On the evening of April 14, 1865, I went to Ford's theater to see "Our American Cousin." My seat was in the first gallery, on a level with and in full view of the upper, right-hand box, reserved for president Lincoln and his party. The house was crowded, for it was to be a gala night. It was Laura Keane's benefit, and it was much more. It was an occasion of public rejoicing. The dreadful war was ended. Peace had come. Loyal people everywhere sought relaxation and an opportunity to show their devotion to the cause of their redeemed land. This was to be a patriotic performance. The orchestra played the "Star Spangled Banner," "Red, White and Blue" and "Marching Along." A patriotic song and chorus, "Honor to Our Soldiers," was to be sung by the company. The actors performed their parts with ability and spirit, the audience was sympathetic and enthusiastic.

The presidential party did not arrive until some time after the play commenced. The dairy scene was on, and Georgiana (Miss Hart), was telling Dundreary (Mr. Emerson) an American joke which he apparently failed to comprehend. Twice she said to him, "Why, can't you see it?" "No. I cawn't see it," he replied. At this moment the president's party arrived, passed around the south side of the gallery, and entered the box. The audience rose and cheered enthusiastically. The actors paused until the president was seated, when Georgiana said, with emphasis, "Well, everybody can see that?" and Dundreary drawled, "They ought to see it, you know."

Later in the evening (my journal says "about 10.30 p. m."), while the play was progressing, a sharp, startling pistol shot rang out. Booth suddenly slid down from the box on to the stage, dragging the flag decorations with him, made some exclamation I did not understand, rushed diagonally across the stage and disappeared. He did not make a clear jump from the box; he did not face the audience brandishing a knife; he made no heroic or dramatic declaration. His whole demeanor was that of a cowardly, sneaking murderer making frantic endeavors to escape danger. Had Booth paused on that theatrical stage for five seconds, he would never have left it alive. Mr. Joseph B. Stewart, a tall, active, athletic man, quickly sprang on to the stage and followed Booth, scarcely ten feet behind him. The theater people swarmed upon the stage. A lady leaned over the front of

the box, crying out, "The president is shot." Several men in the gallery went at once to the door of the box, but could not get in. An officer in military uniform climbed up from the stage into the box. Laura Keane came through the gallery, with a pitcher of water, and entered the box, the door of which had been opened.

There was intense excitement in the audience, but no lack of self-control, no rush for the doors. Readiness to meet whatsoever duty the emergency demanded, vengeance for the dastardly deed, this was the dominating impulse. A few persons climbed over the seats, a few seats were broken from their places, and the people slowly left the building. Within ten minutes after the shot was fired Mr. Lincoln was carried down the stairs, and Mrs. Lincoln, supported by a gentleman on either side, passed out. I remained in the building while this was taking place. When I left a mass of people filled Tenth street. I hastened through the crowds and ran to the military telegraph office, in the war department. The persons I met on the way seemed not to have heard of the tragedy. A report of the assassination and of the attack on secretary Seward had reached the telegraph office, but no particulars were learned until a little later. At the request of manager Bates, I explained what I had seen. Upon hearing the account, Mr. Bates exclaimed, "Oh! that good man ought not to die." No hope for Lincoln's recovery was felt at any time.

A full force of telegraphers spent the night in the office, sending out frequent reports of the condition of the dying president, and in transacting the urgent business required to meet the crisis. I left the office at eight o'clock Saturday morning, the fifteenth, and while walking along G street, between Thirteenth and Fourteenth streets, almost in front of Epiphany Church, met a small squad of cavalry, accompanied by a few military officers and civilians on foot, escorting the body of the president to the White House. The removal was being made quietly and evidently with a desire to avoid public notice. The morning was cloudy, chill and dreary; overwhelming sorrow oppressed the city; mourning emblems were being generally displayed.

(To be Continued.)

Hard Times and Business.

Mr. W. T. Salisbury, manager for the Postal Telegraph-Cable Company of Texas, at Ardmore, Okla., is full of western enthusiasm and optimism. In a recent communication he writes:

"Referring to 'hard times' occasioned by the European war, really we had almost forgotten this dispute, except through reading press reports endeavoring to line-up statements in an effort to figure out a decisive result. Ere long the crisis will come and those unfortunate peoples will return to the pursuit of peace and happiness, and then we peace-loving Americans will be called upon to provide for their rehabilitation from factory and farm, redounding in the greatest prosperity yet recorded. In the meantime we should patiently adjust ourselves for permanency and be prepared to start the wheels of commerce.

"Thirty years ago, when a youngster, I remember hearing grandmother's advice as to saving for 'hard times.' Surely that must be dead by now. In this progressive age we have come in contact with depressive conditions and occasionally we hear of a pessimist who talks 'hard times.' But it is a vision; it is a lack of confidence among ourselves; there is urgent need of co-operation in commercialism. Happily the people are learning to take a more liberal view, with the right man in the right place, and that is what large industries seek now.

"If business is quiet, then the newspaper man has the best of the argument, because the liberal use of printers' ink is more of an asset. I believe everyone is better trimmed for more hustling when he sees receipts falling off than when the rush is on.

"Editors and the telegraph fraternity should not elbow with these pessimist expounders: we will all get by. Johnny Jones says, 'Work like h— 'n advertise.' Let's jump into one of these twelve cylinder landmarines and go after business?"

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(1) Q.—What does sectional area of a wire mean?

A.—The sectional area means the area of one end of a wire which, of course, is usually round. It is found by multiplying the square of the diameter of the wire by 0.7854.

(2) Q.—What qualifications should an automatic department attendant possess, and why?—H. H. S.

A.—As this is a broad subject, those who have had practical experience are invited to submit answers to our correspondent's question.

(3) Q.—Is there any way that I can arrange a telephone so it can be heard in a noisy situation?—R. F. C.

A.—This has been accomplished in one instance by removing the two gongs and attaching a strip of copper to the clapper insulating it from the same. To this strip one leg of a 110-volt lighting circuit was attached; the other leg was attached through a lamp to two contacts screwed to the door of the telephone box, one on each side of the clapper. When the telephone rings the clapper makes contact with the two contacts, causing the lamp to flicker, thus attracting attention.

WOMEN RESERVES IN ENGLAND.—Among the great activities in England, as a result of the war, is the organizing of women volunteer reserves. The women are taught signaling, dispatch riding, telegraphy, motor driving, camp cooking, etc.

Mr. Richard O'Brien, now retired, formerly assistant superintendent of the Western Union Telegraph Company at Scranton, Pa., in remitting to cover his subscription for another year, writes: "I cannot do without TELEGRAPH AND TELEPHONE AGE and I would not if I could."

Some Reminiscences of 195 Broadway.

Mr. Charles M. Holmes, for many years the executive messenger of the Western Union Telegraph Company at 195 Broadway, New York, was recently interviewed by the publisher of this paper in regard to the exacting duties which he was called upon to perform at times in his relations with the presidents of this great corporation. It was his business to meet every caller and announce them to the president if he thought their business was of sufficient importance to warrant an interview. Of course, he was familiar with a large army of callers who had the privilege of entering the president's office unannounced.

Mr. Holmes, who retired from active service five years ago, is considerable of a humorist, enjoys a joke and can tell a good story. In reply to our request for some reminiscences he gives the following:

My recollection of Wm. Orton is of a large, square-shouldered man, with large head, a sad face, and big, bulging eyes. He was very exclusive, and his officers were not permitted to enter his office until duly announced.

At the time the Western Union Company formally took possession of the building at 195 Broadway, electrical matters, such as call systems and telephones, were very crude. Mr. Orton had a system of electrical calls reaching to the various offices, by which he could call any office in the building. These electrical calls were attached to a bank of keys placed on the president's desk, by means of which he called the heads of the various departments. John Van Horne, a vice-president of the company, a man of over six feet, and very thin, was a great favorite with Mr. Orton and had entree to his office. One day he went into the president's office and leaned over, with arms outspread, on the desk, right over the bank of keys, which had been covered by papers placed there by the president. A few moments later Mr. A. B. Cornell, one of the vice-presidents, came into the ante-room, and said that Mr. Orton had called him. When I went in to announce him, Mr. Orton said: "I did not call him." I returned to the ante-room and told Mr. Cornell that Mr. Orton had not called him. General Ansell Stager then entered and also said Mr. Orton had called him, but when I announced him Mr. Orton said, "I did not ring for him." Just then he looked up and saw Mr. Van Horne with his arms on the bank of keys, and said, "John, you are calling the heads of all the departments; here, get up."

One day, a big, stout fellow, measuring six feet, and built in proportion, came up to the president's office. I halted him and asked who he wished to see. He replied, "I want to see Mr. Orton." I sized him up and concluded in my mind that Mr. Orton did not want to see him. I told the man that Mr. Orton was not in his office, although he was. The man then asked what time he would be in. I informed him that Mr. Orton was a very busy man and hard to interview. He then departed and I thought no more of him. In a few days the big fellow came back and said, in reply to my question, that he wanted to see Mr. Orton. I

asked, "What do you want to see Mr. Orton about?" He replied, "I want to kill him." He said this in an offhand way which caused me to look at him, and I thought he was really insane, so I said to him, "You can't kill him to-day."

"Why can't I kill him to-day?" he asked. "Because he is not here to-day," I replied.

I asked the man why he wanted to kill Mr. Orton, and he replied, "I live on Harlem Flats, at Ninety-second Street and Second Avenue, where I own a house, and Mr. Orton has run a telegraph wire over my house and the electricity drops off the wire down into my chimney and disturbs me so I can't sleep." I told him to come in the next day and I would see if Mr. Orton would grant him an interview. In the meantime, I reported the matter to Mr. J. C. Hinchman, general superintendent, and asked him what I should do. He told me to go around to the police station and report it and ask them to send a plain-clothes man, which was done. When the stranger came the following day the plain-clothes man was seated in the hallway. I gave him a signal, and he came up and said, "I'll show you the way to Mr. Orton's office," and escorted the man to the station house, where he was found to be insane and was afterwards sent to an asylum.

Dr. Norvin Green was a typical southern gentleman, and most of his callers were southerners, such as governors, congressmen, senators, generals and leading business men of the South. There were, however, some callers who rarely got into his office. I refer to the southern "colonels," the friends who had seen better days and who, knowing Dr. Green's custom of leaving the office at 4:20 p. m. and going to the Astor House, would meet him en route, knowing they were sure of their "mint julep." One day an angular spinster approached the president's office and asked to see him. I inquired as to her business with him. She fidgeted around and did not look very pleasant, so I tried to make it more plain to her and said, "You must tell me the nature of your business with Dr. Green." She thereupon screamed at the top of her voice, "I want you to understand when I ask to see the physician I don't want to see the druggist." Her screams brought the clerks from nearly every office on the floor, thinking a crime was being perpetrated. She was finally pacified and conducted to the street. I never saw her again.

Dr. Green was an inveterate smoker, and the result was a great many cigar dealers called at the office, with samples, to get his trade. I, of course, held them up, and many, in trying to get an interview with him, bribed me with an offer of cigars of all qualities of tobacco, so I was kept pretty well supplied with smokes.

General T. T. Eckert was also a large, powerfully built man, with a large head, large features, large hands and feet; a fine-looking man, with courtly manners, invariably tipping his hat and smiling affably at the lady receivers in the business office of the company, and he always removed his hat if a lady entered the elevator. He was extraordinarily strong. He could bend an iron bar as if

it were lead. His hobby was horses, and he had a number of them. He was a graceful rider and won several ribbons at the horse show, both for his horses and his graceful riding.

Colonel R. C. Clowry, fourth president, who succeeded General Thomas T. Eckert as president, was also a large man—a westerner—having his share of good looks, and laughing eyes. He was a wit and a good story teller. Many times as we sat together while he signed certificates and bonds, he would indulge in reminiscences and often ask me questions relative to my own life. On one occasion he asked me how long I had been with the company and under whom I had served. I replied, "Please follow me closely and note the titles. I first served 'Mr.' Orton; secondly, 'Dr.' Green; thirdly, 'General' Eckert, and am now serving 'Colonel' Clowry." He looked at me a minute and said, "I don't quite understand." I then repeated, "Mr." Orton, "Doctor" Green, "General" Eckert, "Colonel" Clowry, and added I have been to the top and am now going down on the other side. "I don't know who I may serve next, whether a 'major' or 'captain,'" at which sally Colonel Clowry laughed heartily.

One day a big, fine-looking, well-dressed man, his face beaming with smiles, walked into the ante-room, took a turn around the room and said, "Well, how is my old friend 'Mr.' Clowry." "Mr. Clowry," I replied, "is quite well." Now, I knew when he asked for "Mr." Clowry he had no acquaintance with "Colonel" Clowry, so I concluded that he was an agent, promoter or solicitor. When he handed me his card and I told him "Mr." Clowry was not in, I was afraid the Colonel would come out before the man left, but I took the chance. He then asked when Mr. Clowry would be back. I told him it was impossible to say. He said he would wait awhile. Just then the Colonel came out, took a side glance at the man and walked on. The man asked me if that was "Mr." Clowry. I replied that he was one of the officers of the company. In a short time the man left.

On one occasion, during the summer season, when the executive committee met at noon, I was expected to furnish large palm-leaf fans, so that the members could keep cool during the business meeting. Mr. Russell Sage, who was a member of the committee, one day started away from the meeting with a fan in his hand. Colonel Clowry noticed this and called my attention to it and told me to secure the fan from Mr. Sage. Going down the hall to meet that gentleman, I told him that the fan was the company's property and that I would take care of it until the next meeting, when he would find it again at his chair. Mr. Sage protested, saying, "No, no." He would take it with him. Colonel Clowry, in the meantime, was standing in the doorway, out of sight, enjoying the scene. I finally had to take the fan away from Mr. Sage by force, much to the enjoyment of several on-lookers.

George B. Prescott, the noted electrical engineer of the company, when it first moved into the 195 Broadway building, displayed his electrical knowledge to superintendent A. S. Brown one day by

pulling out his watch and trying to make a comparison of his time with the electric indicator alongside of the elevator. "It is very strange," he remarked to Mr. Brown, "that clock only seems to have one hand." After Mr. Brown got through laughing, he reminded Mr. Prescott that the device was an electric indicator for the elevator and not a clock.

One day, the exact wording of a quotation from the Bible was disputed in the executive office, and I was instructed to find a Bible to settle the matter. I first consulted James D. Reid, and he apologized for not having a Bible in his department. I then began at the operating room and searched every department, office and desk, down to the ground floor, but there was not a copy of the Bible to be found in the structure.

When James D. Reid was appointed United States Consul at Dunfermline, Scotland, President Norvin Green loaned his office to Mr. Reid for an afternoon to bid the lady employes of the company goodbye. Mr. Reid had forgotten that at the farewell meeting to Professor Morse, at the Academy of Music a few years before, that he had been delegated to respond for the ladies in his speech to the inventor of the telegraph. After closing his address, he saluted Professor Morse with a kiss, and then turning to the ladies, said: "You ladies can return that kiss to me at your leisure." The older members of the staff, remembering this incident, passed the word around that as each female employe shook hands with Mr. Reid, she should kiss him. The result was Mr. Reid was kissed between six and seven hundred times. During this osculatory ceremony Dr. Green several times reminded Mr. Reid that he would gladly act as his substitute for awhile if he was getting tired.

On several occasions, operators made their appearance in the ante-room in a more or less intoxicated condition. Their conscience evidently troubled them. They stated that they realized their shortcomings and they desired to see the president to apologize for being in the building in such a condition. I assured them that the president would overlook their indiscretion, but not to let it occur again. Most of them went away very happy, thinking that the president had forgiven them.

While filling the position of doorkeeper, I met many distinguished people, including Grand Duke Alexis, Count Boni and other members of royalty, senators, congressmen, governors, generals and many of the great men of the country, men of money, science, literature, arts and artists, cranks, fanatics and lunatics of both sexes. Sometimes I had a hard task to get rid of them.

One day, a man with a small package called at the office, looked furtively around, laid his hat on the floor and asked in a low tone, "Are you the head man here?" I replied, "No, I guess I am the foot man," putting my foot out as I spoke. He then said, still in a low voice, "Are we alone?" I replied, "Well, the porter is not a great way off," to let him know that I was not unguarded. "I am a Fenian," he said, "and I have a scheme to blow England out of the water." Uncovering his pack-

age, he said, "This is my invention." I saw at a glance that it was only a piece of old wire that had been dipped in tar. He said the scheme was to get four or five American men-o'-war, and have them anchor off England. "These ships are to have very powerful electrical engines," he continued, "and I have invented a small boat, to be worked by clock-work. One end of these cables of mine attached to the ship's, the other end to these boats—there will be as many boats as ships—and at a given signal the ships will start their electric engines, which will go through these cables of mine, and propel the boats to the shores of England, the rudders having been fixed to steer them aright. As soon as the boats touch the land these men-of-war will turn on full power of electricity and blow England to h—l." I informed him the Western Union Telegraph Company was not in that line of business, so his invention could be of no use to it. He asked me if I knew anyone who could help him out. I told him the only one I knew was Thos. A. Edison, the great inventor. He asked where Edison lived. I told him in Llewellyn Park. Inquiring how he could get there, I told him to "take the Cortlandt Street ferry and when you get off anyone will direct you." He then carefully wrapped up his "invention" and departed, and we never saw or heard of him again.

One day a bevy of young lady students from some school, who were in town to see the sights, came to see the Western Union Telegraph building, which, at that time, was the tallest and handsomest structure in that part of town. After asking many questions about the building, I told them I would show them the board room. I arranged the chairs around the table in the same manner as when the board is in session, and pointing to the head of the table I said, "There's where the president sits; there George Gould sits, and beside him, Russell Sage. Next to him Edwin Gould and then Jacob Schiff." As I mentioned each name the girls sprang for the chairs, and one said, "I am sitting where the president sits," etc. Then they exchanged chairs, so that each could say when she returned home, "I sat in the chair of the president of the Western Union Telegraph Company," "I sat in George Gould's chair," etc. I presented each of them with a copy of the annual report, and they departed after thanking me profusely.

One morning President Green came into the office rigged out in a new suit and overcoat. He asked me how they fitted, and I said, "All right." He then pulled a watch out of the overcoat pocket and said he had bought the suit and overcoat at Carhart's, and they had given him the watch. Green trading stamps at that time had not been issued.

One day an Italian came up to the door and asked, "Are you da boss?" I said, "Yes." Putting down a bag containing some bananas and oranges, he said, "I wanta keepa da stand on the corner and you geta alla da banan and peanut for notting; alla right, boss?" I told him he must see the janitor. Up to the present I have had no free banan or peanut.

New Book.

TELEGRAPH ENGINEERING. A manual for practicing telegraph engineers and engineering students. By Erich Haussman. 406 pages; 192 illustrations. New York: D. Van Nostrand Company. Price, \$3.00.

This book, as stated in the preface, is intended for electrical engineering students and as a reference book for practicing telegraph and telephone engineers and for others engaged in the arts of electrical communication. It presents, in a logical manner, the subject of modern overland and submarine telegraphy from an engineering viewpoint, its theoretical and practical aspects being correlated.

No attempt is made to describe all telegraphic devices and to explain their operation, but rather to consider one or more representative types for the accomplishment of the various desired objects, thus permitting a presentation of the subject-matter in proper perspective. It is a very comprehensive work, its eleven chapters covering the following subjects: 1—simple telegraphy; 2—duplex telegraphy; 3—quadruplex telegraphy; 4—automatic telegraphy and printing; 5—telegraph office equipment and telegraph traffic; 6—miscellaneous telegraphs; 7—municipal telegraphs; 8—railway signal systems; 9—telegraph lines and cables; 10—theory of current propagation in line conductors; 11—submarine telegraphy. The appendix contains various mathematical tables.

The whole subject is dealt with in a very thorough manner and brings the book right up to date in its descriptions. Under chapter 4, dealing with printing and automatic telegraphy, these subjects are considered: Wheatstone automatic; ticker telegraphs; Barclay page printing system; other printing telegraph systems, with brief references to the Morckum, Baudot, Hughes, Rowland, Wright, Murray, Creed, Kinsley, Buckingham, and others.

Chapter 11, dealing with submarine telegraphy, covers, among others, the following subjects: Theory of cable telegraphy, speed of signaling, Picard method of signaling, Gott method of signaling, duplex cable telegraphy, sine wave signaling, design of submarine cables, types of cable service and tariffs.

It may be said that, taken altogether, this volume is a real and valuable addition to telegraphic literature and worthy of possession by every telegraph student and engineer. The author is assistant professor of physics and electrical engineering at the Polytechnic Institute of Brooklyn and the book is the outgrowth of the course in telegraph engineering given by him for a number of years at that institution.

The illustrations are very clear and understandable, and while some higher mathematics are employed in the book, the simpler mathematics largely predominate.

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THE most extensive and only complete radio-system in North America, operating on over 1800 ships, having coast stations on the Pacific from Bering Strait to Mexico, and on the Atlantic from Labrador to the Rio Grande, connected by direct wires with Western Union land lines.

TRANS-ATLANTIC AND TRANS-PACIFIC SERVICE AT REDUCED RATES

Such messages should be marked:

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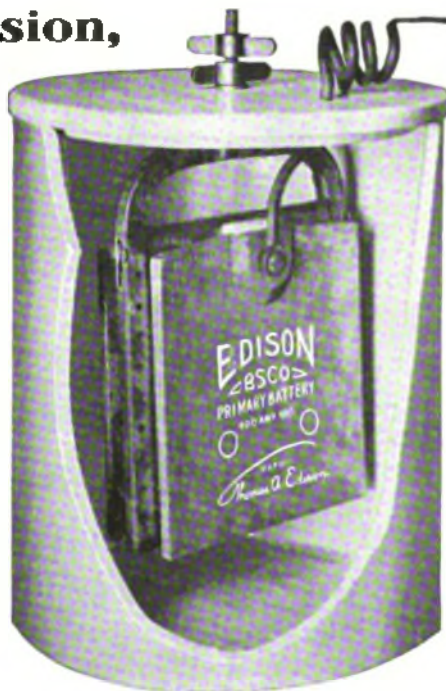
**MARCONI WIRELESS TELEGRAPH COMPANY
OF AMERICA**

42 Broad Street, New York

EDWARD J. NALLY, Vice-President and General Manager

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

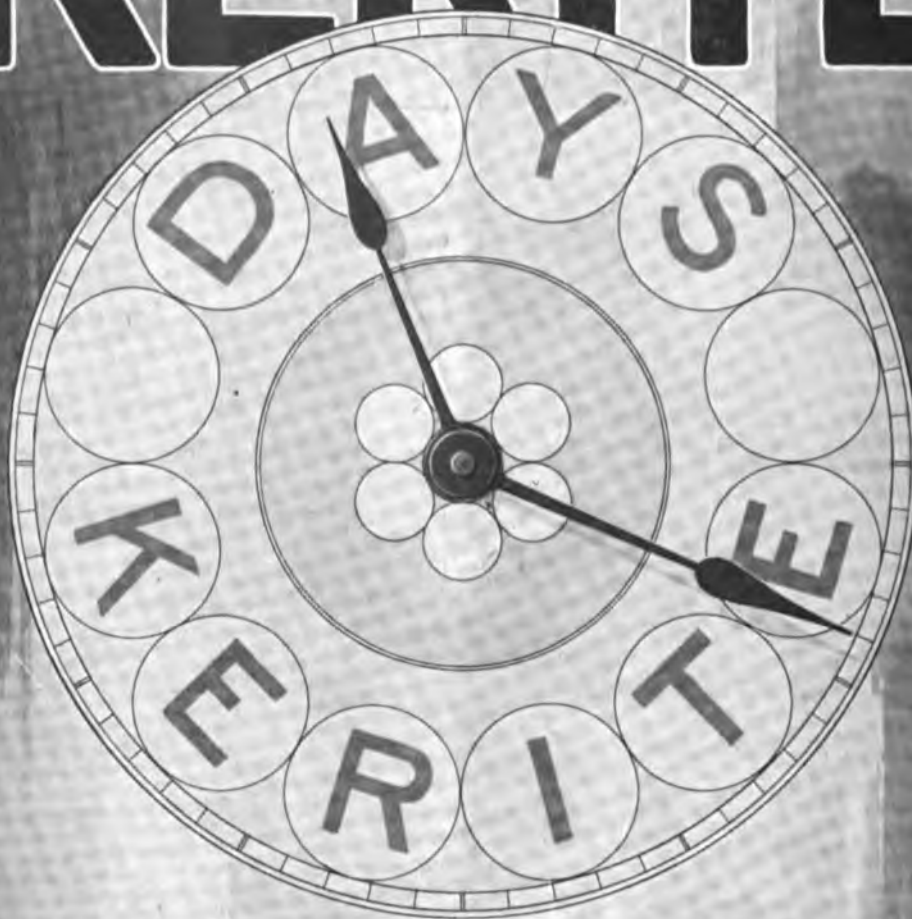
maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



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KERITE



KERITE is time-proof. Installations, of which records extend back over thirty years, show no impairment in its reliability, and no variation in efficiency

KERITE INSULATED WIRE & CABLE COMPANY

INCORPORATED IN NEW YORK

General Offices, Hudson Terminal, 30 Church St., New York. Western Office, People's Gas Building, Chicago.

THE RAILROAD.

MR. W. F. WILLIAMS, superintendent of telegraph, Seaboard Air Line, Norfolk, Va., was a recent New York visitor. He was accompanied by Mrs. Williams.

DR. F. H. MILLENER, experimental engineer, Union Pacific Railroad Company, Omaha, Neb., was married, April 8, to Miss Jessie A. Scott, of Ashland, Neb.

MR. CHARLES T. DAY, formerly superintendent of telegraph of the lines in Mexico, of the Southern Pacific System, but for the past two years located at Ashland, Ore., has been transferred to duties in the San Francisco office of the company.

WIRELESS ON THE LACKAWANNA.—The Lackawanna Railroad Company has issued a folder for public distribution, giving an account of the wireless telegraph system on its road and limited trains. Illustrations are shown of the operator's booth on the train and the method of supporting the antenna on the cars. The wireless telephone is also referred to.

THE LACKAWANNA RAILROAD'S EXHIBIT at the Frugal Fete and Fantasia, given in the ballroom of the Hotel Astor, New York, April 6, for the benefit of the New York Association for the Blind, in addition to the Phoebe Snow representation, the wireless telegraph was the chief attraction, and S O S signals sent out from the Lackawanna booth afforded the entertainers considerable amusement.

TELEGRAPH KEY HELP TO TELEPHONE TRANSMISSION.—A novel idea in combining telegraphy and telephony is shown in an invention of P. P. Banzelzer, Philadelphia, Pa. A combined telegraph key and sounder is designed for attaching to the standard of a desk telephone. The instrument is entirely mechanical in its operation and does not interfere with the telephone circuit. It is frequently difficult or impossible to transmit the voice clearly by telephone, and in such cases the clicks from a telegraph key can be distinctly transmitted and heard. The inventor claims that the instrument can be used as a supplement to the voice, especially in the case of train dispatching where the dispatchers are familiar with the Morse system of telegraphy.

CONVENTION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—Active preparations are being made by the proper committees of the Association of Railway Telegraph Superintendents for the Rochester, N. Y., convention, on June 22, 23, 24 and 25. Mr. J. F. Caskey, of the Lehigh Valley Railroad, chairman of the topics committee, has been active in securing papers for the convention, and some excellent ones will be presented. Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, New York, has promised a paper, and will probably be present at the convention himself. There is every indication that the meeting will be largely attended and a profitable one to the members. The Powers Hotel has been selected as headquarters.

Mr. F. E. Bentley, superintendent of telegraph, Terminal Railroad Association of St. Louis, St.

Louis, Mo., in remitting to cover his subscription, writes: "The enclosed check for two years' subscription is a small matter, in view of the pleasure and benefits derived."

Pole and Wire Maintenance.

In a paper on "Pole and Wire Maintenance," read by Mr. E. H. Ward, of the Western Union Telegraph Company, New York, at the meeting of the Western Division of the Association of Railway Telegraph Superintendents, in Chicago, March 17 and 18, the author stated that no matter how well they are maintained all lines are subject to more or less interruption, which may be classed under two general headings: (1), Weakness of the line itself, resulting from wear and tear, deterioration, lack of adjustment and flaws in material, and (2), Outside causes, such as floods, storms, fires and falling trees.

While interruptions cannot be entirely prevented they can be kept comparatively low by proper maintenance. Maintenance anticipates interruptions by repairing or replacing those parts that are weak from wear and tear or deterioration, before they give way. It also includes removing probable causes of outside interference by cutting trees, moving poles badly exposed to floods, and arranging for the strengthening of weak lines of other companies crossing over the telegraph line.

In maintaining lines the motto should be "maximum service at minimum cost." Interruptions should be kept as low as practicable and when they do occur, they should be cleared with all dispatch. The cost of general maintenance work and trouble clearing should be kept at the lowest reasonable figure.

Mr. Ward discussed his main subject under three headings: (1) Organization; (2) equipment and (3) maintenance work and trouble clearing. The organization consists of the working force and the supervisory force, and the supervision of the linemen should be given by a general foreman, or chief lineman, reporting to the superintendent of telegraph. He gave an outline of the work that should be performed by the linemen to correct faulty adjustments and strengthen weak parts.

In summing up his discussion Mr. Ward said: "The importance of judgment, care and thoroughness in performing or directing maintenance work cannot be emphasized too strongly. Temporary work is unsatisfactory and expensive, and should only be permitted in exceptional cases. When temporary work must be done, proper reports should be submitted and records made so that the unsatisfactory conditions will be kept in mind and removed as soon as practicable. When poles are reset care should be taken to see that they are located in proper line and set to full depth. Guys added should be given the required lead; trees trimmed should be 'rounded up' and all such points should be watched if line maintenance is to be handled satisfactorily."

In concluding, Mr. Ward called attention to the fact that successful line maintenance involves close and constant attention to details. This attention is necessary on the part of the supervising force as well as the working force.

The Ownership of Wireless Equipment.

(Continued from page 180.)

Then it was noted that the defendant steamship company by law was "not bound to have wireless apparatus on its ships; it wants that apparatus for its own safety and profit, and I cannot say, and indeed do not think, that a hundred dollars a month is too much to pay for a device without which it is matter of common knowledge that the insurance premiums on a large and laden vessel would be greater by more than the amount of complainant's fees."

These pointed remarks from so high an authority cover a side of the question to which intending purchasers seldom give the proper reflection. Marconi created wireless and a wireless system; the company which bears his name is the rightful recipient of reward acknowledged by the courts and the people. With the Marconi rental charges upheld as reasonable the steamship owner is confronted with a question of ethics which is aside from the discussion of theoretical and actual profits obtaining by his outright purchase of infringing equipment. American men may have the bargaining faculty highly developed, but there are few that care to lend their names to a commercial transaction which might bring them in line for a bench denunciation as co-operators in questionable business practice.

Dollar and cents considerations are not the only ones in the subject under review, however. The humanitarian aspects of wireless telegraphy are deserving of mention in their very tangible relation to an art which echoes the modern commercial slogan: "safety first."

As an aid to navigation wireless has become indispensable, as a means for saving life and heavy salvage charges its performances are monumentally noteworthy. So many and so familiar to all are the striking instances that bear out this statement, the only mention that need be made in this connection is of the significant fact that wireless—Marconi wireless—has never failed. The apparatus has always been reliable, the men dependable.

Marconi men have never failed.

There is a world of meaning in that five-word sentence. Appreciation of the wireless operator's devotion to duty has been recorded graphically in many great ocean tragedies, but the records of those silent heroes who continuously rise to emergencies and are overlooked because a mishap has a successful outcome only serve to accentuate the universal readiness of every man in the service. What is known among operators as the Marconi Tradition was created and exists in preparedness. Thorough training is another benefit accruing from a rental policy.

Individual ownership of equipment would not permit the proper preparation of men to man the wireless keys. Key manipulation proficiency and mechanical training which might be acquired in general educational institutions could not include the thorough drilling in procedure for all contingencies and the exhaustive study of telegraphic duties and ship's discipline which is made a special feature at the Marconi school. With the constant change in regulations and new conditions arising in a transi-

tory art, the proper training can only be secured through instructors of wire experience and in immediate touch with the practical developments which determine these changed conditions.

Of equal importance with the initial preparation is the system of distributing new regulations and operating information to those in active service. The Marconi Company distributes hundreds of new orders in the course of a year and thus covers an important detail through which the individual owner avoids the possibility of costly violations and is assured of uniform and efficient service.

Granting that the individual owner might have in his employ an official with the proper experience to determine the fitness of operators it is at once apparent that a cursory investigation and a license secured through more or less stereotyped examinations is not so reliable a guide as the long period of observation while the applicant is attending the Marconi school. Nor could the necessary reserve of available operators be otherwise maintained without considerable added expense to the individual owner.

The landline telegraph operator may be recruited from any class or age since the primary requirement is speed and accuracy in disposing of messages; a boy on a farm may by code practice alone acquire equal dexterity with the student in a telegraph school. In wireless telegraphy, however, the skilful key manipulator is far from being an efficient operator. Knowledge of his apparatus, the circuits and the elementary principles of electricity are required by law and employer. Where preparation requires constructive study it is safe to assume that imagination will be aroused, and with it, ambition. It is true that there are operators attracted to wireless service solely by the romance of the sea, and these are the ones that make a reserve supply a daily necessity, but the steady plodder toward the definite goal of ambition is representative of the majority and to this class must be credited the efficiency essential to the industry. The individual owner of equipment could not hold out the inducements that the worthy material find in an organization like the Marconi Company. The ultimate reward in the service of the shipowner would be employment as expert operator, for although executive positions might be won later in the steamship offices, wireless operating efficiency would not be the determining factor. In the Marconi service the operator has ever before him opportunities to qualify for promotion to positions of manager of a shore station, chief operator, inspector, engineer, traffic official or division superintendent. That the men filling these positions to-day have come up from the ranks in a few years serves to spur the operator's ambition and increase his efficiency.

To secure the same efficiency without these future prospects it is at once evident that the individual owner would have to establish initial salary compensation at a material advance, and this of course means added expense.

The operator problem is a tremendously vital one in wireless service and finds its logical solution in organization based upon long experience.

(To be Continued.)

MUNICIPAL ELECTRICIANS.

THE ANNUAL CONVENTION of the International Association of Municipal Electricians will be held at Cincinnati, Ohio, August 24 to 27, inclusive. The headquarters will be at the Gibson Hotel. Mr. Clarence R. George, Houston, Tex., is secretary.

MR. M. J. PELLENZ has been appointed superintendent of the fire alarm and telegraph system at Syracuse, N. Y., vice E. Shannon, who resigned some time ago.

OBITUARY.

E. D. LOCKLIN, aged thirty years, assistant New York district manager of the National District Telegraph Company, died March 24.

SIR JOHN HENNIKER HEATON, the well-known advocate of the English penny telegram and penny-a-word cablegram, died in Geneva, Switzerland, recently.

CHARLES I. JONES, aged eighty-three years, for over forty-five years a telegraph operator on the staff of the *New York Herald*, New York, but for the past twenty years identified with the advertising department of that publication, died at New Canaan, Conn., March 24. He is survived by his wife. Mr. Jones was pensioned by the *Herald* some time ago.

JONATHAN W. AYDON, aged sixty-four years, an old-time telegrapher, and for forty years train dispatcher and chief train dispatcher of the Pennsylvania Railroad Company, and superintendent of the fire and police telegraph system at Wilmington, Del., but for the past few years a publicity man of the Pennsylvania Railroad Company at the same point, died on April 12 from the effect of a stroke of apoplexy.

INDUSTRIAL.

Stentor Company in New Quarters.

The Stentor Electric Manufacturing Company, Inc., which has occupied considerable space at 1700 Broadway, New York, for the past two years, has found it necessary to adequately take care of its growing business to move to more spacious and better appointed quarters at 126 Fifth avenue, corner of Eighteenth street. The present location affords ample space for further development. At the same time a more convenient and more centrally located building has been secured to meet the demands of this growing industry.

The Stentor Electric Manufacturing Company, Inc., manufactures the well-known loud-speaking telephone, which is finding a ready market among various industries. Its use for telephone train dispatching purposes is well known. Many of the equipments are now in regular service on various railroad systems. Each equipment gives satisfaction, and new fields for this useful device are being found in other industries. The future outlook for the company is very encouraging.

Western Electric Exhibit at San Francisco Exposition.

A gigantic desk telephone, fifteen times the size of the standard instrument, is the central figure of

the Western Electric exhibit at the Panama-Pacific International Exposition, at San Francisco.

The booth covers a floor area of 3,000 square feet and is of striking architecture. Among the features of the exhibit are large reproductions of the eastern and western hemispheres, on which the forty-nine principal cities in which the company maintains offices, are marked with miniature electric lamps, which flash every few seconds. The display includes standard articles and specialties produced by the company, including telephone apparatus for dispatching railway trains, the loud-speaking telephone equipment recently perfected by the company being practically demonstrated. Eight of these instruments are installed.

THE CENTRAL RAILROAD OF NEW JERSEY has just finished the installation of telephone train dispatching circuits between Jersey City and Perth Amboy, N. J., and train dispatching and message circuits between Jersey City and Phillipsburg and Lake Hopatcong, N. J., using Gill selectors and telephone arms furnished by the Hall Switch and Signal Company.

THE SAN FRANCISCO TOURNAMENT.—The telegraph tournament, which is to take place at the San Francisco exposition, on May 27, 28 and 29, will be held on schedule time and those who intend to participate are requested to report to the tournament committee at San Francisco. The Panama-Pacific Exposition has proven to be a great success and because of this it has kept each member of the committee having the telegraph tournament in charge extremely busy. The details incident to the successful carrying out of the tournament will not in any manner be neglected. On the contrary, every committee having duties to perform in connection with the tournament will faithfully carry them out. Mr. E. Cox, 1002 Postal Telegraph Building, San Francisco, Cal., is secretary of the tournament association.

New York Telegraphers' Aid Society.

At the annual election of the New York Telegraphers' Aid Society, held at 24 Walker street, March 30, the following officers were elected for the year 1915-1916: Arthur M. Lewis, president; William E. Rath, vice-president; Thomas M. Brennan, treasurer; C. A. Kilfoyle, financial secretary; Mary E. Saunders, recording secretary.

The following were elected to serve on the executive committee for three years: James V. Riddick, Howard Tepe, James J. McSwyny and Herman T. Marks.

At the annual meeting of the society, March 31, the proposed amendment, reducing the sick benefits from eight to seven dollars per week, was adopted.

The annual statement of the society for the year ended March 6, 1915, is as follows:

Balance on hand March 6, 1914	\$25,951.54
Receipts	6,500.59
Total	\$32,452.13

Disbursements:	
Sick Benefits	\$4,290.85
Death Benefits	1,300.00
Expenses	771.40
Balance on hand March 6, 1915	26,049.88
Total	\$32,452.13
RELIEF FUND.	
Balance on hand March 6, 1914	\$6,487.67
Receipts	712.33
Total	\$7,200.00
Disbursements	\$1,065.56
Balance on hand March 6, 1915	6,134.44
Total	\$7,200.00

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. M. S. Polak has been appointed all-night chief operator of the main operating room, vice T. J. Tobin, assigned to other duties. Mr. Tobin had occupied the position of all-night chief operator for forty-two years.

Mr. M. S. Polak, who has just been appointed late night chief operator at the main operating room, 24 Walker street, New York, was born in New York City, March 30, 1867, and entered the telegraph service September 1, 1884. Prior to his appointment he successively filled the positions of traffic chief, division traffic chief and senior supervisor. Mr. Polak is a graduate physician, and his entire life has been spent in New York.

Miss A. Ossenfort, of the main operating department, at 24 Walker street, punched 154 messages in one hour recently and Miss S. Snyder, 145.

NEW YORK POSTAL.

James McGowan, aged sixty-three years, a line-man of this company for the past twenty years, died in Brooklyn, April 7.

PHILADELPHIA POSTAL.

Messrs. Edward Reynolds, vice-president and general manager; M. M. Davis, electrical engineer; J. P. O'Donohue, division electrical engineer, and H. W. Hetzel, traveling auditor, all of New York, were among recent visitors to our new quarters in the Finance Building, which are rapidly nearing completion under the efficient guidance of Mr. D. H. Gage, jr., of the electrical engineer's staff of New York.

CHICAGO WESTERN UNION.

F. L. Donaldson died at his home, on April 5, of

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.

heart failure. Interment was at Wabash, Ind., the home town of the deceased. Mr. Donaldson had been in the service at the Chicago office since 1883, acting in the capacity of "loop chief" since about 1889. His long record of efficient service and his most admirable and genial personality causes his death to be felt keenly by all his associates. Mrs. Donaldson, who survives him, has been assistant time-keeper in the Chicago office for some years.

Mrs. L. E. Finan, wife of assistant night chief operator Finan, died April 6. The remains were taken to Fort Wayne, Ind., for burial.

BOSTON WESTERN UNION.

Assistant wire chief J. J. Mullen is in Bangor, Me., on company business.

Mr. R. Fischacker is on a six months' leave of absence, filling in at Curtis and Sangers'.

Mr. H. J. Finn, one of the best-known telegraphers in the East, has accepted a position with Sanger and Jackson, brokers, being relieved on the Chicago night-letter wire by B. Drew. Mr. F. V. Miret relieves Mr. Drew at the weather bureau nights.

Mrs. E. P. Angel, wife of traffic supervisor Angel, of the North Sydney, N. S., cable station, died in Sydney, February 2, leaving four children, the youngest of whom was three weeks old. Interment took place in Sydney.

The eight-hour day for all female employes has proven a help to the extra list men as well as to those who received the reduction in hours, the extra men being required earlier in the evening.

A son was born to Mr. W. I. McFatter of the main office on April 10. Congratulations.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Day Street, (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 20 to 25, Full Grade, \$1.25; Half Grade, 63c. 25 to 30, Full Grade, \$1.50; Half Grade, 75c. 30 to 35, Full Grade, \$1.75; Half Grade, 87c. 35 to 40, Full Grade, \$2.00; Half Grade, \$1.00. 40 to 45, Full Grade, \$2.25; Half Grade, \$1.12. 45 to 50, Full Grade, \$2.50; Half Grade, \$1.25. 50 to 55, Full Grade, \$2.75; Half Grade, \$1.37. 55 to 60, Full Grade, \$3.00; Half Grade, \$1.50. 60 to 65, Full Grade, \$3.25; Half Grade, \$1.62. 65 to 70, Full Grade, \$3.50; Half Grade, \$1.75. 70 to 75, Full Grade, \$3.75; Half Grade, \$1.87. 75 to 80, Full Grade, \$4.00; Half Grade, \$2.00. 80 to 85, Full Grade, \$4.25; Half Grade, \$2.12. 85 to 90, Full Grade, \$4.50; Half Grade, \$2.25. 90 to 95, Full Grade, \$4.75; Half Grade, \$2.37. 95 to 100, Full Grade, \$5.00; Half Grade, \$2.50.

M. J. O'LEARY, Sec'y, P. O. Box 810, NEW YORK.

Telegraph and Telephone Age

No. 9.

NEW YORK, MAY 1, 1915.

Thirty-third Year.

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The Western Union "Quadruple Duplex," or Octuplex.

(Concluded from page 173, April 10)

The motors used to drive the distributors are of the well-known phonic wheel type, and are driven by impulses from an electrically-driven tuning fork. This assures a very constant rate of vibration, since the rate of a tuning fork is very constant, varying only about 1/100 of 1 per cent per degree Centigrade, and is little affected by changes in the voltage applied to the driving magnet. The mechanical corrector which is mounted between the distributor and the motor is the mechanism which is arranged to mechanically step back the brushes when they have advanced too far, as already explained. The speed of the motor is determined by the rate of vibration of the fork. Large changes in the rate of vibration of the fork are accomplished by adding weights to the two prongs, a set of weights being provided with each fork. Small changes in the speed of the motor (a fraction of a revolution per minute) are obtained by turning the handle at the front of the fork, which, by means of gears and a screw, moves the small fork forward or backward.

PERFORATOR.

Fig. 1 [see April 1 issue] shows the keyboard perforator. This piece of apparatus has a keyboard similar to a standard typewriter. The stroke of the keys is short, so that it can be operated without fatigue. The selecting mechanism consists of five horizontal bars placed beneath the keys, and so arranged that each key, when depressed, will engage one or more of the various bars and depress them by the movement of the key. The depression of

these bars selects the punches in the punch-head. After the selection of the punches is made, a common contact is closed which operates the perforating magnet. The tape is perforated crosswise, instead of lengthwise, thereby effecting a considerable saving in the amount of tape. This is illustrated by Fig. 12, in which the part at the top represents the piece of tape required for transmitting the words "London, New York, Paris." One-half the tape shown in the lower part is the tape required to send the same words by the Wheatstone. The two pieces represent the amount of paper used by a printing telegraph system, which utilizes the Continental Morse code. One tape is required for transmission, and the other is prepared by a receiving perforator and is then fed into a printing machine, which translates it and prints in on a tape. From this it will be appreciated that the economy in tape is a feature of some consideration. A ratchet mechanism, the purpose of which is to indicate to the operator the number of letters that have been punched on one line, is operated one tooth for each operation of the punching mechanism. It carries a pointer across

FIG. 12.—ILLUSTRATION SHOWING ECONOMY IN TAPE.

a graduated scale, and is returned to normal at any time the carriage return key is depressed. A lamp signal is also provided which warns the operator that she is nearing the end of a line. This perforator is extremely fast, and on test has perforated correctly up to a speed of ninety-two words per minute, which was the limiting speed of the operator.

TRANSMITTER.

Fig. 2 [see April 1 issue] shows the transmitter with tape inserted. At each revolution of the distributor the tape is stepped one step to the left. This is accomplished by means of a pulse of current from a segment in the local ring of Fig. 4, as has already been described. The location of this segment is such that the stepping of the tape takes place shortly after the transmission from the fifth segment of the distributor, so that the tape can be moved forward and a new combination set up on the levers before the brush is ready to transmit another signal from this particular quadrant. Five fingers are raised which, if they find holes in the tape, move upwards and operate levers which correspond to those shown in Figs. 9 and 10, thus setting up in one quadrant or one group of five segments the necessary combination for a given signal. The transmitter is provided with two switches for control by the operator. The upper switch which has two positions, "start" and "stop," is used when it is desired to insert a new tape, or when it is desired to stop the trans-

mitter. In the start position the tape is moved forward one step per revolution, as described. In the stop position, the fingers which feel out the holes in the tape are all held down, thus connecting only spacing battery to the five segments connected to this transmitter. The switch in the base, which has two positions, "on" and "off," opens and closes the circuit of the stepping magnet. If in the "off" position, the tape will therefore not be stepped forward, but the signal which happens to be in the transmitter will be repeated once for each revolution of the distributor, because the operation of this switch does not draw down the fingers which feel out the holes in the tape, as does the operation of the other switch. This is sometimes desirable for testing purposes. Normally, this switch is left in the "on" position. This method is adopted with the various pieces of apparatus so that a piece of apparatus can be readily removed if suspected of being faulty, and replaced by one which is known to be in working order.

PRINTER.

The printer is shown in Fig. 4. [See April 1 issue.] In front of the printer proper is a box containing the relays and resistances essential to the operation of the printer. A bell is also provided which responds to a predetermined signal sent over the line, this signal being the signal for "J" preceded by a figure shift signal. Alongside of this box on the printer frame are two push buttons, one marked "CR" and the other "LF." By operating these push buttons, the operator can return the carriage or cause the paper to be moved upward. This is frequently desirable, particularly in starting up after an interruption, in preparing the printer for a new message. "CR" indicates carriage return, and "LF" line feed. The printer and the relay box are two separate units, and are connected to the table wiring through spring clips similar to that shown on the transmitter. The relay box is removed by pulling forward, and the printer by sliding backward. The printer is arranged to print the message in column form on paper $8\frac{1}{2}$ inches wide. Fig. 5 [April 1 issue] shows the form of message and style of characters. Paper is supplied to the machine from a roll mounted on the back and so arranged that it can be readily replaced by an operator standing in front of the table. Just above the window of the printer is a cutting edge which permits a message to be torn off as soon as completed. The machine is of the type in which the paper moves and the type wheel is stationary, except for its rotary movement, in order to bring the desired letter opposite the paper. The type wheel is mounted on a vertical shaft which is driven by a spring, kept under the desired torque by a small motor and dynamometer. The type shaft is released after the letter has been selected, and revolves until it strikes a stop thrown up in its path. The position of the stop is determined by the letter selected, and brings the desired letter in front of the paper. As soon as the type wheel is stopped, the paper is forced against the type wheel by a printing magnet, and the letter is printed. The wheel is inked by two felt rollers which have been saturated with ink, and which are held against the type wheel. The selection of stops is obtained mechanically by

the use of five discs. The position of each disc is determined by an electromagnet which is under control of one of the relays connected to the receiving segments. For each combination of relays selected, there is a corresponding movement of the discs, which permits the required stop to be moved into such a position as to stop the type wheel in the proper position.

AUTOMATIC CONTROL.

Fig. 13 shows a piece of apparatus known as the automatic control. The function of this instrument is to stop the transmitter in case the operator is unable to keep up with the pace set by the distributor. If the perforating operator should stop, the transmitter will continue until the slack in the tape is used up and the tension of the tape lifts the lever of the automatic control. This automatically stops the transmitter, and the transmitter continues to transmit only spacing current, which has no effect on the



FIG. 13.—AUTOMATIC CONTROL.

distant printer. As soon as the operator begins perforating, the lever arm is dropped and the transmitter continues from the point of the interruption. Thus, the message at the distant end is not mutilated. The automatic control has one other important feature; namely, it enables the receiving operator to send bell signals over the line. This is accomplished by an escapement mechanism which drives cams, causing certain spring combinations to be made in sequence. For example, to ring the bell once at the distant end, the operator will insert a finger in the hole marked "Start" and pull down until the finger engages the stop, and then release. In returning to the normal position the cams will be rotated and the required contacts made to give the bell at the distant end one stroke. In doing this, the transmitter is automatically stopped and started, thus causing no mutilation of the message which is being transmitted. If it is desired to ring the bell twice at the distant end, indicating to the operator that the tape should be rerun, the operator will insert the finger in the second hole marked "Rerun," pull the lever down to the stop and release as before, and so on. Thus signals of one, two, three, four or five bells can be automatically transmitted over the line without mutilating the message which is being transmitted. The automatic control is also arranged with the clip connections, so that it can be readily removed.

Fig. 14 shows a complete multiplex table equipment. On the left is the printer with its relay box.

in the center the transmitter and automatic control, and at the right the keyboard perforator. Beneath the table at the left a metal terminal box contains fuses and in it all the connections are made between the table and the distributor.

Figs. 15 and 16 illustrate the flexibility of the sys-

tems sent on transmitter T_1 , are received on printer P_1 , and so on. For example, in diagram 1 of Fig. 15 is shown a system working between cities A, B and C. The line transmission between A and B is a quadruple duplex, likewise between B and C. The following channels are available, each capable of

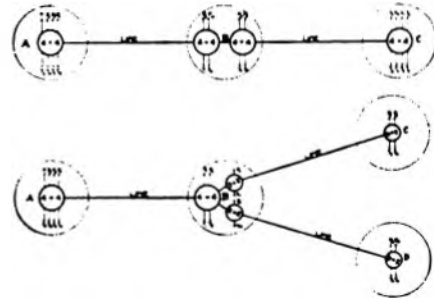


FIG. 15.—DIAGRAM SHOWING FLEXIBILITY OF SYSTEM

carrying traffic at, roughly, forty-five words per minute:

- Between A and B, 4 channels, 2 in each direction
- Between A and C, 4 channels, 2 in each direction
- Between B and C, 4 channels, 2 in each direction

In diagram 2 of Fig. 15 is shown a modification in which the cities A and B are connected by a quadruple duplex, B and C by a double duplex, and

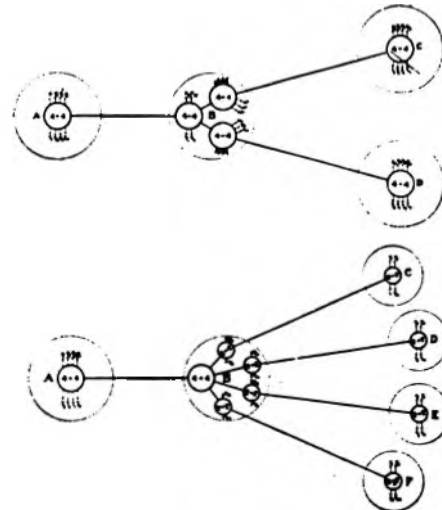


FIG. 16.—DIAGRAM SHOWING VARIOUS CHANNELS OF COMMUNICATION.

B and D by a double duplex. This system affords the following channels:

- Between A and B, 4 channels, 2 in each direction
- Between A and C, 2 channels, 1 in each direction
- Between A and D, 2 channels, 1 in each direction
- Between B and C, 2 channels, 1 in each direction
- Between B and D, 2 channels, 1 in each direction

In diagram 1 of Fig. 16 is shown a system connecting four cities, A, B, C and D, which affords the following channels of communication:

- Between A and B, 4 channels, 2 in each direction
- Between A and C, 2 channels, 1 in each direction
- Between A and D, 2 channels, 1 in each direction
- Between B and C, 6 channels, 3 in each direction
- Between B and D, 6 channels, 3 in each direction



FIG. 14.—COMPLETE MULTIPLEX TABLE EQUIPMENT.

tem. In these figures T_1 , T_2 , T_3 , etc., represent tape transmitters, each of which is fed with tape from a keyboard perforator, and P_1 , P_2 , P_3 , etc., represent receiving printers or, if desired, reperforators. In any case, it is understood that a message sent on transmitter T_1 is received on printer P_1 ; that mes-

Diagram 2 of Fig. 16 shows a modification of the system connecting cities A, B, C, D, E and F. This arrangement affords the following channels for traffic:

- Between A and C, 2 channels, 1 in each direction
- Between A and D, 2 channels, 1 in each direction
- Between A and E, 2 channels, 1 in each direction
- Between A and F, 2 channels, 1 in each direction
- Between B and C, 2 channels, 1 in each direction
- Between B and D, 2 channels, 1 in each direction
- Between B and E, 2 channels, 1 in each direction
- Between B and F, 2 channels, 1 in each direction

Whether or not any of these modifications will ever be installed exactly as described is problematical, but they are all possible, and serve to show the inherent flexibility of the system. The practicability of the system has been proven by tests of the quadruple duplex by the Western Union Telegraph Company. This equipment has been in operation for more than a year. The results of this and other less extended tests indicate that the system is thoroughly practical, and is well past the experimental stage.

The multiplex principle of Baudot, and the five unit code used by him over thirty years ago is the foundation of the system. It remained for Donald Murray, who had previously developed a high-speed system, using the Baudot five-unit code, to see and appreciate the inherent advantages of the Baudot multiplex principle. This he incorporated in the Murray multiplex, which included machine sending and column printing. Thus we see that the system described, although novel in many respects, is not altogether an innovation, but is rather the realization and working out of old principles which have been tried and proven.

Telegraph and Telephone Patents.

ISSUED APRIL 6.

- 1,134,236. Microphone. To H. E. Shreeve, Milburn, N. J.
- 1,134,282. Telephone Key. To G. E. Mueller, Aurora, Ill.
- 1,134,308. Telephone-Exchange System. To J. L. Wright, Washington, D. C.
- 1,134,933. Telephone Switching Apparatus. To B. D. Willis, Chicago, Ill.
- 1,134,978. Semi-Automatic Telephone-Exchange Trunking System. To E. A. Mellinger, Chicago, Ill.

ISSUED APRIL 13.

- 1,135,011. Telephone System and Apparatus. To C. L. Goodrum, Rochester, N. Y.
- 1,135,121. Telephone Exchange. To F. A. Lundquist, Chicago, Ill.
- 1,135,321. Selective Electrical Signaling. To L. M. Potts, Baltimore, Md.
- 1,135,322. Transmitting Apparatus for Electrical Signaling. To L. M. Potts, Baltimore, Md.
- 1,135,344. Printing-Telegraph Alphabet. To C. G. Ashley, Chicago, Ill.
- 1,135,393. Transmitter for Wiring Telegrams and the Like. To A. Rappenecker, Bremen, Germany.
- 1,135,436. Telephonograph. To E. Chabeault, Marseilles, France.

- 1,135,487. Signaling System. To E. E. Backus, Chicago, Ill.
- 1,135,604. Process and Apparatus for Determining the Position of Radio-Telegraphic Receivers. To A. Meissner, Berlin, Germany.
- 1,135,613. System of Operating Typewriters and the Like. To L. M. Potts, Baltimore, Md.
- 1,135,614. Telegraphy. To L. M. Potts, Baltimore, Md.
- 1,135,643. Party-Line Telephone Systems. To H. D. Willis, Chicago, Ill.
- 1,135,654. Intercommunicating Trunk Line Telephone System. To R. M. Beard, New York.
- 1,135,686. Thermo Telephone. To B. Gwozd, Berlin, Germany.
- 1,135,687. Thermic Telephone. To B. Gwozd, Berlin, Germany.
- 1,135,920. Selective Electrical Signaling. To L. M. Potts, Baltimore, Md.
- 1,135,971. Telephone-Call Recorder. To D. J. McGauran, Geraldton, Western Australia, Australia.
- 1,3901 (reissue). Automatic Telephone System. To F. Newforth, jr., Chicago, Ill.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on April 28:

American Telephone and Telegraph Co.	121 $\frac{1}{4}$
Mackay Companies	80
Mackay Company, preferred	68
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2 $\frac{3}{4}$
Western Union Telegraph Co.	68 $\frac{1}{2}$

This publication is prepared to purchase for its clients one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends which in many cases will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.

TELEGRAPHING WITH CANNON.—When the first boat completed the passage of the Erie Canal in 1825 the fact was announced all along the route by the firing of cannon placed within hearing distance of one another. It required fifty-eight minutes to transmit the signals from Albany to New York and back again.

PERSONAL.

MR. G. H. CORSE, JR., an old-time telegrapher who has represented railroad interests at Yokohama, Japan, for several years past, has taken up his residence in San Francisco, Cal.

MR. E. H. HOGSHEAD, the veteran telegrapher, of Meridian, Miss., has been selected as lay commissioner to the General Assembly of the Presbyterian Church which meets at Rochester, N. Y., May 20. Mr. Hogshead is well known throughout the country to telegraph people as a writer of unusual ability.

MISS LUCILLE COLLETTE, daughter of Mr. N. T. Collette, an old-time telegrapher, now residing in Seattle, Wash., is the subject of an extensive write-up, illustrated with a photograph, in the New York daily papers, dated Sunday, April 18. Her success as a violin soloist has been unprecedented in New York. She has been fulfilling daily engagements during the entire season. Miss Collette is soloist for almost all of the principal clubs in New York, which is an honor rarely ever granted an artist. She has just returned from fulfilling an engagement in Montreal, where she scored a great success. Miss Collette is accompanied by her mother.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. W. I. CAPEN, vice-president, is absent on a business trip through the middle west.

MR. J. McMILLAN, manager Canadian Pacific Railway Company's Telegraph, Montreal, Que., was an executive office visitor on April 23 and 24.

MR. DONALD McNICOL of the electrical engineer's staff, New York, has returned from a trip through New York state on company business.

APPOINTMENTS.—MR. W. W. MORRISON, manager at Oklahoma City, Okla., has been appointed manager of the St. Louis, Mo., office, vice W. S. Daniel, who has become chief clerk to superintendent S. H. Mudge at Chicago. C. F. Crittenden, manager at St. Joseph, Mo., has been transferred to Oklahoma City as manager, vice Mr. Morrison; S. I. Reed, has been appointed manager at North Adams, Mass.; B. E. Palmer, at Lawrence, Mass.; Frank Ellis, at Chicopee Falls, Mass.

MRS. LILLIAN M. K. HAWES, manager of a Postal branch office in Jacksonville, Fla., has inherited a half interest in a valuable estate. Mrs. Hawes is at the present time in New York on business connected with the transfer of the property, after which she will return to Jacksonville and resume her duties in the telegraph office for a few months, when she will resign from the service.

NEW OFFICE.—A thoroughly modern office was opened by this company at 8 Fulton street, New York, April 25.

MONKEY ON WIRES.—A monkey which escaped from a house in Union Hill, N. J., took refuge among the telegraph wires. The fire department was called out to secure the animal, which they did by shaking him off the wires.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

MR. G. D. PERRY, general manager, Great North Western Telegraph Company, Toronto, Ont., was a recent executive office visitor.

MR. D. C. DAWSON, district traffic superintendent, St. John, N. B., retired on a pension on May 1, after nearly fifty years service.

MR. F. G. JONES, for many years identified with the Jacksonville, Fla., force, who recently underwent a fourth operation for hernia at Philadelphia, has returned to duty much improved in health.

MR. C. O. FULLER has been appointed manager at Santa Fe, New Mex., to succeed F. V. Nash.

MR. J. R. BRADER, cashier at Utica, N. Y., has been appointed manager at Easton, Pa., vice F. H. Cooley who becomes manager at Allentown, Pa., to succeed H. L. Hilton, resigned to engage in other business.

MR. GUY EMPIE, former manager at Orlando, Fla., has been transferred to Tampa as manager, succeeding Mr. F. G. Warde, resigned.

MR. S. R. CRISMAN, South Whitley, Ind., has been appointed manager at North Manchester, Ind., vice Mrs. F. W. Cunningham, resigned.

WALTER W. MURPHY, aged thirty years, manager of the Athens, Ga., office, died at Atlanta, Ga., April 22, after a brief illness. Mr. Murphy was formerly manager at Savannah, Ga.

MR. F. B. STERLING, assistant superintendent of building, 16 Dey street, New York, fell down the elevator shaft, from the first floor to the bottom of the pit, a distance of forty feet, on April 25, sustaining serious injuries. Mr. Sterling was taken to the hospital, where he is at present doing as well as could be expected.

SAVINGS FUND.—The employees of the traffic department at Minneapolis, Minn., have organized "The Minneapolis Western Union Christmas Fund, No. 1," for the primary purpose of encouraging thrift among its members. Mr. R. H. Hanson is president, J. E. Sterling, vice-president, and S. G. Dostaler, secretary-treasurer.

DAVID B. MITCHELL, aged sixty-six years, former manager of the race department at 195 Broadway, New York, died at his home in New Rochelle, N. Y., April 27. Mr. Mitchell was born in Scotland and settled in Canada in early youth. He began his telegraph career with the Montreal Telegraph Company in 1865 and came to New York for the Western Union Telegraph Company in 1873, and with the exception of a few months remained in the service of that company until his retirement a few years ago. Mr. Mitchell was one of the most expert telegraphers of his time and was a very capable official. He was one of the best-known men in the service and had a wide circle of friends. He was a former president of the Serial Building Loan and Savings Institution and conducted its affairs with marked ability and success.

BOWLING NEWS.—The inter-department bowling contest initiated by the treasurer's and commercial general manager's office teams on March 5, re-

sulted in the holding of an informal tournament in which teams of the division auditor, traffic, plant and accounting departments, in addition to the two first-mentioned, participated. The commercial and plant teams each won four and lost one set of games, the former losing to the plant and the latter to the accounting. Wm. Kampf, captain of the accounting team, made high score of the tournament, with 254, while the commercial team's score of 958 was easily the best individual game of the series. It is the intention to organize a league early next season among the various departments and conduct a formal tournament, the winning team to play matches by telegraph with the winners of the tournaments conducted at division headquarters points.

C. P. Pollak, General Superintendent, American District Telegraph Company, New York.

Mr. Charles Pope Pollak, whose appointment as general superintendent of the American District Telegraph Company, with headquarters at New York, was announced in our issue of April 16, is a native of St. Louis, Mo., where he was born on August 27, 1866. He entered the service of the American District Telegraph Company in New York, October, 1912, as superintendent of the Eastern Division, and held that position at the time of his advancement to the post of general superintendent. Mr. Pollak's territory is east of Chicago, including Memphis, Tenn., and New Orleans, La.

American District Telegraph Changes.

Mr. Joseph Maxwell, district superintendent, New York, has been appointed superintendent of the Eastern Division, with headquarters in New York, vice Charles P. Pollak, advanced to the position of general superintendent.

Mr. J. J. Kelley, manager of the Pittsburgh office of this company, has been appointed district superintendent of the National District Telegraph Company, New York, vice Joseph Maxwell, promoted.

Mr. H. A. Manshardt has been appointed manager of the American District Telegraph Company at Pittsburgh, Pa., vice J. J. Kelley, promoted.

Mr. O. H. Smith, manager of the Baltimore, Md., office, has been advanced to the position of district superintendent of the same interests, with headquarters at Boston, vice J. R. Kearns, promoted to be superintendent at Chicago, vice R. C. Baker, appointed general superintendent at that point.

Mr. H. C. Munchausen has been appointed manager of the Baltimore, Md., office, vice Mr. O. H. Smith, promoted and transferred to Boston.

Mr. George T. Edgar has been appointed manager of the American District Telegraph Co. of Cleveland Co., at Cleveland, Ohio, vice Mr. Isaac Morris, retired.

The American District Telegraph Company of New Jersey reports for the calendar year 1914

gross income amounting to \$2,517,682, which compares with \$2,391,818 earned in the previous year. Operating expenses, depreciation, etc., increased \$74,284, to \$1,808,729; dividend disbursements at the annual rate of 4 per cent were \$398,562.

How the Willard-Johnson Fight Reports Were Handled.

The Western Union Telegraph Company made a friendly invasion of Cuba on the occasion of the Willard-Johnson contest, held in Havana, April 5.

Manager E. F. Varona and his chiefs, Messrs. Peters and Carey, were assisted by J. J. Welch, traffic engineer, New York; J. Lister and A. F. Fiske, of the New York Central Cable Office; J. M. Fletcher, Richard Jones, R. D. Guinn, H. D. Turner, of Atlanta, Ga.; W. C. Fain and K. L. Nevin, of Jacksonville, Fla. Ten additional operators were also assigned to the Key West, Fla., office, where a portion of the press matter and cable business was relayed. Division traffic supervisor J. W. Ware and division wire chief McDowell were in charge of the traffic and apparatus at that point.

On account of the meagre facilities available it was necessary to undertake feats never before tried in the handling of such events. One of them was to transmit over one circuit (submarine cable Havana to Key West and land line north) three separate and distinct descriptions of the contest, round by round. Mr. J. Lister was the operator picked to transmit the matter at Havana and Mr. J. Kearney to receive it in the Central Cable Office, New York. The continental alphabet was used, and it was speeded along by a free use of Phillips' code.

The matter filed by the three press associations was rotated so each would have an equal number of "firsts." There was not a delay or mishap during the contest, and Messrs. Lister and Kearney were the recipients of many well-deserved compliments. Twice during the contest Mr. Lister was waiting for copy and impatient to be "off." He was less than a full round behind when the winner was flashed. The file of specials was much heavier than was anticipated, but there were no delays. Each correspondent in Havana was complimented by his paper or association on the manner in which he covered the contest, and also on the manner in which it had been received.

The press association matter handled on the first cable circuit was distributed by the Central Cable Office under the supervision of superintendent W. A. McAllister to the press associations on direct pony circuits. The flash of the winner was transmitted simultaneously on all circuits by Havana, Central Cable Office and Key West.

The Western Union is fortunate in having a gentleman of Mr. Varona's type as its Cuban manager. He and his staff are to be congratulated on the manner in which the entire traffic was handled. The 40,000 words of newspaper matter was forwarded without delay and the regular cable traffic moved with its accustomed speed.

THE CABLE.

MR. JOHN H. SMART, formerly superintendent of the Commercial Cable Company, New York, for the past ten years a resident of Cape Cod, Mass., was in the city last week visiting friends. Mr. Smart retired from active service on account of eye trouble.

CABLE FROM SCOTLAND TO RUSSIA.—The British Government has just laid a cable from the northern part of Scotland to Russia. The work was done by the cable steamer "Colonia" and finished in eleven days. Twenty expert cable operators have been sent to Russia and the cable is now in full operation. The length of the cable is approximately 1,500 miles.

NEW CABLE STATION AT ROCKAWAY.—Ground has been broken for the new cable station of the Western Union Telegraph Company at Hammill's, Rockaway, Long Island.

RAPID CABLE CUTTING.—The postmaster-general of England stated recently that within four hours of the outbreak of the war, every German cable that ran from Germany westward or eastward under the sea had been severed.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to April 28, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Paramaribo and Cayenne, April 17.

CANADIAN NOTES.

THE BUSY TIMES.—The Great North Western Telegraph Company is publishing, for the promotion of its service, a sheet, entitled "*The Busy Times*." The April 10 issue contains some helpful articles for the improvement of the service, one, entitled "Look After the Details," by Mr. C. E. Davies, electrical engineer of the company at Toronto, being especially timely. "*The Busy Times*" is published at the company's headquarters in Toronto, and is printed on pink paper.

How Promotions Are Made on the Canadian Pacific Railway.

"In any organization so large as that of the Canadian Pacific Railway, where, under normal conditions, over 100,000 employes are on the pay-roll," says the *Montreal Gazette*, "one great problem is that of keeping the employes, so to speak, dynamic, part of a living organization and not of a mere machine. Zeal and ambition must be kept burning. Just as every soldier of Napoleon carried a field marshal's baton in his knapsack, so every office boy in the Canadian Pacific Railway must feel he is a possible president, not merely earning his dollar a day till pension day. One system introduced on the Western division with this in mind has proved exceedingly efficient. Each superintendent or foreman or head of a department makes two reports a year on his staff. Bright men are

thus earmarked for special promotion. If any man is criticized the report is shown to him and initialled by him before it goes to Winnipeg. He gets a square deal, and if he has any life in him he mends his ways, so that no such criticism can be made twice. Then, again, there are independent scouts, looking for bright men, the tidy station agent, the courteous trainman, the man cool in an emergency, the inventive mechanic, the stenographer who can run the office when the chief is absent. These scouts are searching for merit only, not for faults.

"Over the whole system of the Canadian Pacific Railway ideas and suggestions made by employes are not only welcomed, but lead to promotion. They go to the record office, where a statement of the employe's career is attached to the suggestion before it is considered by a committee. If the idea is adopted, the record of the employe's career is then before the eyes of the powers that be, and recognition is sure to follow. The needle in the haystack is easy enough to find with a magnet, and there are a dozen magnets looking out for merit among the 100,000 employes of the Canadian Pacific Railway."

Great North Western Telegraph Traffic Conference.

On Good Friday, April 2, a general meeting of the Great North Western traffic department was held at Toronto. In addition to chief operators, wire and traffic chiefs from Montreal, Toronto, Winnipeg, Ottawa, Quebec, Hamilton and London, the following officials were present: Geo. D. Perry, general manager; A. C. McConnell, secretary and auditor; S. B. McMichael, general manager, Dominion Messenger and Signal Company; W. J. Duckworth, plant superintendent; Chas. E. Davies, traffic superintendent; Geo. Watt, superintendent of supplies; R. H. Hathaway, superintendent of reports; L. S. Humes, superintendent, second district; W. G. Barber, superintendent, third district; A. R. Bodell, commercial supervisor; C. W. Dawzy, inspector; F. McTaggart, inspector; F. Timms, plant superintendent, Dominion Messenger and Signal Company; G. Hogarth, local manager, Toronto, and C. E. Lillie, office manager, Toronto. Altogether, there were thirty-seven officials present and the entire day was spent in listening to short talks from the officials in the morning, and after partaking of an excellent luncheon at the Albany Club, a general discussion of matters relative to the improvement of the Great North Western service followed. A new slogan was adopted, it having been decided by the commercial representatives to refer to the new Great North Western crest as the "Sign of Service." The traffic men have decided to co-operate in every way to make this a reality, not only in name but also in point of fact.

THE TELEPHONE.

DR. ALEXANDER GRAHAM BELL, Thomas A. Watson, Dr. Bell's associate in the original telephone work, John J. Carty, chief engineer of the American Telephone and Telegraph Company, and Dr. M. I. Pupin, inventor of the loading coil, were elected honorary members of the New York Elec-

trical Society at the meeting on April 14. Mr. Watson gave a lecture entitled, "The Birth and Babyhood of the Telephone."

MR. THEO. N. VAIL, president of the American Telephone and Telegraph Company, has returned to his office after several months of rest in the south. He is in excellent health.

MR. FRANK R. STARKEY, superintendent of installation and maintenance of the New England Telephone and Telegraph Company, Boston, Mass., was a recent New York business visitor. Mr. Starkey is an old-time telegrapher, and called on several New York friends of his telegraph days.

MR. DANIEL R. GIBBS, district Morse supervisor of the American Telephone and Telegraph Company, Philadelphia, Pa., who was retired in December, 1914, was recently presented by his numerous friends and associates in the service with an autograph album, some choice tobacco for his pipe and \$60 in gold, as a token of the esteem in which he was held. The album contained many appropriate verses and tributes to Mr. Gibbs. The book was sent as far south as Atlanta and as far west as Kansas City for signatures of those who wished to testify in writing to their respect for that gentleman.

TELEPHONE AND TELEGRAPH BILL DEFEATED.—The Foley bill to place all telephone and telegraph companies in the state under the jurisdiction of the New York Public Service Commission, Second District, was defeated in the state senate April 20.

ALBANY TELEPHONE BUILDING.—We have received a set of four postal cards from Mr. W. B. Eddy, special agent, New York Telephone Company, Albany, N. Y., showing different views of the Bell Telephone Building in that city.

WOMEN NIGHT TELEPHONE OPERATORS IN LONDON.—Women telephone operators in London have been pressed into night duty owing to the large number of male operators who have enlisted for war service. The women work from 8 p. m. to 8 a. m. four nights a week.

Telephone Earnings.

The American Telephone and Telegraph Company reports total earnings for the three months ending March 31, \$11,504,494.04, compared with \$11,564,003.35 for the same period of 1914; expenses, \$1,317,798.18, compared with \$1,330,572.12, leaving net earnings \$10,276,195.86 and \$10,233,431.23. After deducting interest and dividends the balance is \$1,431,330.18, compared with \$1,202,211.83 in 1914. The earnings reports of the Bell Telephone System in the United States for the months ending February 28 shows gross earnings \$37,732,280, as compared with \$36,476,470 for the corresponding period of 1914; expenses, \$27,347,613, as compared with \$26,660,337; net earnings, \$10,384,667, compared with \$9,807,133; surplus, after deducting interest and dividends, \$1,688,312, compared with \$1,756,989 in 1914.

Newspaper Men at Banquet Talk Over New York-San Francisco Line.

At the annual dinner of the American Newspaper Publishers' Association, held at the Waldorf-

Astoria, New York, in the evening of April 22, the principal feature was the connection with San Francisco over the transcontinental telephone line. Greetings were exchanged between mayor J. P. Mitchel, of New York, and mayor James Rolph, jr., of San Francisco, and other prominent men. Solos were sung and a cornetist in San Francisco played "All Those Endearing Young Charms," every strain of which was clearly heard in New York. A receiver was placed at each of the 600 plates, so all could hear. A member of the Metropolitan Opera Company sang in New York for the San Francisco audience. Mr. H. D. Estabrook, formerly solicitor for the Western Union Telegraph Company, New York, was among the prominent guests at the banquet.

Review of Principal Articles in Contemporary Telephone Publications.

AN INTERESTING account of the use of the telephone in the Baltimore police department is given in the April number of *The Transmitter*. The telephone service of that city is highly developed and is a very important link in the police department. The article is well illustrated.

THE WESTERN ELECTRIC NEWS for April contains an interesting description of the telephone-phonograph apparatus used in connection with the small sight-seeing cars encircling the exhibit of the Panama canal, which is a feature of the San Francisco Exposition. As the cars pass around the exhibit an explanatory lecture is delivered by means of a system of telephonic and phonographic apparatus to the passengers seated upon the cars.

"THE HISTORY OF A TELEPHONE POLE" is the title of an interesting article in the April number of *Telephone News*, by Mr. R. A. Griffin. Few persons outside of the construction forces of a telephone or telegraph company have any idea as to how poles are obtained. To these in particular and everybody in general this article will be of much interest. It is well illustrated with views showing the various steps in the work of cutting and preparing poles.

TREATED AND UNTREATED TELEPHONE POLES.—The forest service of the United States Department of Agriculture, in co-operation with the American Telephone and Telegraph Company, placed a series of experimental poles in three different lines for the purpose of obtaining data on the efficiency of various preservatives and methods of treatment. The results are set forth in the report of Mr. Clyde H. Teesdale, printed in *Telephony* for April 3. The plan of the experiments and the methods of inspection are described and the conclusions reached are that good results were obtained with all preservatives except tar and creolin; that untreated poles set in crushed stone or charred at the butt showed less decay at the ground line than those set untreated in sand; that fewer removals and fewer badly decayed poles were found in portions of the lines running through swamps and wet locations than in drier situations; that brush treatment with a good preservative give an increased life to poles sufficient to pay well for the cost of treatment.

RADIO-TELEGRAPHY.

MR. WILLIAM MARCONI arrived in New York April 24 on the steamer "Lusitania" from Liverpool. He came to testify in the suit of the Marconi Wireless Telegraph Company of America against the Atlantic Communication Company. While here he will inspect the Belmar, N. J., station also the Canadian stations.

MARCONI COMPANY ELECTION.—At the annual meeting of the Marconi Wireless Telegraph Company of America, held in Jersey City, April 19, the following were elected directors for five years: John Bottomley, George S. De Sousa, and Edward L. Young. The officers elected were: President, John W. Griggs; first vice-president, W. Marconi; second vice-president and general manager, Edward J. Nally; third vice-president, secretary and treasurer, John Bottomley; assistant treasurers, George S. De Sousa and Reuben S. Harlan.

WIRELESS EQUIPMENT IN COURT.—Wireless apparatus was installed in the Federal District Court, in New York, recently to enable judge Mayer to decide a patent suit brought by Samuel L. Kintner, receiver of the National Electric Signaling Company, against the Atlantic Communication Company. The judge listened to wireless messages passing between vessels at sea and the Sayville, L. I., and Sea Girt, N. J., stations.

ENLARGING SAYVILLE RADIO STATION.—The Telefunken wireless station of the Atlantic Communication Company at Sayville, L. I., has been increased from a 35 kilowatt plant to 100 kilowatts, and three 500-foot towers are being erected. Practically the entire new plant was made in Germany, and it is thought direct communication with Nauen, Germany, can be maintained practically all the time, both day and night.

Notable Gathering at the Radio Institute Dinner.

The Institute of Radio Engineers on April 24 gave a dinner at Luchow's restaurant, New York, in honor of two of the foremost radio men in Germany—Ferdinand Braun and Johann Zenneck. These gentlemen are visiting the United States in connection with patent litigation, also with the Sayville plant, which is being enlarged.

Among those present were, besides the two guests of honor, Messrs. John Stone Stone, president of the institute, who acted as toastmaster; Nikola Tesla, prof. G. W. Pierce, of Harvard University; judge J. M. Mayer, of the United States District Court, New York, before whom the patent litigation is being tried; E. J. Nally, vice-president and general manager; G. S. De Sousa, assistant treasurer and traffic manager; D. Sarnoff, assistant traffic manager; E. B. Pillsbury, general superintendent, and Lee Lemon, superintendent, of the Marconi Wireless Telegraph Company of America, New York; Dr. Alfred N. Goldsmith, New York; Lieutenants McDowell, Mayhoad, Hill and Clark, United States Navy radio experts; Dr. K. G. Frank, New York; Dr. Lee De Forest, the well-known radio inventor and expert; R. H. Marriott, radio inspector, Seattle,

Wash.; and Fritz Lowenstein, radio expert, New York.

Addresses were made by Ferdinand Braun, Doctors L. De Forest, K. G. Frank and A. N. Goldsmith; prof. G. W. Pierce, judge J. M. Mayer and Messrs. N. Tesla, J. S. Stone and R. H. Marriott.

Dr. William Marconi, who arrived in New York Saturday morning, sent a telegram, expressing his regrets at not being able to be present on account of a previous engagement.

It was noteworthy that all of the belligerent European nations were represented at the dinner, also both sides of the patent litigation now pending in the United States District Court between the National Electric Signaling Company and the Atlantic Communication Company.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

"*The Wireless Age*" (New York) for April contains several articles of much interest, among them being: "How to Conduct a Radio Club," by E. E. Bucher (Article XII); "In and Out of the War Zone," by F. J. Doherty; "Connection to Japan Made Over Pacific," and many others of interest to the service.

THE MARCONI WIRELESS TELEPHONE is described briefly in the *Wireless Age* (New York) for April. The short distance instrument has a guaranteed working range of thirty-one miles between ships at sea. It is expected that the commercial wireless telephone will be announced within a few months. An illustration shows the apparatus.

WIRELESS IN THE ARCTICS—"What Wireless Could Do in the Arctic" is the title of an article in the April number of the *Wireless Age* (New York) giving the views and experiences of Burt M. McConnell, meteorologist of the ill-fated Stefanson expedition. Mr. McConnell thinks that wireless telegraphy could be used to good purpose by explorers in the Arctic regions in preventing loss of life and effecting rescues.

THE WIRELESS WORLD.—Among the principal articles in *The Wireless World* (London) is a personal sketch of Mr. Wm. Duddell, the well-known English electrical engineer, the only one who ever occupied the presidential chair of the Institution of Electrical Engineers for two consecutive years. The wireless station at Port of Spain, Trinidad, West Indies, is also described and illustrated, and the proposed wireless control of public clocks is set forth by Alfred E. Ball. Wireless telegraphy in the war is reviewed, and the wireless transmission of photographs is described by Marcus J. Martin. The issue also contains much other matter of a technical and personal nature.

MR. A. C. ADAMS, of the Chicago, Milwaukee and St. Paul Railroad, Milwaukee, Wis., in remitting to cover his subscription for another year, writes: "I enjoy reading the AGE and would not want to be without it."

Dinner of the Magnetic Club.

The spring dinner of the Magnetic Club of New York was held at the Broadway Central Hotel in the evening of April 15, and was well attended in spite of the feeling that the conditions resulting from the European war would deter many from participating.

The old-time good feeling which is characteristic of these meetings showed no diminution, and every one present entered into the spirit of the occasion with enthusiasm. The meeting was a success in every particular, and the programme was excellently arranged and carried out, and the dinner was satisfactory in all respects and much enjoyed. There was excellent music to enliven the occasion, and the gathering was brought to a close with a superior vaudeville entertainment. During the dinner singing was indulged in, and, as an added amusement, toy rubber balloons were freed all about the room. Fancy paper hats and caps were distributed and worn and this feature added much to the amusement of the affair. Each one was presented with a box of fine candy.

At the head table were seated many of the general officials of the Postal Telegraph-Cable Company, including Messrs. E. Reynolds, vice-president and general manager; C. P. Bruch and W. I. Capen, vice-presidents; C. F. Leonard, superintendent; M. M. Davis, electrical engineer; J. F. Skirrow, associate electrical engineer; C. E. Merritt, assistant treasurer, Commercial Cable Company; John Doran, superintendent, complaint and claim department, and E. H. Johnson, a former president of the club. These gentlemen laid aside all dignity for the time being and wore their gaudy headgear with as much enjoyment as did the rest of the members.

The only speaking was a short address by president Leonard at the conclusion of the dinner, after which the tables were cleared and the rest of the evening was given over to the enjoyment of the vaudeville programme.

Mr. Leonard emphasized the value of friendship and said that the man who thought he did not need friends was laying up for himself very unhappy old age. The Magnetic Club, he said, was a place to make friends who would stand by a man to the end.

Those present were:

Albany, N. Y.—N. C. Pangburn.

Baltimore, Md.—J. A. Vogt.

Binghamton, N. Y.—F. G. Wyman.

Boston, Mass.—C. A. Richardson.

Bridgeport, Conn.—S. H. Flint.

Buffalo, N. Y.—L. M. More, C. H. Newman, H. D. Reynolds, J. W. Sullivan.

Elmira, N. Y.—J. S. McIntire.

Jersey City, N. J.—A. C. Ackerman, F. Ackerman.

New York—J. de J. Almonte, P. M. Bachelder, J. R. Beard, M. W. Blackmar, F. J. Block, W. P. Bowman, T. A. Brennan, E. M. Brewster, C. P. Bruch, W. I. Capen, T. Cardenas, J. J. Cardona, A. H. Clarke, J. J. Cochrane, M. R. Cockey,

S. Cohen, W. Commerce, J. Costelloe, M. M. Davis, Wm. Deegan, B. J. Dixler, J. J. Donoghue, T. J. Donovan, J. Doran, T. J. Dunn, W. B. Dunn, M. Dunn, M. E. Duff, W. Finley, A. V. Finn, V. Fiora, T. E. Fleming, J. H. Flood, A. A. Fraser, J. J. Fredericks, H. G. Funk, D. H. Gage, jr., J. C. Geigle, M. F. Geigle, J. J. Ghegan, John Goldhammer, R. Gould, W. S. Hallett, L. R. Hallock, H. D. Hartman, John Henry, P. A. Hickey, T. J. Horan, E. H. Johnson, M. Jurist, A. F. Kavanaugh, W. J. Kavanaugh, L. P. Kearsley, F. G. Kernan, F. J. Kernan, M. Klepper, C. A. Lane, C. Leonard, C. F. Leonard, C. P. Linder, A. Lockwood, C. J. McCarthy, J. J. McCauley, M. A. McConnell, J. J. McDermott, C. P. McInerney, F. E. McKiernan, H. J. McNamee, A. McNeill, J. F. McNeill, D. McNicol, D. J. McQuade, D. F. Mallen, C. T. Mallette, N. A. Malpas, J. A. Manning, C. E. Merritt, J. Meyers, R. H. Miller, Wm. Mitchell, E. Moore, J. T. Needham, E. O'Brien, C. B. Obst, G. J. O'Brien, J. P. O'Donohue, M. J. O'Leary, J. G. Payne, F. Pearce, M. Pertka, H. Peters, J. A. Pinto, B. F. Poor, E. J. Rankin, W. Redleisen, D. F. Regan, E. Reynolds, L. O. Rogers, J. Russo, F. J. Sancinati, W. Scarborough, B. Schlesinger, C. C. Shelley, C. Shirley, D. Shortal, T. Singleton, J. F. Skirrow, S. Smith, H. L. Stern, E. M. Sturgis, F. Sullivan, T. R. Taltavall, E. P. Tully, E. M. Underhill, J. J. Wallace, A. Walsh, A. J. Ward, R. Wecholer, H. Weise, C. Yacht, F. Yawger, jr., F. Yawger, H. Zweifel.

Niagara Falls, N. Y.—W. J. Martan.

Philadelphia, Pa.—C. E. Bagley, R. C. McCreedy, C. T. Meyers, E. W. Miller, W. M. Phillips, J. H. Wilson.

Pittsburgh, Pa.—H. Scrivens.

Rochester, N. Y.—R. J. Little.

Syracuse, N. Y.—J. W. Weed.

Washington, D. C.—G. M. Foote.

ASSOCIATED PRESS ELECTION.—At the annual meeting of the Associated Press held in New York, April 20 and 21, officers were elected as follows: Frank B. Noyes, president; Daniel D. Moore, first vice-president; Benj. H. Anthony, second vice-president; Melville E. Stone, secretary; F. Roy Martin; assistant secretary; J. R. Youatt, treasurer. Messrs. Stone and Martin were reappointed general manager and assistant general manager, respectively.

GIRL MESSENGERS.—The experiment of employing girls as telegraph messengers in the Liverpool, England, suburban post-offices is being tried. The demand for boys greatly exceeds the supply, and the problem of Liverpool girl unemployment is acute.—*London Electrical Review.*

PUBLIC UTILITY ECONOMICS.—A series of ten lectures on public utility economics, delivered before the West Side Young Men's Christian Association, New York, has been printed in book form. The lectures cover a wide variety of subjects pertaining to public utilities.

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SOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 are for sale at the office of this journal, 253 Broadway, New York. The price is \$9.50 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 1, 1915.

STATEMENT.

Statement of the ownership, management, circulation, etc., of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th each month at New York, N. Y., for April 1, 1915, required by the Act of August 24, 1912.

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THOMAS R. TALTAVALL, Editor.

Sworn to and subscribed before me this 12th day of March, 1915.

HENRY A. VAN DER PAAUWERT,
Notary Public, Kings County, No. 29.
Certificate filed in N. Y. Co., No. 4.
(My commission expires March 31, 1915.)

Improving Business.

Notwithstanding the strain upon business in the United States in consequence of the disturbed conditions resulting from the European war, the splendid condition of the New York stock market reflects the good sense of the business community.

The stable condition of the market has undoubtedly exercised a beneficial influence among business concerns, with the result that there is a more optimistic feeling in the country than at any time during the past nine months and there is every indication that general business is improving.

The Telegraph Engineer.

It used to be the fashion a few years ago to refer to the telegraph as being incapable of further development, but we never shared that opinion. On the contrary, we have consistently held to the belief that it was just as susceptible of improvement as it ever was, and that it only required the stimulus of necessity to arouse the dormant forces to action.

In the past decade we have all witnessed great activity and many changes in the telegraph, and telegraph engineering has become a distinct and highly specialized profession. Developments have been so rapid and revolutionary that it has been quite difficult to keep pace with them and it is hardly possible now for one man to master all the details in every branch.

What has been the cause of this great awakening in telegraph engineering in late years? The answer is not far to find. It was a response to the universal demand for more efficient methods of doing business, and in order to handle the greatly increased telegraph traffic resulting therefrom the engineering departments of the telegraph companies have been called upon to provide improved means. This required a high order of technical knowledge and skill and the response to the demand for such ability has been very gratifying. Many telegraphers took up the study and have become proficient engineers and supervisors, and are now occupying positions of importance.

The new development work has been along the lines of multiplex and high speed telegraphy and some notably efficient systems have been produced. The "quadruple-duplex" system introduced by the Western Union Telegraph Company, a description of which is now running in these columns, represents the latest development in telegraphy. The comparative simplicity of the system is its most striking feature.

Another system which deserves mention in this connection and which has proved its worth in practical use is the Morkrum. This instrument is gaining rapidly in popularity and many wire-operating concerns are introducing it on their lines. It, as well as the octuplex just referred to, belongs to the printing telegraph type of apparatus, and does not require skilled labor for its operation, but for the maintenance of these systems technical knowledge and skill are required. It is at this point where unusual opportunities are offered to ambitious young men to become expert in the technical side of their vocation. These printing systems have become standard and the demand for expert help to look after them will continue to grow. The future for the telegraph engineer is therefore very assuring and the ambitious telegrapher would do well to consider this new means of attaining distinction.

How to Study.

Many people think that after they leave school their education is finished, but in this they are decidedly wrong. When one begins business life he enters another school and constantly learns something new, as time passes. To become most efficient in life we should study as earnestly in business as we did in school, but very few people do this, with the result that they fall behind in the world's progress.

The successful man is essentially a student. In studying technical subjects the matter should be read and reread until the student is sure that he understands what the author has to communicate, thus fixing it indelibly in the mind so that it can be recalled at any time.

Each time a book or a passage is read new light is added to our previous knowledge on the subject. Prominent electricians have told us that they have read certain text-books many times, and it is this fact that has enabled them to become leaders in their profession.

Mere reading is not study. There are a few persons that have the faculty of absorbing all that there is in a book in two or three readings, but they are very rare indeed. If a subject is worth studying at all it should be studied well, and not read superficially. Each reading makes a deeper impression on the mind, and if repeated often enough the impression becomes ineffaceable. Knowledge thus absorbed becomes a part of ourselves and no one can rob us of it.

English Telegraph and Telephone Finances.

An account recently issued by the post office shows that the gross revenue of the British telegraph and telephone services for the year ended March 31, 1914, was \$52,341,995, and the amount received in respect of royalties from the National Telephone Company, Ltd., and other licensees was \$238,930; while services rendered to other public departments without remuneration were valued at \$597,290. The total expenditure, including \$5,000,000 for interest and part repayment of capital in respect of the purchase of the National Telephone Company's plant, was \$49,109,890, leaving a debit balance of \$340,170.

The excess of expenditure and interest on telegraph stock over telegraph and telephone revenue for the year was \$1,668,625. The capital expended on the trunk telephone system amounted to \$36,749,815; on the exchange system and private wires, including \$53,545,000 paid to the National Telephone Company, to \$100,480,000; and on stores not allocated to \$2,500,000, making a total of \$140,730,400.

The expenditure for the year on the telegraphs was \$17,545,050, exceeding the income by \$1,953,970; including the interest on the purchase price of the telegraphs, the estimated pension liability, and provision for depreciation, the deficiency of revenue for the year was \$6,058,700.

The expenditure on the telephone service was \$16,928,980, and the revenue \$30,877,000, leaving a

balance of \$13,950,000; after deducting interest on loans, pension liability, provision for depreciation, etc., the net surplus was \$1,195,000. The working of the exchange system showed a net profit, and of the trunk system a net loss. The deficiency on the telegraphs in 1912-13 was \$5,876,735.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

Why does the collection of hydrogen gas upon the copper plate weaken the output of current?

What is the meaning of the word, "polarized," as applied to batteries?

What becomes of the oxygen gas generated in a cell of battery?

Why are dry batteries not suitable for work where a continuous current is necessary?

What type of chemical cell is best suited for telegraph work?

Do all types of battery yield the same quantity of current under equal conditions?

When a battery gives a strong current at the time the circuit is closed and the current afterwards decreases, what does it indicate?

In selecting a battery, what is the first thing to consider?

Would a battery that is suitable to work a telegraph circuit be as well adapted to supply current to operate an electric light? If not, give the reasons why.

Why does a bluestone battery yield only one-half of its current for useful work?

What is meant by the "internal resistance" of a cell?

If the zinc plate in the cell is called the positive plate, why is the copper plate also called the positive, both being a part of the same cell?

Does the current start originally from the copper pole of a battery? If not, where does it originate?

What is electromotive force?

How is the intensity of electromotive force, or electrical pressure, as it is frequently called, expressed—that is, what is the name of the unit employed to express the action?

What cells of battery possess practically unit electromotive force?

Does the size of a cell affect its electromotive force?

Explain why a small cell has as great an electromotive force as a large cell.

Is the internal resistance of a small cell any greater or less than that of a large cell? Explain the cause of the difference.

(To be Continued.)

The Telegraph Industrial Situation.

The United States Commission on Industrial Relations, which was appointed by Congress, held meetings at the Sherman Hotel, Chicago, April 12 and April 13, at which were taken the testimonies of Messrs. Newcomb Carlton and Belvidere Brooks, president and vice-president, respectively, of the Western Union Telegraph Company; E. Reynolds, vice-president and general manager, Postal Telegraph-Cable Company; Thos. M. Powers, manager, operating department, of the Postal Telegraph-Cable Company, Chicago; T. W. Carroll, division traffic superintendent, Western Union Telegraph Company, Chicago; S. J. Konenkamp, president, Commercial Telegraphers' Union; H. B. Perham, president of the Order of Railroad Telegraphers, and several operators. The proceedings were conducted by Commissioners Frank P. Walsh, chairman; A. B. Garretson, J. O'Connell, J. B. Lennon and Aishton, and the findings will be reported to congress.

Mr. Newcomb Carlton, president of the Western Union Telegraph Company, stated the total number of Western Union employes was about 40,000. With respect to dealing with the employes, he said the general plan which he had always adopted was to have an open door to all employes who have grievances. He had personally investigated and adjudicated many grievances the best he could. He estimated that sixty per cent of the cases appealed to him had been decided in favor of the employe. He did not, however, believe that this was an altogether satisfactory way to deal with employes. He believed that everything should be done to prevent a cessation of work in the telegraph service, and he believed there should be a Federal Commission that would safeguard the interests of the employes. The corporation, the public and the employes are entitled to that protection.

Mr. Carlton stated that he believed in the organization of labor and collective bargaining with a responsible organization. A representative body of the employes of the Western Union Company would certainly represent such an organization. He thought that men had been discharged from the Western Union service since he has been with the company because they were members of the telegraphers' union. The company did not approve of membership in that union. He explained later that membership in the union was not always the cause of discharge, for there were sometimes compound reasons. Some had been reinstated because of mitigating circumstances.

Asked if the company kept a blacklist and refused employment to men suspected of being members of the union, Mr. Carlton said that a record is kept of a man's general character in the service, his ability and his affiliations, but there is no blacklist per se. He stated that there was a special service for the purpose of reporting on union matters. He knew nothing personally about the stealing, in 1911, of lists of names and other documents from officers of the telegraphers' union, although he had heard something about it.

Mr. Carlton testified as to the messenger service and telegraph schools, and stated that the company

had, in the past four years, introduced a system of fighting the loan shark, which has been highly beneficial, and explained its method of operation.

A sickness benefit, pension and life insurance plan had also been instituted, which he thought was the most liberal in the United States, with the exception of that of the telephone company. He also referred to supplying operators with typewriters.

He further stated as his belief that telegraphers, in general, should make more money, and that an opportunity to do so would be found in the so-called premium plan of payment. He thought that a first-class telegrapher ought to be in a position to earn at least \$5.00 a day for a tour of nine hours.

Mr. S. J. Konenkamp, president of the Commercial Telegraphers' Union, stated that the Canadian Pacific Railway has what is known as an "Employes' Agreement" with members of the union, while the United Press and the International News Service have "union shop" agreements or contracts with the union. Referring to wages paid operators, he said they have always been on the bare line of subsistence, although the cost of living had increased. He spoke at length regarding the various "tricks" and said the tendency for the past several years had been toward establishing nine hours a day for all work.

"The constant opposition of the Western Union to unions is no surprise to us," said Mr. Konenkamp. "The company has been consistent in that for fifty years, and for thirty years the possession of a union card has been the signal for dismissal. They have employed criminal methods, or at least have turned their heads away when criminal methods were employed. Correspondence of the union was stolen from one of our men at St. Paul, and the heads of telegraphers began to fall as the result of information thus obtained concerning the organization. My own room was ransacked in St. Louis, Kansas City, Denver, and Salt Lake, and in Salt Lake they got a black-book in which I had the names of 1,700 telegraphers."

Mr. Konenkamp said that one George Converse, a former "spotter," confessed to him that he stole the book. In Chicago, on another occasion, a valise containing convention records and other important data was stolen. Three men were indicted, and one of these, he said, was now awaiting trial in Chicago. The witness said that his remedy was government protection of the right of the men to organize and to bargain collectively. He added that if the union suffered because of the personality of its leaders he would pledge that within ninety days after the Western Union had recognized the union they would all resign.

The Western Union adopted the bonus system in 1875, but abandoned it later, he said, but kept up the speed mania. Each telegraph company publishes monthly in its employes' books, speed records of individuals and the officers in the district divisions and the younger elements commit suicide in their effort to make records for these purposes. Insanity, nervous prostration and other things are the inevitable end. Of late years, he continued, the system of jollying the operators into further exer-

tion is changed to slave traffic tactics. They now demand more work; more speed.

Mr. Konenkamp described his efforts to get Mr. Theo. N. Vail, former president of the Western Union, to cease his warfare upon operators who wanted to be members of the union. Mr. Vail was very friendly and expressed sympathy for the operators, stating that the conditions under which they worked were disgraceful. He said he hoped to make conditions so good that it would not be necessary to have an organization of employees. Mr. Vail promised to take the matter up with his executive committee, but, as Mr. Carlton had stated, the executive committee dictates the policy of the company, this may have been the reason why nothing came of Mr. Vail's desire to do something for the employees. At the final conference with Mr. Vail that gentleman stated that he would like to see the men have an organization, that he believed telegraphers were unjustly treated and that there was absolutely no reason why the higher officials should not stop the persecution of employees, but he was afraid that such an organization as he would like could not be had. Mr. Konenkamp suggested that the kind of an organization he was in favor of was like Mr. Dooley's, in which "there was no dues, no benefits and damn few members." Only one thing we ask, said Mr. Konenkamp, is the right to organize. "I don't know how the employers would expect the telegraphers of the United States to create a responsible organization when, every time a man joins, even secretly, the spotters and officials proceed to crucify him."

Mr. Konenkamp stated that his organization in committing itself to the doctrine of government ownership does so with the restriction that the right to organize shall be maintained and established.

Mr. Konenkamp said that the telegraph companies maintained telegraph schools in many of the large cities, and that there was a constantly decreasing demand for telegraphers. The telegraph system in America, he said, is a great press in which the use and energy and life of thousands of men and women are coined into gold for industrial aristocrats. He insisted that the Western Union Company maintained a discharge list, notwithstanding president Carlton's statement to the contrary.

Mr. Belvidere Brooks, vice-president of the Western Union Telegraph Company, made plain his opposition to the Commercial Telegraphers' Union as at present constituted. "I will not say that we object to the present officials, but that inference may be drawn," he remarked. "Thirty years ago our company opposed the union, but just prior to 1907, when a strike was called, which cost us \$5,000,000, the union became rejuvenated, and we made no protest. Then came strike talk, and we offered arbitration. An agreement was reached, but the very next day a strike was called in San Francisco, which eventually spread all over the country. Since then we have not cared to employ men interested in the union. We cannot deal with an organization like that."

Mr. Brooks thought that competent telegraphers should receive not less than \$100 per month.

Mr. Henry Lynch, an operator from Winnipeg,

Man., stated he was discharged from the service of the Postal Company for attending a union meeting in Chicago and could not be reinstated, and although his record was clear with the Western Union he could not get employment from that company on account of his Postal record. Feeling that he was blacklisted by both companies he went to Canada. He gave the names of eighteen other operators who had been forced to leave the United States for the same reasons. He stated that the employer in Canada "is a very fair, considerate man."

Mr. Edward G. Barrett, repeater attendant at Chicago for the Western Union Company, stated that he was formerly engaged to "check up unionism"—to ascertain who were members of the union. Asked what was his conception of the organization he replied "it looks to me like the men are trying to better themselves but the company won't have it." It was his bread and butter working in line with the company in preventing men from getting it.

Mr. Edward Reynolds, vice-president and general manager, Postal Telegraph-Cable Company, stated that his company had about 15,000 employees, including messengers. Of this number, between five and six thousand were operators. He referred to the union of employees and explained its object and operation. Under its constitution, grievances are presented collectively, but since the formation of the association there never has been any dissatisfaction over the question of wages. The relations of the employees to the company are the most cordial. If a Western Union operator discharged for cause applied to his company for employment he would be employed if he was deserving and there was any work to give him. He would not be refused employment for the sole reason that he belonged to the union, but his case would be carefully considered first. The Postal Company made no objection to the union when it was formed prior to 1907, and the members were permitted to wear their buttons openly. A year prior to 1907 the union operators began to coerce and intimidate their associates, and adopted tactics which resulted in damage claims against the company and also injured the business of the public. On August 12, 1907, the men walked out without presenting any grievance or making any demands; they struck because they were ordered to do so by the union. The company is now opposed to the union because it is practically the same to-day as it was in 1907. The company now requires applicants for work to sign a pledge that they will not join any organization during the term of their service. Mr. Reynolds stated that he had never caused the discharge of a man because he was suspected of belonging to the union. He described the bonus system at length, and stated that the earning power of telegraphers is greater to-day than it was in 1907. The company does not employ special agents, and employs no method of checking up whether men are union or non-union. Increase in wages is based on the merit of the individual. Regarding the strike of 1907, Mr. Reynolds stated

he had never been able to find anyone willing to accept the responsibility for it. The interruption to business almost ruined the company.

Mr. Reynolds made a long statement, setting forth the work he had done toward uplifting the employees. "The standard of work is laid down," he said, "and any man that doesn't turn out the required quality of work doesn't have to be spied upon. He is found out anyway. A union man nearly always doesn't do it."

Refusal to affiliate with the employee's association does not prejudice a man's standing, Mr. Reynolds said. He did not agree with other witnesses that telegraphers were underpaid. The public ownership of telegraph lines, Mr. Reynolds thought, would be a very bad thing for the telegrapher, the taxpayer and the service.

Mr. T. W. Carroll, division traffic superintendent, Western Union Telegraph Company, Chicago, said that the conditions brought about by the war last year is the main thing that is responsible for so many men being out of employment in the telegraph field to-day. "We endeavored to take care of every employee we had because labor conditions in other fields were bad," he said.

To many criticisms of the company called to his attention, Mr. Carroll insisted that he wanted the commissioners or an examiner to come to the office and see for themselves. "The correspondence and the whole shop are open to you," he declared.

He added that despite the business depression of 1914, in his division alone, out of a total of 3,550, he increased 1,503 salaries and decreased only fifty-two. Forty-eight of the reductions applied to employees whose class of work was changed.

Touching the subject of overwork and "speeding up," Mr. Carroll stated that the average of all operators in the main offices of his division in the year 1914 was between 600 and 660 words an hour.

Mr. Carroll thought that the lack of employment, or full time among telegraphers was due to conditions over which neither of the two telegraph companies had control. The main problem his company had was to take care of the telegraphers by giving some of them part time. There are a great many more telegraphers on the labor market to-day than there is work for them to do. He gave the number of men carried in various cities more than the load calls for. Many of them, he said, could be dropped without affecting the service. Many of them had their own homes, and the only thing to do was to take care of them. "If a man is anxious to work and the work is not there he is naturally going to be dissatisfied," Mr. Carroll said.

Mr. B. F. Shrimpton, of the New York Local, asserted that a spy system of the Western Union made men in that office afraid to be seen talking to a union man, much less to join the union. Men in that office, he stated, were dissatisfied with conditions, but afraid to protest. He said the only remedy for conditions was to protect the men in the right to organize.

Mr. W. T. Russell, a Postal operator at Chicago, stated that there was much dissatisfaction over wages and the "hounding" of the men to speed up.

"There are 300 men in the Chicago office, and I don't believe that you can find two of them who are satisfied," he said.

Mr. Thomas N. Powers, manager of the operating department of the Postal Telegraph-Cable Company, Chicago, gave the ratings and records of various operators in his department, which showed that the highest salary paid is \$95 per month and the lowest \$40. A telegrapher known to be a member of the Commercial Telegraphers' Union would not be given employment in the office. No men have been discharged and substituted by women. Women receive the same wages as do men if they work the same circuits. He stated that the men who had testified in contradiction to Mr. Reynolds' testimony did not tell the truth.

Mr. H. B. Perham, president of the Order of Railway Telegraphers, stated, in reference to the strike of 1907, that the men in San Francisco had no opportunity of knowing the facts in relation to the agreement that had been reached with the Western Union Company, because it was within twenty-four hours of the strike coming on that the agreement was made. The agreement was made in Washington and the strike started in San Francisco. Mr. S. J. Small was then president of the Union. Mr. Perham stated that his organization is on a formative plane, and is not yet perfect. Ninety-five per cent of the railroads in the United States, he said, were "scheduled," that is, had contracts with the employees.

Mr. Perham said that about 43,000 of the 53,000 railroad telegraphers were organized. It was his understanding that the present executive of the Commercial Telegraphers' Union used his entire influence in opposition to the strike of 1907 and that he was elected to office later on the basis of that opposition. He believed that if there had been four days more in which to inform the men in San Francisco as to what took place in the Washington negotiations the strike would not have occurred. The men who went on strike were raw recruits and had not learned how the union transacted business. They were not safe until they learned that. The strike spread from town to town until it involved the entire country. He believed the men in Chicago and New York knew that an agreement had been reached with the company, but their grievances were of such a character that no man in the world could have prevented them from striking. It started as a "flash in the pan." His experience is that to get the men organized and put under control is one of the best methods of bringing industrial peace, and there can be no peace for the commercial telegraph companies until they recognize the union of employees and do business as other people do it.

Testimony was also given by Mr. C. H. McElreath, of Detroit, Mich., representing the executive board of the Commercial Telegraphers' Union of America; S. P. Aubrey, C. E. Emerson, T. L. Yarrington and D. F. Rogers, Postal operators in Chicago; Percy Thomas, past-president, Commercial Telegraphers' Union, and Wesley Russell, secretary of the union. The five Postal operators contradicted many of Mr. Reynolds' statements.

The Assassination of President Lincoln, as Told by Eight Survivors of the United States Military Telegraph Corps.

(Continued from page 188, April 10)

ACCOUNT OF THOMAS AUSTIN LAIRD, WAR DEPARTMENT TELEGRAPH STAFF, 1865, NOW OF BUFFALO, N. Y.

After dinner on April 14, 1865, while on Pennsylvania avenue, walking towards the Capitol, I met a friend who invited me to go to Ford's theater with him.

We took seats in the fourth row from the stage to the right of the orchestra leader, about fifteen feet from president Lincoln's box.

The theater was packed, it being a "gala night," because of the presence of the presidential party, General Grant having also been expected. "Our American Cousin" was played, Laura Keane taking the part of Florence Trenchard. The first act was about half over when the president's party arrived, and the audience cheered enthusiastically until after the party were seated, when the play was resumed. We had a full view of the box and its occupants. Major Rathbone and Miss Harris sat in front and the President and Mrs. Lincoln were further back.

In the third act Madame Mountchessington (Mrs. D. Kelly) left the stage in a huff, saying to Asa Trenchard (Harry Hawk), "You don't understand the manners of good society. That alone can excuse the impertinence of which you are guilty."

Trenchard: "I guess I know enough to turn you inside out!" The audience clapped hands and cheered.

Just then we heard a footstep in the passage back of the president's box, and very soon thereafter a pistol shot and a man appeared at the front of the box and leaped over the railing, pushing aside the American flags that draped it, and with one foot on the outer ledge swung himself outward and dropped to the stage. His spur caught in one of the flags and he fell to the stage, but recovered himself and flourished a dagger. Stepping backwards and holding his dagger above his head, he uttered the words, "Sic Semper Tyrannis." He then worked his way to the right entrance and out to the alley in the rear of the theater. I, and others near me, recognized John Wilkes Booth as he fell on the stage. To me he was no stranger, for I had seen him riding a bay horse that very afternoon down Pennsylvania avenue. I had often seen him in Cincinnati, where he played "Petruchio" and "Ingomar" at Wood's theater. While he was making his way out of the theater it appeared that somebody was helping him, by the way in which the scenery was withdrawn out of his path. The time was a few minutes after ten o'clock.

Most of the audience rose to its feet, many shouting. "Catch him." "He has shot the president." "Cut his heart out." But no one molested the assassin and he escaped.

A woman near me had fainted at her escort's feet. I helped to place her in a chair. Many others were in a hysterical condition. I lost my companion in the excitement. The noise was awful, the tumult

and shrieks continued. Miss Keane stepped to the front of the stage, and raising her hand, said, "Please be seated; the president is not dead." She then picked up a glass of water, came down the steps near the drummer of the orchestra, passed me in the centre aisle, and worked her way through the crowd towards the street front, turned to her left and came back to the president's box. All this occupied possibly two minutes, so short a space of time, and yet long enough for all to realize that a most dastardly deed had been committed.

I went out of the theater to Tenth and F streets and ran to the house of major Thomas T. Eckert, assistant secretary of war, three blocks above where I lived. On reaching the door I burst in abruptly, ringing the bell as I entered. A colored servant met me in the hallway and said, "Why, Mistah Laird, you g'wine tear dat do' down?" Major and Mrs. Eckert, on the floor above, came to the head of the stairway, the major asking, "What's the matter?" I said, "President Lincoln has been shot at Ford's theater, but was not dead when I left a few minutes before." The major was shaving himself, his face being covered with lather. He remarked, "I will be down in a moment." He was ready almost immediately, and as we reached the street he told me to hasten to the war department telegraph office and notify Mr. Bates, the manager, of what occurred, request him to summon to duty every operator available, and see that every wire was manned. It required but a few minutes of lively sprinting to land me at the war department, where I delivered major Eckert's instructions to manager Bates, who was on duty with others of the telegraph staff, including Albert B. Chandler and George C. Maynard. The latter had been in the theater when the president was shot and had come direct to the telegraph office. Soon we were all busy sending and receiving important dispatches relating to the tragedy, and to the efforts of the authorities to find the assassins.

Major Eckert established a relay of messengers between the Tenth street house and the war department, and sent us frequent bulletins, written by Secretary Stanton, which we transmitted over the wires for distribution to the press.

For several days the telegraph staff had their meals served in the telegraph office, by order of Secretary Stanton. We lacked nothing for comfort, except more exercise for our limbs beyond the confines of the halls of the war department building.

ACCOUNT OF GEORGE ALBREE LOW, WAR DEPARTMENT TELEGRAPH STAFF, 1865, NOW LIVING AT WILKINSBURG, PA.

On the night of the fourteenth of April, 1865, I left the war department about 8.30 or 9 for my third-story back room at major Eckert's house on Thirteenth street. George C. Maynard was my roommate, and if my memory serves me right, Homer Bates and Albert Chandler had the front room on the same floor. I was not feeling well and had been relieved early, and I either accompanied major Eckert home, or we both arrived there about the same time. I had gone to my room and was partly undressed when a messenger arrived in great

haste, with startling intelligence that president Lincoln had been shot. I can call to mind the hasty departure of the major, and the intense grief of his estimable wife as she came to my room door and repeated the sad news. My first impulse was to don my clothes and go to the telegraph office where I knew I should be needed, but her appeal that I should stay in the house, as she was alone, prevailed, and I did not go to the war department until between 5 and 6 in the morning.

I can never forget the gloom and the saddened faces of my comrades as I entered. Mr. Bates was at the first table, and John H. Dwight, now long dead, at the next. Maynard, Chandler and Laird at other wires. The latest bulletin from secretary Stanton, addressed to major-general Dix, for distribution to the press of the country, which had been transmitted to New York about the time I reached the telegraph office, told us that Mr. Lincoln was still alive, but sinking rapidly, and about 7.30 we heard of his death.

ACCOUNT OF HENRY H. ATWATER, OPERATOR
WASHINGTON NAVY YARD, 1865, NOW
OF BROOKLYN, N. Y.

I have looked over my old war documents to see if I could find anything of interest on the subject of the assassination of president Lincoln. I was not in the theater on the evening of April 14, 1865, but was in my room in the navy yard, where I was stationed, when about 11 p. m. I was called up by Mr. Maynard at the war department office and informed that president Lincoln had been shot at Ford's theater. I ran to give the information to commodore Montgomery at his house, and met the commodore as he was entering the yard and conveyed the information. He replied, "I guess that is a mistake, for I have just come from uptown and heard nothing of it." I told him that it had just occurred, and returned to my quarters. At 1.05 a. m., April 15, the following message passed over the wire:

"War Department, April 15.

"To Brig. Gen'l. Barnes, Point Lookout, Md.

"Stop all vessels going down the river and hold all persons on them till further orders. An attempt has been made to-night to assassinate the president and secretary of state. Hold all persons leaving Washington.

(Signed) "H. W. HALLOCK,
"Major Gen'l Chf. of Staff."

Shortly afterwards I received the following telegram for commander Parker who was down the river. I delivered the message to T. H. Eastman, lieutenant-commander Potomac flotilla.

"War Department, April 14, 1865.

"To Commander Parker:

"An attempt has been made this p. m. to assassinate the president and secretary of state. The parties may attempt to escape down the Potomac.

(Signed) "J. H. TAYLOR,
"Chief of Staff."

"Navy Yard, Washington,
"April 15, 1.10 a. m.

"To S. Nickerson, Acting Vol. Lieut.:

"Send the fastest vessel you have with the following message to commander Parker.

(Signed) "T. H. EASTMAN,
"Lt.-commander Potomac flotilla."

"Navy Yard, Washington,
"April 15, 1865, 1.15 a. m.

"To Commander Parker:

"An attempt has this evening been made to assassinate the president and secretary Seward. The president was shot through the head and secretary Seward had his throat cut in his own house. Both are in a very dangerous condition. No further particulars. There is great excitement here.

(Signed) "T. H. EASTMAN,
"Lt.-commander U. S. Pot. flotilla."

"War Department,
"April 15, 1865, 2.10 a. m.

"To Navy Office:

"Remain on duty all night unless permission is given to close. Answer.

(Signed) "THOS. T. ECKERT,
"Maj. & A. Q. M."

"War Department,
"April 15, 1865, 8 a. m.

"H. H. Atwater, Navy Yard:

"President died at seven twenty-two (7.22) this a. m.

(Signed) "MAYNARD, Opr."

"War Department,
"April 15, 2.20 p. m

"Commodore Montgomery, Navy Yard:

"If the military authorities arrest the murderer of the president and take him to the yard, put him on a monitor and anchor her in the stream with strong guard on vessel, wharf, and in yard. Call upon Comdt. Marine Corps for guard. Have vessel immediately prepared ready to receive him any hour, day or night, with necessary instructions. He will be heavily ironed and so guarded as to prevent escape or injury to himself.

(Signed) "GIDEON WELLES,
"Sec'y of Navy."

"War Department,
"April 15, 1865, 2.20 p. m.

"To Col. Jacob Zeilin, Comdg. Marine Barracks:

"Have extra strong and careful guard ready for special service if called for by commodore Montgomery.

(Signed) "GIDEON WELLES,
"Secy. of Navy."

It should be borne in mind that as yet how far the conspiracy extended was unknown and it was feared that an attempt might be made to release the prisoners when caught. That night, April 15, Payne, the accomplice of Booth, was brought to the navy yard and placed on a monitor, which was

anchored out in the stream, according to instructions. As my wire ran down the river to Point Lookout via St. Ingoes, the route taken by Booth and Herold, many telegrams were sent in relation to their capture. About twelve days after the assassination, Booth was shot and shortly afterwards his body was brought to the navy yard and placed on the monitor "Montauk," where I saw it, covered over with a cloth. That evening it was taken on a tug or launch to the arsenal and placed, for the night, in a room where empty shell boxes had been thrown. This was about dusk and after the workmen had left the arsenal yard. This information was given me that evening by Henry Bishop, the operator stationed at the arsenal yard, who was standing on the pier when the launch arrived with the body. The next morning the papers had it that Booth's body was taken down the Potomac to be thrown into the ocean. This was probably done to mislead the public as to its disposition. While Payne was confined on the monitor, Miss Seward, daughter of the secretary, escorted by general Hardin, my old commander at Fort Reno, came down to identify Payne, who, it will be remembered, rushed past her and into secretary Seward's room, where he committed the murderous deed.

(To be continued)

NOTE.—Through a clerical error in transcribing the article of Mr. David Homer Bates, which appeared in our April 16 issue, several lines were omitted at the end. The last sentence of his contribution to the symposium (page 184) should have read as follows:

A careful study of his speeches and writings, and a perusal of many of his biographies since that brief record was made, has only served to confirm my youthful estimate of his simple and altogether lovely character which has now become the wonder and admiration of the civilized world—combining with its innate gentleness a marvelous tact in the handling of men and in the settlement of complex questions of national importance—a faculty of leading public opinion into broader channels and thus aiding in the formation of righteous judgments, a skillful control of great events, an ability to gather up the useful fruits of political conflict and above all these material qualities, and toning them for more effective service to mankind, a boundless charity for, and deep sympathy with, the suffering oppressed. All this indeed in spite of envy, jealousy, malice and political and personal hatred, in the midst of the greatest civil war of history. Surely like the Saviour "he endured the contradiction of sinners;" and the mantle of his charity covered not only the downtrodden everywhere but his own enemies as well, and if he could have spoken after the fatal bullet entered his brain, he would, no doubt, have said, "Father, forgive them, they know not what they do."

LEGAL.

TELEGRAPH COMPANIES IN MINNESOTA.—Jurisdiction over telegraph companies in Minnesota has been placed in the hands of the State Railroad and Warehouse Commission.

FIVE THOUSAND FOR SUDDEN NEWS OF DEATH.—Mrs. Anna V. Stockton of Denver, Col., has sued a telegraph company for \$5,000 damages because of the delay of a message announcing the death of her father in St. Louis. She had started to visit her father before the message reached its destination and she did not know of his death until she arrived at St. Louis. The sudden breaking of the

news, she charges, caused her collapse and she suffered a nervous strain which she attributes to the delay of the message.

TELEGRAPH AND CABLE RATES.—In a decision handed down by the Interstate Commission on April 20, in the case of W. N. White and Company, of New York, against the Western Union Telegraph Company, finds that the defendant's standard rates for the transmission of messages by telegraph from New York to San Francisco and by cable from New York to points in England are not unreasonable or discriminatory. The attack on the San Francisco rates was based chiefly on the fact that press messages are accorded lower rates. The decision says: "The right of carriers subject to the act to initiate their charges is too well established to need citation of authority. Such charges are prima facie reasonable, except where otherwise provided by law. Congress has here provided that messages may be classified into 'day, . . . press, . . . and such other classes as are just and reasonable,' and that different rates may be charged for the different classes."

INDUSTRIAL.

POLES FOR GREECE.—Three steamers loaded with 17,000 cedar telephone poles for the Greek government are on their way across the ocean. They were supplied by the Western Electric Company.

SELECTOR SIGNAL.—A United States patent has been issued to Mr. E. E. Kleinschmidt, of New York, on a selector signaling system, in which the selectors are bridged on a main-line circuit and adapted to ground a signaling circuit. The invention has been assigned to the Hall Switch and Signal Company.

SHERARDIZED WIRE.—Sherardizing is a process of dry galvanizing and renders iron rustproof. The ordinary method of galvanizing is by the hot dip and electric systems, but in sherardizing zinc dust is applied to the articles to be treated after they have been properly cleansed and then heated. When the process is completed the articles are found covered with a coating of zinc, which has rooted itself into the iron. The process is adapted to the treatment of iron telegraph wire, telegraph fittings, and any article made of steel, iron or malleable castings that can be galvanized by the hot or cold process. All articles so treated are claimed to be more durable than when galvanized in the old way.

Mr. R. C. Hall, manager of the Postal Telegraph-Cable Company, Lansing, Mich., after ordering a copy of Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students, by W. H. Jones, writes us as follows: "Copy of Jones' Diagrams received, and very much pleased with same. The very thing needed by our profession. Will be glad to pass the good word along to others." This is a sample of hundreds of letters we are receiving from all sections of the country. Railroad test operators particularly are pleased to have this book at hand for the reason that the chapters on the management of switchboards and testing of wires have made their operation of the lines much easier.

Telegraph Tournament Postponed

The executive committee having the San Francisco Tournament in charge have unanimously decided to postpone the dates of the Tournament from May 27-29 to August 26 and 27. This action was deemed necessary because everyone identified with the project has found it impossible to complete the work incident to pulling off a successful telegraph tournament of this magnitude on the dates previously agreed upon. The postponement until three months later will afford the needed time to complete all of the details and will enable many telegraph operators to take part in the contest, which would not be the case if the Tournament occurred in May.

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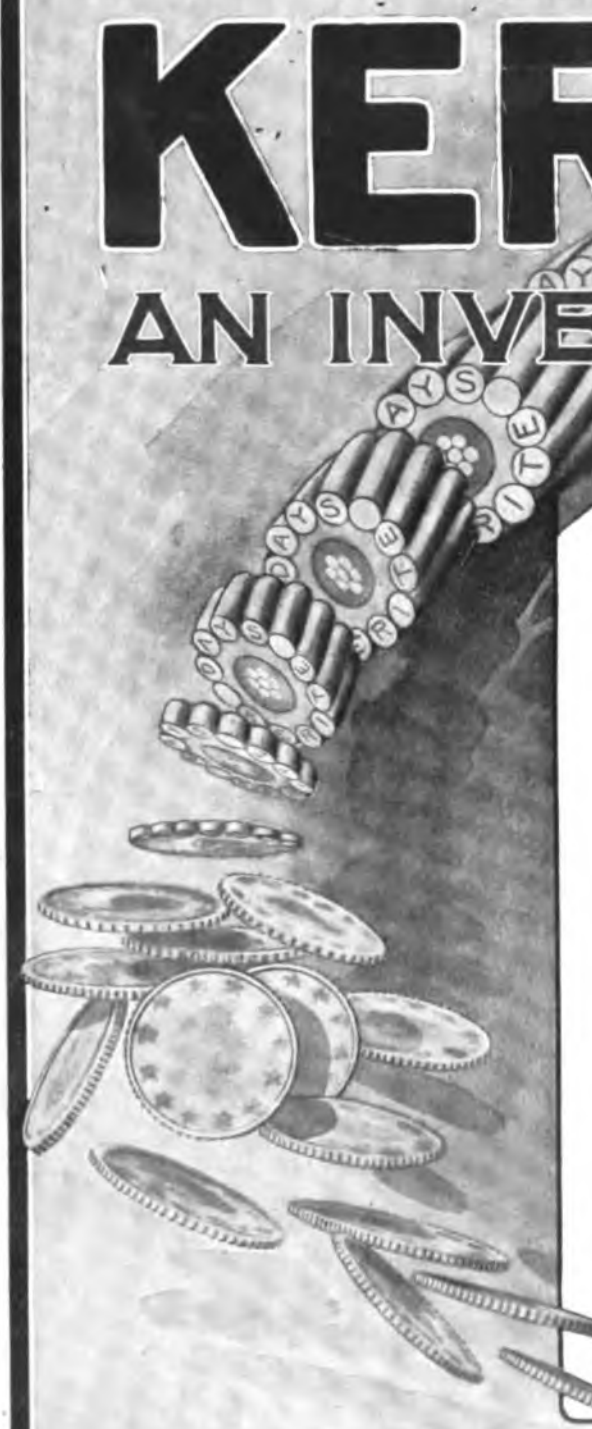
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L. H. Bridge 80-108

THE RAILROAD.

WIRELESS TELEPHONE ON THE LACKAWANNA.—Service messages and conversations by wireless telephone were exchanged between Scranton, Pa., and Binghamton, N. Y., on the Lackawanna Railroad on April 25, a distance of sixty-three miles over a mountainous country. Mr. L. B. Foley, superintendent of telegraph, telephone and wireless, was in charge of the experiments. The service was actual messages and not simply Hello, Hello. They were copied at the distant end and repeated back and the service was very satisfactory, and apparently reliable. The next wireless telephone experiments will take place between Scranton, Pa., and Hoboken, N. J., a distance of 150 miles.

REPORT OF WESTERN DIVISION ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—The proceedings of the meeting of the Western Division of the Association of Railway Telegraph Superintendents, held at Chicago, March 17 and 18, have been issued in standard pamphlet form. The typographical appearance of the book is very handsome and is a decided improvement on the mechanical make up of former "proceedings." The book was produced under the direction of Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railway, St. Paul, Minn., chairman of the Western Division.

Railway Telegraph Superintendents' Convention.

As was announced in our April 16 issue, the headquarters of the convention of the Association of Railway Telegraph Superintendents, which will be held in Rochester, N. Y., June 22, 23, 24 and 25, will be at the Powers Hotel. The committee on arrangements is busily engaged in giving the final touches to the programme, and we expect to be able to give the complete schedule in our issue of May 15. Several papers of special interest to the superintendents have been secured, as well as others of more general importance. Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company, will present a paper, and considering the high standing of Mr. Carty in the electrical profession, his paper will not fail to be one of the most important contributions to the proceedings of the association. Mr. P. W. Drew, superintendent of telegraph, Minneapolis, St. Paul and Sault Ste. Marie Railway, Chicago, Ill., is the secretary of the association.

Testing on Railway Wires.

Mr. W. Rogers, telegraph engineer, Missouri Pacific Railway Company, St. Louis, Mo., read a paper entitled "Modern Testing Facilities and Their Relation to Railway Wire Plant Efficiency," at the meeting of the Western Division of the Association of Railway Telegraph Superintendents, in Chicago, March 17 and 18. He referred to the utility of the volt-mil-ammeter, the bridge testing set, the new Western Union test panel and to their use on his read.

The following extracts are taken from the paper: One of the first results noted after the installa-

tion of the volt-mil-ammeters was the improvement brought about in main gravity batteries. The mil-ammeter showed up inequalities in the distribution of the current and many rearrangements were made whereby all wires received the proper amount of current. The voltmeter, of course, showed at a glance whether or not the batteries were in good condition and up to voltage.

The results obtained in the way of better insulation were very gratifying.

Voltmeters and ammeters may be used for many other purposes in a telegraph office. The testing of relay-coils, etc., for crosses, making approximate resistance measurements of coils, ascertaining whether or not coils of differentially-wound relays are balanced, etc., may be mentioned as a few everyday examples.

The uses of a Wheatstone bridge testing set are so many that it is hard to conceive of a good reason for not having one in every testing-office. In a repair-shop or storeroom where both defective and good-order telephone and telegraph apparatus is handled, I consider one a necessity. Their use on the Missouri Pacific has kept out of service many ringer-coils, simplex-coils, relays and other pieces of apparatus which while apparently all right were actually defective.

By using the bridge for locating faults, it is practicable to do away with a large number of test-offices, with their switchboard troubles and line losses due to cable. The greatest feature in the use of the bridge is that the linemen can be directed to approximately the mile-post location of the fault.

Our experience with these test-panels has been very gratifying, and while as yet no great number of them have been installed, we are confident that they are an improvement over the old peg-board. The same statement applies to the larger boards of the same type, used in wire chiefs' offices.

In addition to the equipment described, there is a simple device that is essential in a well-regulated wire chief's office and which costs about forty cents and pays for itself every day. It is commonly called a "swing-bell" and consists of an ordinary vibrating bell, a Morse relay, cord and plug and a couple of dry cells, being, in effect, an ordinary switchboard test-set in which the sounder is replaced by a bell. In most railway testing-offices, the wire chief is expected to perform other duties, usually telegraphing. Locating a slow "swing" on a wire requires considerable time. Using the "swing-bell," the wire chief can open the wire under test at some test-office, cut in the bell and go about his other duties. If the swing is on the near side of the open, every time it comes in the bell will ring. The process of locating the swing is then obvious. If a wire is open or grounded and is being covered by a lineman, the bell may be cut in and by the proper arrangement of the line battery, the removal of the fault will cause the bell to ring, attracting the attention of the wire chief: the wire is then restored to service without unnecessary delay. The "swing-bell" can be used in a number of ways as a telltale, saving time out of all proportion to its cost.

Committee on Line Construction.

The sixth meeting of the National Joint Committee on Overhead and Underground Line Construction was held on Wednesday, March 31, in the rooms of the American Institute of Electrical Engineers, New York.

The committee devoted most of its time at this meeting to discussing the various clauses of the overhead power wire crossing specification, and the work of revision was gotten well under way. The specification was divided into four sections and the following sub-committees appointed to handle the work of revision on their respective sections:

Sub-Committee "A" (Structural)—F. L. Rhodes, chairman; G. A. Harwood, R. J. McClelland, R. D. Coombs, J. H. Davis.

Sub-Committee "B" (Insulation)—W. J. Eck, chairman; Percy Thomas, F. B. H. Paine, R. E. Chetwood, E. B. Katte, A. S. Richey.

Sub-Committee "C" (Conductors)—Paul Spencer, chairman; Thos. Sproule, Geo. A. Cellar, W. I. Capen, R. J. McClelland, H. T. Wreaks.

Sub-Committee "D" (Clearances)—C. L. Cadle, chairman; G. F. Sever, W. J. Canada, L. S. Wells, H. S. Warren, E. B. Katte.

Circular letters have been issued to operating companies, tower manufacturers, consulting engineers, and others, requesting that they furnish the committee with data, reply to a series of questions, and forward opinions regarding the proposed specifications.

What the committee particularly desires at this time is the suggestion of specific clauses, or paragraphs, to be added to or changed in the existing specification, and it is hoped that anyone interested in this subject will communicate at once with the committee.

Mr. R. D. Coombs, 30 Church Street, New York, is secretary.

OBITUARY.

FRANK L. GARIEPY, a member of the Omaha, Neb., Western Union operating force, died April 20.

HENRY W. POOR, aged seventy-one years, the publisher of "*Poor's Railway Manual*," who died in New York recently, was a director of the Postal Telegraph-Cable Company of Texas.

MAJOR S. FLOOD PAGE, aged eighty-two years, whose connection with electrical undertakings in London dates back over a long period of time, died in London, England, April 7. He was for a long time on the board of three of the Marconi Wireless companies, including the American company.

SIR JOHN CAMERON LAMB, aged seventy-one years, a former official of the British post-office, died at Hampstead, England, March 30. He started in the post-office service in 1864 and became second secretary in 1897, from which position he resigned in 1905. In 1886 he represented his government at the Paris conference for the protection of submarine cables, and in 1890 was the first British delegate and also the delegate of the Cape and Natal at the International Telegraph Conference in Paris. He

represented Great Britain at the Berlin Wireless Telegraph Conference in 1905.

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

Mr. J. B. Dillon, of the Western Union, Dallas, Tex., office has submitted the following in answer to question No. 2 in this department in our April 16 issue, answers to which were invited from our readers:

"An automatic attendant should possess a good knowledge of the theory and practice of a polar duplex, so that he may be enabled to make as near a perfect line balance and static compensation as is possible. Unless that is done, a poor tape on a Wheatstone, or very badly mixed messages on a printer will result. When it is stated he should possess a good knowledge of the theory and practice of a duplex, it is to be understood that he must know how to adjust relays and transmitters to secure maximum efficiency and also be able to trace and remove all faults. He should possess a good knowledge of the use of such tools as are needed for the upkeep of the automatics. In a few words, he must be a fair mechanic as well as a fair electrician. Thus equipped he must be alert and also watch the movement of traffic so as to be able to effect any needed improvements, no matter of what nature. He must understand the "punch machines," and be able to remedy faults therein. He must be able to read the punched slips as also the blue tape, so that any false dots, or other irregularities in either may be quickly detected. With these qualifications and attention to every detail, you have a good automatic attendant."

The San Francisco Tournament Postponed.

The telegraph tournament, which was to have been held in San Francisco on May 27, 28 and 29, has been postponed until August 26 and 27. Owing to the great amount of work involved in preparing for the affair, it was found impossible to complete the details in time for the original date. The postponement, therefore, will afford sufficient time to give proper attention to the multitude of details and have everything in readiness for the event on the new date.

Mr. Thomas A. Edison will donate a handsome diamond disc phonograph and a supply of records and will hold them subject to the wishes of the executive committee until after the tournament is over.

The Hamilton Watch Company of Lancaster, Pa., has also donated a handsome, high-grade gold watch, which will likely be given to the winner of the railroad event.

Mr. F. H. Menagh, who resides in Jersey City, in renewing his subscription for another year, writes: "Enclosed please find \$2.00. 'Nuff said."

The Arrival and Internment of the German Converted Cruiser, "Prinz Eitel Friedrich," Newport News, Va.

BY I. A. WORTHINGTON, MANAGER, WESTERN UNION
TELEGRAPH COMPANY, NEWPORT NEWS, VA.

Little did the population of the city of Newport News, Va., think when they commenced their day's labor on the balmy, spring-like day of Wednesday, March 10, that before the setting of the sun they would be visited by one of the famous German sea raiders, the converted cruiser "Prinz Eitel Friedrich," which many of us thought was resting on the bottom of the ocean.

At 11:30 a. m. this ship, bearing all the marks of a long sea voyage, dropped anchor in the harbor, in plain view of the city, and soon all was excitement. A messenger came running into the Western Union office and informed the manager there was a German warship just coming in. His report was investigated, and the first step taken was to get a permit to board the ship from the collector of port, Mr. Norman R. Hamilton. Having this permit in our possession we quickly procured a launch, and supplying ourselves with blanks of all kinds, we placed the launch under command of our night clerk, who returned shortly after with a goodly amount of salvage in the way of messages.

Realizing that the time was short before the afternoon editions of the newspapers would go to press, we immediately proceeded to provide facilities for handling the large volume of press matter which would be filed in a few moments. As this is not a relay office our facilities are limited, but we secured additional wires and about noon the rush started, lasting during the day and night. The next morning the correspondents from the great dailies arrived and after interviewing the officers and crew on the cruiser, commenced to file their press matter. At noon we had three circuits to New York, one to St. Louis and one to Detroit, Mich. This condition was duplicated day and night for a week, when it was decided that the boat must undergo repairs, requiring approximately three weeks. These repairs were made in the plant of the Newport News Shipbuilding and Drydock Company, the largest shipbuilding plant on the Atlantic coast. After the docking of the boat the correspondents left for their several homes, promising to return when the time for repairs had expired.

About April 1, the time-limit for repairs having about expired, the question as to whether the raider would again seek further prey on the sea or be forced to intern was uppermost in the minds of the people, the captain having stated that he would again put to sea. This naturally brought the correspondents back to await developments. The utmost secrecy being maintained with reference to the disposition of the boat caused the correspondents to remain and advise their papers several times a day developments as they arose.

On the night of April 3, it was rumored that the cruiser would put to sea. The night was dark and sheets of rain, accompanied with flurries of

snow, making it an ideal night for her to try to escape the watch kept by the allies' cruisers at the capes. The office was kept open all night, the correspondents keeping in touch with the situation by means of a launch. All of our force were kept on duty awaiting the outcome and trying to keep in touch with our relay office, our facilities having been crippled by the storm. But the cruiser remained at her dock. It was not until April 8 that the captain decided to intern and the boat was later taken to the Norfolk Navy Yard for internment.

You ask me, "How did you do it?" My reply is, "We did it through co-operation. Every employe and I do not forget the messenger, realized that the reputation of the company for fast and efficient service was at stake and each one shouldered his part of the burden without complaint, working long and hard hours of service." We do not forget the wire chiefs in our Richmond and New York offices who responded with promptness to every request made upon them for facilities, which enabled us to move the traffic speedily and with ease. Operator I. E. Mullen, recently of our Richmond, Va., office, had charge of the handling of the press matter, assisted by operators J. G. Gurley, S. B. Roberts and manager J. A. Davis, of our Fortress Monroe, Va., office, who came up at night after his office closed, and the prompt handling of the large volume of press matter was largely due to their efforts.

Since the internment of the "Eitel Friedrich," the German converted cruiser, "Kronprinz Wilhelm," has arrived in port, causing another rush, of which I will write later, when her disposition has been decided upon.

UNIQUE FLORIST'S ADVERTISEMENT.—A florist in Bridgeport, Conn., has an attractive display in his shop window, representing the "Florists' Telegraph Delivery," a branch of the Society of American Florists, by which it is possible for anyone living in one place to have flowers delivered to almost any other place in the world practically immediately. In the window a young lady sits operating a telegraph instrument, the wires of which extend to a globe, also to the tags from florists all over the country who represent the system in their towns, which make up the background of the display. These tags are all addressed to the local florist.

VALUABLE REFERENCE FILE.—Those who do not wish to save the full issues of TELEGRAPH AND TELEPHONE AGE for future reference will find that the best method of preserving the important items is to clip from each issue of the paper the educational and engineering and other articles, date them and file them away in envelopes properly marked. This reduces to a very small compass the important matter which appears in our columns each twelve months.

THE AMERICAN TELEGRAPHER, which is published by Mr. Jeff. W. Hayes, has moved its headquarters from Los Angeles to Portland, Ore., where it will be produced in the future.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 584 and 585 to meet the claims arising from the deaths of J. W. A. McCracken at Port Jefferson, N. Y.; F. W. Graff at Spangle, Wash.; F. L. Tompkins at Peoria, Ill.; G. B. Simpson at Chicago, Ill.; Mary R. McLaughlin at St. Louis, Mo.; F. H. Honberger at Chicago, Ill., and A. K. Helman at Easton, Pa.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. L. C. Boochever an attache of the office of J. P. Edwards, division traffic superintendent, addressed a meeting of the Western Union Educational Society on the afternoon of April 13. His subject was "The story the figures tell" or "Traffic statistics and their use." His address was educational and interesting, and every listener profited by what he heard. Mr. Boochever proved to be a lecturer of exceptional ability.

Mr. Joseph F. McCullum, an old American District Telegraph employe, and in recent years located in the general operating department as an assistant traffic chief, died on April 15, after being ill about three weeks with pneumonia.

BOSTON WESTERN UNION.

The premium system has been instituted on the following circuits, Chicago nights, manned by Wm. Conry and A. B. Kurtz; "CO," New York, manned by Harry Hutchinson and "FX," New York, covered by S. J. Mangione.

Mr. P. L. Murphy has left the service, and is now working for Paine and Weber, brokers.

Mr. Frederick Feltus has resigned and has accepted a position with the International News Service at Lawrence, Mass.

Business is very heavy for this season of the year, all extra men, as well as the regulars, making full time.

Mr. S. B. Haig, division traffic superintendent, outside New York City, New York, is in the city on company business.

PHILADELPHIA POSTAL.

Our baseball team is being rounded into form. Thirty-five candidates for the first team have reported for practice and a good showing for the

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.

season is expected. J. J. Hardy of the superintendent's department is manager and W. G. Kurtz of the operating staff is captain.

Quad-chief C. A. Currier has been temporarily assigned to duties in connection with our new quarters in the Finance Building. R. L. Massey has been transferred to the quad department and P. J. Reilly is acting way room traffic chief.

The sympathy of the office force is extended to Joseph L. Hockery in the sudden loss of his brother Harry L. Hockery, who died from pneumonia.

CHICAGO WESTERN UNION.

Mrs. Bessie M. Bracken died suddenly of heart disease while performing her duties as librarian of the Christian Science Reading Room at 2632 North Clark street, April 14. Interment took place at Graceland, April 16. Mrs. Bracken was an employe of the Western Union Telegraph Company prior to the spring of 1908, having a record of about twenty-five years' service as operator and timekeeper. A large number of friends and acquaintances will always remember her as a woman possessed of a grand character and remarkable intelligence. Perhaps the word "Love" might tell the story of her life more truthfully, for she loved her friends and associates and was always ready to help them whenever they asked her to assist them.

Mrs. Rose Agnes Feltes (formerly Miss Schabel) died at her home in Detroit, Mich. Deceased was an employe of Western Union Telegraph Company at Milwaukee, Wis., some years ago and was "receiver" in the manager's office at Chicago. She had an exceptionally good record and was well liked by all who knew her.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000

Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street. (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 80c. 30 to 35, Full Grade, \$1.25; Half Grade, 85c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y. P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 10.

NEW YORK, MAY 16, 1915.

Thirty-third Year.

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How Electromagnetic Waves Are Propagated.

To many persons the propagation of electromagnetic waves, as used in wireless telegraphy, is still shrouded in mystery. The following description by Mr. William Marconi gives a clear explanation of the phenomena and of operation of the wireless transmitter, the action of which is one of the most perplexing things to the student.

When the transmitting key is depressed, high-tension current is allowed to charge the vertical wire, or aerial, which, when discharging, causes a rapid succession of sparks to pass across the spark-gap.

The sudden release, caused by the spark discharge, of electrical strain or displacement created along the lines of electrical force through space by the charged wires, throws off into space a large amount of energy in the form of a displacement wave in the ether and, as a consequence, the vertical wire becomes a radiator of electric waves. It is easy to understand how, by pressing the telegraphic key which controls the charging current, for longer or shorter intervals, it is possible to emit a long or short succession or series of waves, which, when they reach a suitable receiver, will induce in it minute sympathetic currents, and in corresponding long or short periods, and, in this manner, faithfully reproduce the Morse or other signs transmitted from the sending station.

It is well known that the rapid electrical oscillations in the wire produce two effects in external space, called, respectively, electric and magnetic force. In the case of a simple vertical air wire the magnetic force is distributed along concentric lines embracing the wire; while the electric force is distributed along certain looped lines in the

plane of the wire. As the currents in the air wire reverse their direction the magnetic and electric forces in space also reverse, but not everywhere at the same moment.

The magnetic and electric forces are affections or states of the ether, and in virtue of the inertia or elasticity of the medium, they are propagated from point to point with a definite velocity which is the same as that of light.

We can explore the field near the air wire, or antenna, by means of a neon glow tube, which becomes illuminated when held in the electric field. By means of an antenna which, for the necessities of space has been made spiral-wound, it is here possible to show whether the same is excited to its fundamental or to a harmonic.

The receiver also consists of an air wire connected to ground through some form of detector, which makes it possible to detect by means of a telephone, or record by an ordinary telegraph instrument, the effects of the minute currents induced in the receiver by the action of the waves transmitted to it by the sender.

A straight rod in which electrical oscillations are set up forms, as is well known, a very good radiator of electrical waves. In all what we call good radiators electrical oscillations set up by the ordinary spark discharge method cease or are damped out very rapidly, not necessarily by resistance, but by electrical radiation removing the energy in the form of electrical waves.

It is also a well-known fact that when one or two tuning forks having the same period of vibration, is set in motion, waves will form in the air; and the other tuning fork, if in suitable proximity, will immediately begin to vibrate in unison with the first. In the same way a violin player sounding a note on his instrument will find a response from a certain wire in a piano near by; that particular wire, out of all wires of the piano, happening to be the only one which has a period of vibration identical with that of the musical note sounded by the violinist. Tuning forks and violins, of course, have to do with air waves, and wireless telegraph with ether waves, but the action in both cases is similar. It is very important to take into consideration the one essential condition which must be obtained in order that a well-marked tuning or electrical resonance may take place. Electrical resonance, like mechanical resonance, essentially depends upon the accumulated effect of a large number of small impulses properly timed. Tuning can only be obtained if a sufficient number of these timed electrical impulses reach the receiver. For, to set a pendulum in vibration by small taps, we must not only time the taps properly, but keep on tapping for a considerable period. It is, therefore, clear that a dead beat radiator, i. e., one that does not give a train or succession of electrical oscillations, is not suitable for tuned or syntonized telegraphy.

Telegraph and Telephone Patents.

ISSUED APRIL 20.

1,136,283 and 1,136,284. Mouthpiece Protector for Telephone Transmitters. To T. C. Smith, Newark, N. J.

1,136,347. Telephone-Exchange Switchboard. To C. O'D. Lee, jr., Baltimore, Md.

1,136,449. Microphone. To C. W. Underwood, Crowley, La.

1,136,477. Transmitting Apparatus for Use in Wireless Telegraphy and Telephony. To G. Marconi, London, Eng.

1,136,683. Wireless Receiving Apparatus. To J. S. Leach, Brooklyn, N. Y.

1,136,912. Telephone Repeater System. To T. G. Martin, Chicago Ill.

ISSUED APRIL 27.

1,137,044. Keyboard for Printing-Telegraph Apparatus. To W. Zabel, Edgewood Borough, Pa.

1,137,146. Printing-Telegraph Apparatus. To C. L. Krum, Chicago, Ill.

1,137,150, 1,137,151 and 1,137,152. Composite Electric System. To A. D. T. Libby, Elyria, Ohio.

1,137,186. Telephone Receiver. To J. J. Comer, Chicago, Ill.

1,137,188. Differential Microphone Repeater. To J. J. Comer, Chicago, Ill.

1,137,193. Means of Combined Telephonic and Telegraphic Transmission. To P. B. Delany, South Orange, N. J.

1,137,200. Common-Battery Automatic-Telephone System. To W. L. Campbell, La Grange, Ill.

1,137,223. Machine Telephone Switching System. To F. R. McBerty, Antwerp, and L. Polinkowsky, Brussels, Belgium.

1,137,231. Machine Telephone-Switching System. To L. Polinkowsky, Brussels, Belgium.

1,137,235. Telephone Receiver. To H. H. Schneider, Seattle, Wash.

1,137,315. System for the Transmission of Intelligence. To R. A. Heising, East Orange, N. J.

1,137,360. Telephone System. To C. Smith, Cleveland, Ohio.

1,137,372. Telephone-Exchange System. To J. L. Wright, Washington, D. C.

1,137,384. System for the Transmission of Intelligence. To E. H. Colpitts, East Orange, N. J.

1,137,474 and 1,137,475. Selective Signaling Apparatus. To E. R. Gill, Yonkers, N. Y.

1,137,614. Amplifier for Telephones. To R. D. Hatch, Memphis, Tenn.

CENSUS REPORT OF TELEPHONES, TELEGRAPHS AND MUNICIPAL FIRE ALARM AND POLICE SIGNAL SYSTEMS.—The report of Wm. J. Harris, director of the census, on telephones, telegraphs and municipal electric fire-alarm and police-patrol signaling systems for 1912, has just been issued. It covers the development of the telephone industry, equipment and traffic, comparison of the Bell and other systems, financial statistics and exchange rates. The section devoted to the telegraphs covers land telegraphs, governmental telegraphs, ocean cables, wireless, and governmental wireless.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on May 12:

American Telephone and Telegraph Co.	119
Mackay Companies	77½
Mackay Company, preferred	66¾
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	2¼
Western Union Telegraph Co.	66¾

[This publication is prepared to purchase for its clients one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends which in many cases will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

MR. J. A. TOWNSEND, a forty-niner of the telegraph, now living in retirement at Rochester, N. Y., has taken up his residence at Ovid, N. Y., for the summer months. Mr. Townsend was manager of the Dunkirk, N. Y., Western Union office for over fifty years.

MR. CHARLES H. DUBOIS, who was one of the earliest manufacturers of electrical instruments, if not the first, is still alive. He is ninety-one years of age, and lives near Long Branch, N. J. He made registers for professor Morse in 1849 and 1850 in a shop at the corner of Broome street and Broadway, New York, and frequently met the famous inventor.

PROF. F. BRAUN, director of the College of Physics of the University of Strassburg, Germany, lectured on wireless telegraphy in Newark, N. J., April 30, under the auspices of the Newark Technical Society. In his lecture he gave generous credit to Drs. W. Marconi, V. Poulsen, R. Goldschmidt, L. De Forest, and Count Arco for their part in the development of wireless telegraphy.

E. R. ROSENBAUM, of New York, has sued one of the telegraph companies for \$2,500 damages, because, he alleges, that the company failed to deliver a message to his bride's parents, announcing his marriage. Mr. Rosenbaum thinks that the price asked is little enough for the absence of the "Bless you" from his father-in-law.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. CHARLES C. ADAMS, vice-president, has returned to his office after a ten days' trip through Maryland and Virginia, in company with Mr. Clarence H. Mackay, president of the company.

MR. W. I. CAPEN, vice-president, returned to his office on May 5 from a business trip through the middle west.

MR. J. J. WHALEN, manager of the main operating department, 253 Broadway, New York, is returning East and is expected to reach New York about June 1.

MR. RICHARD P. MARTIN, manager at Hartford, Conn., is recorder for the Sphinx Temple, Hartford, Conn., being an Ancient Arabic of the Nobles of the Mystic Shrine. Mr. Martin is also the chairman of the transportation committee in connection with the pilgrimage to be made to the Pacific Coast in July.

MR. RAYMOND W. KROHER, operator at Hartford, Conn., has been promoted to the position of manager at New Britain, Conn., to succeed Mr. W. P. Spellman, resigned.

OUTING OF NEW YORK BRANCH MANAGERS' ASSOCIATION.—The eighth annual outing of the Branch Managers' Association will be held at Witzel's Point View Island, College Point, L. I., on Saturday, June 26. Tickets will be seventy-five cents.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

MR. WILLIAM HOLMES, superintendent of tariffs, has returned to New York from Florida much improved in health.

MR. EDWARD EVERETT, of the office of the commercial general manager, has been appointed manager time service, with headquarters at New York.

MR. I. D. HOUGH, JR., testing and regulating expert of the traffic department at Dallas, Tex., has devised a cut-out arrangement which saves the use of one wire between Houston and Beaumont in handling news.

MR. J. W. MCMAHON, president of the Western Union Society of Connecticut, Bridgeport, Conn., announces that arrangements are now being made for the summer outing of the society on August 15. Various committees are interested in selecting a most desirable location and as a number of games will be played and prizes distributed to the winners, the affair promises to be one of the best of its kind in telegraph circles. Officials of the society would be glad to hear from their friends who wish to attend.

MR. W. S. VAWTER, of Stamford, Tex., has been transferred to the office of Mr. F. C. Cole, district commercial superintendent at Dallas, Tex., and Mr. G. H. Wilkinson has been appointed manager at Stamford.

MR. C. E. HARRISON, formerly chief operator at Montgomery, Ala., has been appointed chief operator at Jacksonville, Fla., succeeding Mr. R. L. Branton, transferred to Raleigh, N. C. Mr. Branton was presented with a gold watch by the office employes on his departure from Jacksonville.

MR. J. W. McLAIN, night chief operator of the Montgomery, Ala., office, has been promoted to be chief operator, vice C. E. Harrison, transferred to Jacksonville.

F. B. STERLING, aged thirty-eight years, assistant superintendent of building 16 Dey street, New York, who received severe injuries by falling down an elevator shaft at 16 Dey street on April 25, as reported in the May 1 issue, died on May 4 from his injuries. He was very popular among the employes. He is survived by his wife and two children.

PREMIUM CIRCUITS have been established in the different divisions as follows: Eastern, 104; Western, 147; Southern, 80; Gulf, 56; Mountain, 14; Pacific, 25. Other circuits are being added from day to day, as arrangements and conditions permit.

THE MORSE ELECTRIC CLUB will hold its outing on Saturday, July 17, at Donnelly's Grove, College Point, L. I., N. Y.

THE DALLAS, TEX., ELECTRICAL CLASS devoted one of its recent meetings to the study of the theory and operation of the ticker.

THE AUSTIN, TEX., office was recently moved into new quarters, and on the occasion manager O. D. Parker and staff entertained the public with an informal "at home."

THE WESTERN UNION ELECTRICAL CLUB was recently organized at Omaha, Neb. Meetings will be held twice a month. The following officers were elected: President, Robert M. McDonald; vice-president, Frank L. Keller; secretary and treasurer, W. J. Kean.

AN EDUCATIONAL SOCIETY has been organized at Los Angeles, Cal., by members of the three departments on March 23. The following officers were elected: President, R. H. Miller, district traffic supervisor; vice-president, T. W. Kane, general wire chief; secretary, G. C. Terry, chief clerk.

A "GET-TOGETHER MEETING" was held in San Francisco, on the evening of April 6, and was attended by officers and employes of all the departments, and the telegraph department of the Southern Pacific Railway Company. The subject of discussion was "Co-operation," and remarks were made by H. J. Jeffs, president of the society; A. E. Marlatt, J. G. Decatur, chief clerk Terill, of the Southern Pacific Railway; A. H. May, C. E. Thatcher, W. H. Wilson, manager Moore and J. E. Milka.

MR. W. L. JACORY, of New York, president of the American District Telegraph Company, and Mr. R. C. Baker, of Chicago, general superintendent of the Western Division of the same interests, returned to their respective offices on May 11, after an extended business trip to the Pacific Coast. The various offices in Washington, Oregon, California, Utah, Texas and other states were visited.

NEW HELENA, MONT., OFFICE.—This company has moved its main office at Helena, Mont., from its former location to the new Power Building. This building is up to date and the new quarters have been fitted up with modern equipment in all departments. The operating room and employees' quarters are situated on the second floor. There are sixty Morse positions and four printers. The commercial office is finished in golden oak and is one of the finest offices in the state.

The Helena office is about the most important between St. Paul and the Pacific Coast. All of the Northern Pacific overland lead comes into the Helena board, which is of the latest jack type. All overland wires on the northern overland route are repeated there and a portion of the central overland route which comes to Butte over the Oregon Short Line from Ogden receives like attention.

Printers are worked to Salt Lake, Spokane and St. Paul, and Morse trunk circuits to St. Paul, Salt Lake, Chicago, Billings, Miles City, Butte, Spokane, Seattle, Portland, Great Falls and Missoula.

The office relays for Montana, northern Wyoming and Idaho, western North and South Dakota. The number of Morse operators varies according to the season, between thirty and forty-five. The printer attendants average eighteen to twenty-five. The total number of traffic employees at the present time is sixty-one, including the manager and chiefs, who are: C. C. Maxson, chief operator; L. E. Rudd, manager; A. Cullen, night chief operator; W. K. Thomson, late night chief operator; G. O. McNerney, wire chief; H. G. Bennett, quadruplex and repeater chief; O. A. Fisher, printer chief; L. P. Taber, traffic supervisor; G. P. Smith, way supervisor; C. Q. Adams, night traffic supervisor.

All portions of the offices are equipped with intercommunicating telephones, and the indirect lighting system is followed both upstairs and down.

The average number of messages handled per month is 210,000. The power plant consists of fifteen motor-generators which furnish voltages of 50, 110, 160, 260 and 340.

The operating room, together with the rest and retiring rooms are on the second floor, with the commercial department on the first floor. Every detail has been provided for the comfort and convenience of the employees, and the furnishing of all departments is modern and sanitary throughout.

C. H. Carroll, Manager, Memphis, Tenn.

Mr. Charles H. Carroll, recently appointed manager at Memphis, Tenn., for the Western Union Telegraph Company, was born in Nashville, Tenn., December 25, 1881, and entered the telegraph service in his native town in October, 1909, as operator. By faithful attention to duty, backed by a strong desire to learn the details of the business, he has made rapid progress, and has filled the offices of local commercial agent and district commercial agent at Nashville. On May 1, 1911, he was appointed district manager at Louisville, Ky., and on March 19, of this year, was advanced to his present position.

Death of Gerrit Smith.

Gerrit Smith, aged seventy-seven years, the well-known telegraph engineer and inventor, died at Amityville, Long Island, N. Y., May 4. Mr. Smith was born in Providence, R. I., August 16, 1838, and entered the telegraph service in 1853 for the House Printing Telegraph Company in Boston, Mass. He soon became an expert on the House printing instrument and worked the line between Boston and Nahant. He became a Morse operator while in the employ of the American Telegraph Company in Providence, and left there in 1860 to accept a position in the New York office. About 1865 he became manager for the United States Telegraph Company at Providence. After the consolidation of this company with the Western Union, Mr. Smith became chief operator at 145 Broadway, New York, and in 1874 became assistant to George B. Prescott, electrician of the Western Union. During the time he served as chief operator he made several inventions, including an automatic repeater, duplexing the Phelps combination printer, and improvements in the quadruplex. Mr. Smith, accompanied by Mr. Geo. A. Hamilton, went to England in 1877 to exhibit the quadruplex in practical operation on the British lines. In 1879 he took the position of engineer-in-chief of the American Rapid Telegraph Company, but returned to the Western Union in 1882 as "electrician of circuits."

Mr. Smith retired in 1907 after a telegraph service of fifty-four years. He was a gentleman of high character, extremely modest, and was held in esteem by his many friends. His nature was as gentle as that of a woman and he was universally loved. Services were held at Amityville, Thursday evening, May 6, and were attended by many telegraph officials.

MR. RALPH D. BLUMENFELD, managing director of the *Express*, of London, England, one of the leading daily newspapers of the metropolis, in renewing his subscription to **TELEGRAPH AND TELEPHONE AGE** for the thirty-third time, has this to say: "It doesn't seem possible that this makes the thirty-third year of my adherence to your paper. That means that I have been a subscriber since the first number. I wonder how many originals there are. Why don't you compile a list of them and see what they are doing now. It would make a most interesting collection."

Mr. W. S. Daniel, formerly manager of the Postal Telegraph-Cable Company, St. Louis, Mo., who is on leave of absence for a few months for the benefit of his health, in renewing his subscription for another year, writes: "**TELEGRAPH AND TELEPHONE AGE**, besides keeping telegraph people posted on up-to-date matters vitally interesting to those engaged in that profession, also keeps me in touch with my nearest and best friends, whom I know are as much interested in me as I am in them. Long may it prosper and shed its lustrous rays over the craft."

THE CABLE.

JAPANESE CABLE RESTORED.—The cable between Guam and Tokio has been repaired, thus restoring direct communication with Japan.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to May 12, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Paramaribo and Cayenne, April 17, Manila and Shanghai, May 10.

CANADIAN NOTES.

A SIXTEEN-CIRCUIT SELECTOR CONCENTRATION UNIT has been installed in the Montreal office of the Great North Western Telegraph Company. It is of the standard Western Union pattern.

"THE BUSY TIMES." Through an error in our issue dated May 1, it was stated that the new publication, "The Busy Times," at Toronto, Ont., was issued by the Great North Western Telegraph Company. This was erroneous. It is produced by the Dominion Messenger and Signal Company, Ltd., for the promotion of the company's service. Mr. S. B. McMichael is general manager of that company.

PHOTOGRAPH OF GREAT NORTH WESTERN OFFICIALS.—We have received from Mr. C. E. Davies, traffic superintendent, Great North Western Telegraph Company, Toronto, Ont., with his compliments, a copy of a photograph of the company's traffic officials who attended the traffic conference in Toronto, on April 2. There are thirty-seven gentlemen composing the party. General manager G. D. Perry occupies the middle seat in the front row.

CANADIAN TELEPHONE AND TELEGRAPH REPORT.—The telephone business in Canada for the year ended June 30, 1914, showed an increase of more than \$2,250,000 in gross earnings, while the telegraph companies reported a decrease of \$112,000, as compared with 1913. The gross earnings of the telephone companies last year totaled \$17,297,268, with gross operating expenses of something over \$12,000,000. The net earnings were \$4,500,000. The gross earnings of the Canadian telegraph companies last year totaled nearly \$6,000,000, with operating expenses of more than \$4,000,000. The net profits were \$1,741,000, on a capital cost valuation of \$9,255,000. There were 6,150 employees in the telegraph service in 1914.

Mr. M. A. Noss, of the Western Union Telegraph Company, New Haven, Conn., in a pen-copy letter, remitting to cover his subscription to our publication, convinces us that perfect penmanship has not passed into oblivion, as commonly supposed. Mr. Noss' writing is certainly an improvement on the commonplace typewriter copy.

THE TELEPHONE.

B. E. CHASE, of Rochester, N. Y., a director of the New York Telephone Company, died suddenly in New York recently as the result of an operation.

S. J. SHURTS, aged eighty-three years, president of the New Jersey Telephone Company, died at Lebanon, N. J., May 9.

Telephone Pioneers' Meeting in San Francisco.

The fifth annual meeting of the Telephone Pioneers of America will be held in San Francisco, Cal., September 21, 22 and 23, with headquarters at the St. Francis Hotel.

The business meeting will be held on the morning of the twenty-first, papers will be presented in the afternoon, and, in the evening, the usual banquet will be given by the American Telephone and Telegraph Company, to which Pioneers and members of their immediate families are invited.

The Pacific Telephone and Telegraph Company has invited the members and their friends to participate in a trip to Sausalito and Mt. Tamalpais on September 22.

On September 23 it is proposed to hold a telephone reunion at the exhibit of the American Telephone and Telegraph Company in the Panama-Pacific International Exposition, at which time there will be demonstrations of transcontinental telephony.

The special Telephone Pioneers Limited will leave New York, Boston and Philadelphia, Tuesday, September 14, and Chicago, September 15, after the arrival of the party from the East.

Secretary R. H. Starrett is sending out detailed information regarding the trip, and will be glad to answer any further questions. His address is 15 Dey street, New York.

Review of Principal Articles in Contemporary Telephone Publications.

THE CONDUCT OF A SUCCESSFUL COLLECTION DEPARTMENT is the title of an article in the *Bell Telephone News* for April, by C. E. Wilde. The fundamental consideration in conducting a commercial enterprise, he says, is to sell a product of service and collect the money. The principle elements required are energy, courteousness, plus vigilance and intelligent application.

THE PLANT DEPARTMENT OF THE MICHIGAN STATE TELEPHONE COMPANY is described by C. G. Sharpe, plant superintendent of the company, in the April number of the *Bell Telephone News*. Mr. Sharpe gives an account of the work done in his department during the past year, which is the first under the present plan of organization.

FINANCIAL REPORTS of the employees' benefit fund general committee of the Chicago Telephone Company, the Wisconsin Telephone Company, the Cleveland Telephone Company and the Michigan State Telephone Company are given in the April issue of *Bell Telephone News*.

ANNUAL DINNER OF CLEVELAND TELEPHONE COMPANY.—The first annual dinner of the Cleveland Telephone Company was a very successful affair, over 1,000 officials and employes being present. Addresses were made by Allard Smith, general manager; H. F. Hill, vice-president; Alonzo Burt, vice-president and treasurer; W. I. Mizner, secretary, and Clifford Arrick, publicity manager. A full and interesting report of the affair is given in the April issue of *Bell Telephone News*.

TOLL LINE ENGINEERING IN MICHIGAN is described by Mr. C. Kittredge, engineer Michigan State Telephone Company, in the April *Bell Telephone News*. It is an interesting story of the territory and the engineering practice therein. The Michigan Company has no loaded toll lines, and is now considering the use of the new repeater on some of its longer circuits.

The Mountain States Monitor for April devotes considerable space to an interesting story of the Salt River Valley, by P. C. Gettins. The history of the region is briefly given and this is followed by short accounts of the telephone organizations and service in the various cities in Arizona. Among other contents of this issue is a paper read by F. H. Yelton before the Telephone Society of Denver on the solution of rate problems. He holds that rates are more accurately solved by the application of the modern measured service, or message rate service, than in any other plan yet proposed.

Can't Keep Up With the Procession.

"How's the telephone service in your town?"

"Worse and worse. The private wires are increasing so fast that I'm in almost total ignorance of the private affairs of my immediate neighbors."

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.

INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS, at Cincinnati, Ohio, 1915. Secretary, Clarence R. George, Houston, Tex.

TELEPHONE PIONEERS OF AMERICA, at San Francisco, Cal., September 21, 22 and 23, 1915. Secretary, R. H. Starrett, 15 Dey street, New York.

COOKING EGGS BY TELEPHONE.—"Hello, Central! I've just put some eggs on to boil and I find that my clock has stopped. Would you mind ringing me up in three minutes?"—*Exchange*.

THE DOT AND DASH CLUB, a social association composed of old-time telegraphers of Seattle, Wash., and vicinity, held a meeting in that city on April 27. Over three hundred old timers were present on this occasion and it proved to be a very enjoyable affair.

RADIO-TELEGRAPHY.

MR. FREDERICK W. SAMMIS, chief engineer, Marconi Wireless Telegraph Company of America, New York, is absent on an inspection trip of Alaskan and other Pacific coast stations.

NEW WIRELESS STATION IN JAMAICA.—The British Admiralty is erecting a powerful wireless station on the Blue Hills, near Kingston, Jamaica.

THE RADIO SOCIETY OF WESTERN PENNSYLVANIA has been formed at the University of Pittsburgh. The university has completed a wireless telegraph plant, and will co-operate with the high schools of the district in its use.

WIRELESS OPERATORS MUST NOT SWEAR.—A wireless operator in Massachusetts was recently admonished by the United States Department of Commerce for swearing by wireless, and warned that his license would be revoked if he was not more careful with his language.

INSTITUTE OF RADIO ENGINEERS.—The Institute of Radio Engineers held its regular monthly meeting at Columbia University, New York, May 5. Mr. Benjamin Liebowitz presented a paper on "The Pupin Theory of Asymmetrical Rotors in Unidirectional Fields, With Special Reference to the Theory of the Goldschmidt Alternator." The paper dealt with the theory of the Goldschmidt alternator in particular, as developed by Prof. Pupin.

NAVIGATION WIRELESS EXHIBIT AT SAN FRANCISCO.—The exhibit of the United States Bureau of Navigation at the San Francisco Exposition consists of a one-quarter kilowatt, quenched gap, battery-operated radio panel set, which was designed by the Bureau of Standards. The exhibition of this set is intended to convey to those interested what is considered the proper manner of installing a ship radio apparatus. The exhibit is located in the Palace of Liberal Arts.

RADIO EQUIPMENT FOR LIGHTHOUSE TENDERS.—Five duplicate radio sets are being manufactured for the lighthouse tenders "Columbine," "Cypress," "Orchid," "Sequoia," and "Manzanita." The apparatus was designed at the Bureau of Standards, Washington, D. C., and is being manufactured under its supervision. The effective range will vary from 100 to 300 miles, in accordance with atmospheric conditions. The transmitter is of the "quenched-spark" type. Adjustments are made automatically by simple manipulation of switches, and adapted for wave-lengths of 600, 750 and 1,000 meters.

WIRELESS INFRINGEMENT SUIT.—The Marconi Wireless Telegraph Company of America is suing the Atlantic Communication Company to prevent the latter from using Telefunken apparatus, which, it is alleged, infringes Lodge and Marconi patents. The case is being tried before Judge Van Vechten Veeder in the United States District Court in Brooklyn. Among those who testified for the Marconi interests were R. A. Weagant and Julius Martin, assistant engineers of the Marconi Company. Prof. F. Braun and Dr. Zenneck, the German wireless ex-

perimenters, will probably testify for the defendant company. Dr. William Marconi will probably testify when plaintiff takes rebuttal proof.

Wireless Operators on the "Lusitania."

D. C. McCormack and R. Lease were the wireless operators on the steamer "Lusitania," which was sunk by German submarine boats off the coast of Ireland, May 7. Mr. McCormack was saved, but it is not yet known here whether Mr. Lease was rescued or not. Mr. McCormack sent out the distress calls, which gave the first notice to the outside world of the great disaster. When the ship sank he was thrown into the water and was at the point of unconsciousness when he suddenly came to the surface. He was in the water three hours before being rescued. He says the thought of death did not enter his mind.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

THE LOSS of the steamer "Denver" in mid-ocean, last March, after having sent out wireless distress signals, is described in the May number of *The Wireless Age*. The story was written by Henry McKiernan, first operator, and Fred H. Crone, his assistant.

A BIOGRAPHICAL SKETCH is given in the May number of *The Wireless Age* of Mr. James M. Sawyer, superintendent of the maintenance, repair and inspection division of the Marconi Wireless Telegraph Company, at New York. Mr. Sawyer is a native of Maine, and has had a wide experience in electrical construction work.

"RESONANCE PHENOMENA IN THE LOW-FREQUENCY CIRCUIT" is the title of the leading article in the April number of *The Wireless World* (London), Mr. H. E. Hallborg being the author. It is the purpose of the author to outline briefly the principal low-frequency circuit characteristics common to all radio transmitters using alternators and transformers for charging the condensers of the radio-frequency circuit. The article is to be continued.

RADIO TELEGRAPHY WITHOUT ELEVATED ANTENNAS.—Messrs. Charles A. Culver and John A. Riner are the authors of an article in the *Electrical World* describing experiments with low horizontal aërials. As a result of the experiments, the authors state, several facts stand out more or less clearly. In the first place, so far as they know, this is the first time in this country that electric waves have been successfully received over commercial distances by using a single bare wire placed directly on the ground. Further, it is apparent that a somewhat symmetrical multiple earth-wire system may be used for receiving in practical radio communication, without necessitating any increase in sending power over that employed when utilizing ordinary elevated antennas. It is also evident that such single or multiple earth-wire systems possess a directive effect,

and that the elements which extend away from the transmitting station are the most important in this respect. It would appear that such a system operates most effectively when its electrical length, including the winding on the transformer primary, is something like one-fourth that of the incident wave. The receiving instruments, it seems, should be inserted about one-third the distance from the end nearest the transmitting station and to operate at the same efficiency the total length of such a ground-wire system should be approximately twice that of an elevated aerial. When used as an absorber, insulation of the wires apparently plays a very minor part. The ease and dispatch with which an earth-wire system may be installed makes the plan valuable for use under certain conditions, particularly in military operations and press work. It remains to be determined whether a similar arrangement may be used over commercial distances as a radiating system, and many of the properties of such earth wires are still to be worked out quantitatively. The authors are continuing their experiments along both these lines.

Valuable Book for Telegraphers.

The new edition of Jones' *Diagrams and Complete Information for Telegraph Engineers and Students* is meeting with a large demand and sale. No book has ever been published on the telegraph that so completely covers the subject. It is valuable to the student who is preparing himself for a higher and more remunerative position, as well as to the practicing telegraph engineer who keeps a copy close at hand for reference and further study.

The book contains a vast fund of information for telegraphers. It tells in plain English the principles and practice of the telegraph, and the illustrations used represent the latest apparatus used by the two leading telegraph companies. Every detail of the telegraph is covered; and the most modern devices, including methods of measurement, simultaneous telegraphy and telephony, etc., etc., are amply described. The book has sixty-four chapters and 464 pages and is bound in flexible leather covers. It fits in the pocket.

Every telegrapher should possess a copy of this leading work. It was written by a telegrapher for telegraphers, and the author, who is now a member of the engineering staff of one of the principal telegraph companies, has had long experience in the technical side of telegraphy, and has the faculty of imparting his knowledge in plain and easily understood English.

The price of the book is \$2.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. W. M. Godsoe, superintendent, Canadian Pacific Railway Company's Telegraph, St. John, N. B., Can., in remitting to cover his subscription, writes: "I desire to thank you for keeping my subscription in force, as I prize your journal very highly, and would not care to miss even one number."

Monument to Dead Wireless Heroes.

As was briefly announced in our April 16 issue, a granite memorial in the form of a drinking fountain, erected in Battery Park, New York, to the memory of nine wireless operators who lost their lives within the last four years while at their post of duty, was dedicated on May 12. The cost of the monument was defrayed by contributions from wireless operators, and the names of those whose memory is thus perpetuated, are: S. S. Sczpanck, G. Eccles, Jack Phillips, L. A. Prudhunt, D. C. Perkins, F. J. Kuehn, W. E. Reker, C. J. Flemming and H. F. Otto.

The memorial was presented to the city of New York by Mr. F. B. Dalziel, chairman of the committee of the Maritime Association, and was accepted on behalf of the city by acting-mayor George McAneny, who made some appropriate remarks.

Among those present were J. C. Perkins, of Philadelphia, Pa., father of D. C. Perkins, one of the lost wireless operators; the parents of F. Kuehn, who lost his life on the steamer "Monroe"; E. J. Nally, vice-president and general manager, and John Bottomley, vice-president, secretary and treasurer, Marconi Wireless Telegraph Company of America, and many other prominent and distinguished persons. Dr. William Marconi was not able to be present on account of his attendance at court.

The first to die was Stephen S. Sczpanck, who was lost on car ferry No. 18, September 9, 1910, on Lake Michigan. When within twenty miles of the Wisconsin shore the ferry struck a rock. Sczpanck sent out the wireless distress call, and after passing through the passenger cars which were being transported across the lake, and assuring the passengers that help was coming, he returned to his room to continue his call for help. All the passengers were picked up from lifeboats, but four men, including Sczpanck, went down with the ferryboat.

George Eccles lost his life on August 26, 1911, on the steamer "Ohio," which struck a reef and sank in thirty minutes while on her trip between Washington and Valdez, Alaska. Eccles sent out calls for help and remained at his post sending messages to the approaching rescue ships. The rising waters finally cut off the current supply and silenced the wireless apparatus. After the passengers had been transferred to lifeboats the steamer slid into deep water and sank, carrying with her Eccles and four others. The entire ship's company, save these, had been saved in the face of tremendous odds by the coolness and courage of the Marconi man who remained at his instrument to the last.

The death of Jack Phillips on the "Titanic," April 15, 1912, is, of course, familiar. Phillips remained at his post to the last, and it was largely due to his coolness and skill that so many were saved. On the night of the disaster Phillips was tired out after a long vigil in the wireless room. The machinery had broken down in part during the preceding day and Phillips had worked uninterruptedly for seven hours to repair it. Had Phillips neglected the work or had his skill been unequal to making the

repairs the fate of the "Titanic" might have been one of the mysteries of the sea. Early in the evening the steamer hit an iceberg, and the captain requested Phillips to send out the distress signals. Several steamers were picked up and Phillips continued calling. The "Titanic's" signals grew fainter and fainter as the ship sank deeper into the water. The captain ordered Phillips and Harold Bride, his assistant, to abandon the ship, but Phillips stuck to his post, calling for help. When he finally left his instruments the last of the lifeboats had gone. When the "Titanic" made her final plunge, Phillips was rescued from the icy waters by one of the crowded lifeboats, but he died from exposure before help arrived.

Lawrence A. Prudhunt, who lost his life on the "Rosecrans," was the youngest of the wireless heroes, being scarcely eighteen years of age. The wreck occurred on the Pacific on January 7, 1913.

The "Rosecrans" was sunk after striking a rock. While the crew were busy with the boats, Prudhunt remained in the wireless booth, sending out the call for help until the end. Had he left the instrument he would have had a chance in the boats, but he stood by the key until the ship literally broke to pieces beneath him. When the rescuers sought him they found that he had been pinned under the wreckage of the wireless house and washed overboard. A monument has already been erected at Venice, Cal., to the memory of Prudhunt.

It was in the wreck of the "State of California" that Donald Campbell Perkins perished. The ship struck a reef on the Alaskan coast and sank within three minutes. Perkins was asleep when the crash came. He rushed into the wireless room in his pajamas. With everyone else struggling for the boats his first thought was to reach his instrument. The inrush of water had put the main wireless instrument out of commission. Perkins coolly adjusted the auxiliary wireless set and began sending. The call was answered by the steamship "Jefferson," which chanced to be near by. As the ship began to go down a lifeboat near the wireless room was washed against the door and jammed it so tightly that Perkins' escape was cut off. He, nevertheless, continued to operate the wireless instrument and a moment later went down with his ship.

One of the most recent of these sea tragedies occurred with the sinking of the steamer "Monroe," on January 30, 1914. The wireless operator, Ferdinand J. Kuehn, was a New York boy, only twenty years of age, and a graduate of the Bronx High School. The "Monroe," which plied between New York and Norfolk, sank within twelve minutes after a collision off the Virginia coast. The crew succeeded in getting three boats away. Kuehn's assistant brought a life preserver to the wireless room and helped Kuehn to adjust it, while the operator, without interruption, sent out the S O S again and again. He was induced to go on deck only at the last moment, when it was known that the ship was sinking. As he stood on the deck Kuehn noticed that one of the women passengers had no life preserver. He unfastened his own and insisted

on the woman's accepting it. He had time to assist her to adjust it and helped her into a boat. A few moments later the survivors in the boat saw him slip on the tilting deck and fall into the water. He was not again seen. Kuehn was one of the last to attempt to escape, and even then sacrificed his life in giving away his cork belt.

Walter E. Reker was the wireless man on the steamer "Sampson," which sank after a collision with the "Princess Victoria" off Seattle, Wash., April 25, 1914. It is a proof of the bravery and efficiency of the crew that all but two of the fifty-four passengers were saved. Reker might readily have saved himself by taking to the boats with the passengers and the greater part of the crew. He remained at the wireless key, however, giving directions to the rescuing ship which proved invaluable. He ignored repeated appeals from the boats to save himself. When the last boat had left safely Reker reported to the bridge and remained to share the fate of the captain. It proved to be too late for them to leave and eight of the men, including the wireless operator, went down with the ship.

Two wireless men, Clifton J. Flemming and Harry Frederick Otto, were lost in the wreck of the "Francis H. Leggett," off the Oregon coast, on September 19, 1914. The steamer, which carried a large passenger list, was bound from Portland to San Francisco. The wireless men remained at the instrument until it was disabled. With the seas passing completely over the wireless booth they succeeded, however, in communicating with a nearby ship and gave the necessary directions for reaching them. Flemming was floating at some distance from the ship, holding onto a piece of wreckage, when he saw a woman struggling in the water without support. The spar he was clinging to was not large enough to support two. Flemming deliberately gave up his place to the woman and was not again seen.

Telephone Service in the War.

The war simply could not be conducted at all along the present lines without the agency of the telephone, says *The Telephone Review*. Thus far it has been an artillery duel. Without the telephone the big guns would be useless, for the objective is rarely, if ever, in sight of the battery.

The gunners train their guns on the target by laying them at a fixed angle with some definite visible point. The captain goes to a place from which he can see the enemy, and has a telephone line run out to him from the battery. Watching the fall of the shells, he telephones in the necessary corrections.

In the German artillery trenches orders and instructions are sent almost exclusively by telephone, the soldier attending it lying face downward and calling out instructions for firing, giving the range and the distance.

The perfection which has been attained in means of communication is a factor of incalculable value. For instance, the possibility of such a departure from the front as that of General Sir John French recently, would have been unthinkable in other days.

To-day, however, Gen. French can return to England, confer with Lord Kitchener and Premier Asquith, attend councils before the King, and in the meantime hold hourly conference over the telephone with Sir Archibald Murray at the front in France or Belgium.

Not the least valuable phase of telephone usefulness, though seemingly a very minor one, is its ability to supply entertainment to the intrenched armies. A really grave hardship of war is the entire lack of diversion suffered by the men at the front, and the strain of remaining long in the trenches without any amusement has frequently proved extremely serious. By means of the telephone, however, a way has been opened to overcome this condition, for it has been found that soldiers in the front trenches can listen to gramophone concerts being enjoyed by men in camp eight miles in the rear.

An American war correspondent describes the telephone exchange of the German army in Laon, France, where twelve soldiers were sitting before portable switchboards. With metal transmitters clamped on their heads, these soldiers were sending or receiving messages to and from all parts of the mid-battle front. With only an hour to do it, they could disconnect the lines, pull down and reel in the wires, pack the batteries and the exchanges, and have the entire outfit loaded upon automobiles for speedy transmission elsewhere.

How Operator Primrose Became a Minstrel.

George Primrose, the well-known minstrel, declared that he learned to dance when he was little more than a boy and a telegraph operator in a suburban railway station.

"I think I began it involuntarily," says Mr. Primrose. "I would hear the keys a-clicking and subconsciously I would duplicate the ticking with my feet on the floor." When I first noticed myself doing this I was using my right foot entirely for this pedal telegraphy, when I proceeded to educate my left foot along the same lines, without having any idea at that time of becoming a dancer. Of course, all this was done while I was sitting at my desk.

"Then I got to doing it when I walked about the office. It developed the muscles of my feet wonderfully, and almost before I knew it I was dancing telegraph messages all over the place."

Mr. Primrose's educated feet have been his fortune. They have given him the name the world over as "America's most graceful dancer." They have been the means of a livelihood for nearly forty years. He has never had a corn, a bunion, a callous or the slightest trouble of any kind with his feet, which, he says, is due to the fact that he always kept his pedal extremities in action and always wore one kind of shoes.

Although it is many years since he was a telegraph operator Mr. Primrose is still able to send or receive a message as well as the most expert operator, and he still composes and executes telegraph messages with his feet when practicing about the theater.

The Ownership of Wireless Equipment.

(Continued from page 102, April 1.)

Earlier in this article passing reference was made to the improvement in apparatus effected through the Marconi rental policy. Every so often those who are not familiar with the many details which in combination make up an efficient wireless service are moved to criticize all apparatus that does not include every refinement of the moment. When the design of the equipment on one ship is compared disparagingly with another because it is not the very latest production, the wireless service is not being considered—type and power of single installations do not constitute wireless service.

Unquestionably the latest equipment is desirable, but it is not always practicable to supply it. A good wireless set costs a considerable amount of money. Improvements are made not only from year to year, but from day to day. It is not to be expected that with every new development the Marconi Company can afford to replace equipment which is giving satisfactory service. The individual owner would not do this, nor would he consider it necessary to give the older apparatus the minute inspection and careful attention which the Marconi inspection system makes a matter of routine. A steamship man looks upon wireless equipment from a business standpoint; if he owned it by outright purchase and it complied with government regulations and was giving satisfactory service the announcement of some little improvement wouldn't be sufficient to make him discard it for a new and expensive set.

Individual ownership of equipment would not only have retarded the progress of the art, but would have lowered the standard of apparatus. Many steamship owners who were not required by law to install an equipment would have considered the heavy investment represented in initial purchase and have decided to get along without wireless. Others who were affected by the regulations and whose business was conducted on a small scale would purchase the minimum equipment necessary to comply with the law and view it as they do lifeboats, adequate for present use until the inspectors notify them differently.

The other side of the question reveals the Marconi Company making every effort toward continual improvement in service and equipment. Scores of new devices and alleged improvements are being constantly examined and tested, discarded and adopted, according to proofs of efficiency. It is a business proposition; a service organization depends upon its reputation for continued patronage and would find it poor economy to continue with apparatus obsolete or inefficient when the whole system may be benefited by the gradual substitution of improved equipment.

Having confined this preliminary discussion thus far to considerations of expense, convenience and utility to steamship owners, a thought or two on another phase of the rental policy should be acceptable. There is no deprecating the value of wireless, nor humanity's debt to Marconi. The organization

which has been built up about his name and efforts is deserving of proper financial reward. Otherwise there can be no gratitude, nor, indeed, can there be any spirit of fair play. Those who showed their early faith by lending financial support, too, are entitled to a fair return on investments and the more permanent income represented in rental policy is the only one which can make this possible. Both inventor and investor have been extremely patient through a long series of court proceedings arising out of the cupidity of frenzied financiers and their get-rich-quick exploitation of wireless telegraphy. It has taken many years and many dollars to have the validity of Marconi's claims upheld by courts in all countries, and clear the field for proper development. Meanwhile, the parasites have been dissipated, some to jail and others to oblivion. But at what cost to progress!

Fifteen years ago the Marconi Wireless Telegraph Company was incorporated in this country and for the first three years of its existence so tied up in patent litigation that commercial advances were out of the question. In 1902 but four shore stations and four liners were being operated with the American equipment. Two years later only two ship equipments had been added, and up to three years ago there were operated but ten land stations and fourteen ships, five of which were yachts. Continuous patent litigation and competition at ruinous contract rates from wireless telegraph companies organized for looting had arrested expansion up to this point. Then the bankruptcy courts and the federal authorities closed in on these competitors, and clapping their moving spirits into jail left the field free for proper development.

In the three years which have since intervened the American Marconi Company has increased its ship and shore stations until the total now reaches approximately 500. Including the new trans-oceanic plants recently completed there are now sixty-two shore stations fully equipped, and messages transmitted in the course of a year run into millions of words.

The successful operation of a system of this magnitude and the advantages of international affiliations of equal strength have made the Marconi Company of to-day a great commercial institution, worthy of the boon to humanity it represents and typifying progress and ultimate reward to the loyal supporting public.

With its rental policy proven economical, its charges fair and equitable to steamship companies, and its service reliable, there can be no question that ship wireless equipments are better operated by one control than by individual ownership.

PART II—GOVERNMENT VS. PRIVATE OPERATION.

Shortly after the conception of these initial articles, a member of the editorial staff of *The Wireless Age* made a short sea voyage in an unofficial capacity. During the trip he engaged two fellow passengers in conversation, and without any suggestion from him they gradually led the general discussion of timely topics around to a consideration of wireless telegraphy from the public's viewpoint. The magazine

man did not disclose his identity or his connection with the subject under discussion. Except where pressed for an opinion he remained silent, content to add a word here and there when by supplying a trifling bit of information new impetus was given to what later developed into a controversy.

The two ship acquaintances were representative men. One was the sole owner and manufacturer of a widely known household specialty, the other a special investigator for a financial reporting agency.

Once the romantic and humanitarian aspects of wireless had been disposed of the talk took on a more commercial tone and the usual dissection of communication processes followed. The manufacturer was of the distinctly modern type, aggressive in problems of marketing, an experienced campaigner, and an unusually deep student of production efficiency. The other was of a more judicial turn of mind, with a broad appreciation of commercial factors by virtue of his calling.

In time they began to speculate on the effect of legislation on commercial wireless business and hazarded an opinion or two as to whether the effect was good or bad. They came to a deadlock finally when the manufacturer heatedly exclaimed: "I suppose it is the same with this business as it is with any other—too much congress! Business should be let alone in this country. We make laws too fast. Granted that in the past a few big corporations abused privileges, does that mean the public mind should be filled with apprehension and every manufacturer be suddenly confronted with the fact that it's costing him more money to get business than ever before? Half of this commercial uplift is misdirected. Sanity in law-making is what we need.

"Business is dull. Why? Not because of the war. My factories are running night and day. But I am not making the legitimate profit. And simply because the government is trying to run my business!"

The other did not agree with him. He believed big business did not suffer through supervision from Washington. And as the first speaker was equally positive that the benefits were overshadowed by the damage done, the argument waxed hotter and hotter. They were both strong men and staunch supporters of their respective opinions. Denunciations became more violent and suggested remedies more radical as they plunged deeper into the subject. Then, as suddenly as it had begun, both stopped short in the midst of the controversy. The slow smile that spread over the features of one was reflected in the face of the other.

"We have drifted rather wide of the mark," began the agency man. "You know we started out to discuss wireless . . . Now here is a business in which I believe government supervision, direction—ownership even. . . ."

And he went on to review what he considered the merits of federal control of wireless, along with the telegraphs and telephone. At first the manufacturer did not agree with him. Gradually, however, he capitulated, and under the other's tuition began to see positive benefits—not for his

business of course, but, when he stopped to think it over, "quite a logical thing for wireless."

This, to the silent wireless man, was a truly amazing expression. Less than an hour before a highly intelligent manufacturer had been bitterly scoring the legislators because of interference with the conduct of his business. That opinion he still held; and it was safe to say nothing could change it. Yet, on the sayso of a chance acquaintance, he had modified his views on the question of wireless solely through accepting as facts a series of half-truths which the other had picked up here and there.

There can be no question that the advocate of federal ownership was sincere. He was painfully so, with the ring of conviction in his voice that has ever made a little knowledge a dangerous thing. Which, to a man who knew the true particulars, and the accurate figures covering the details he mentioned, made it startlingly apparent how public opinion may hinge and actually be swung on little discrepancies.

If the speaker had been required to set his arguments down in writing he would have verified his details; but no record of his conversation was being kept, his opponent had little or no knowledge of the federal ownership propaganda and conjectures became convictions in the easy freedom of unrecorded speech. And what was the result? A fairly influential citizen was given the groundwork of what may later develop into a definite attitude on that particular subject.

This rather lengthy preamble has been set down for two reasons: first, to illustrate the value of committing our present discussion to the printed word; second, a justification of the writer's opinion that government ownership is necessarily one of the considerations to be taken into account.

If the lay public gravitates unassisted to that phase of the subject in a general discussion of commercial wireless it is reasonable to presume that one of the first suggestions in a consideration of Corporate vs. Individual Ownership would be: Why not the compromise—government ownership?

Let us therefore consider this question first.

All good arguments are founded on fact. The most obvious comparison in favoring federal operation of wireless is the British Post-office's management of the kindred industry, the telegraph. This is one of the most successful instances of government ownership on record, the one quoted by the writer's ship acquaintance and the inevitable basis of discussion when the subject is introduced.

For forty-five years the British Government has had this monopoly and, similar operation of wireless telegraphy not being known, its wire telegraph record is the logical basis for whatever conclusions may be drawn through comparison.

(To be Continued)

Mr. Jos. Marshall, chief operator, Western Union Telegraph Company, Savannah, Ga., writes: "No body of men in this country has a better paper than the AGE, and I cannot understand why all operators do not subscribe for it."

Medal for Mr. Edison.

Mr. Thomas A. Edison was presented with the Civic Forum Medal for Distinguished Public Service, at a public reception in Carnegie Hall, New York, on Thursday evening, May 6. The medal is of gold and has inscribed upon it the words "Inventor and World Benefactor."

There was a large audience present to witness the interesting ceremony, Mr. and Mrs. Edison occupying prominent seats on the platform. Addresses were made by Dr. N. M. Butler, president of Columbia University, Dr. William Marconi, ex-governor Fort, of New Jersey, and other distinguished gentlemen. President Wilson sent his greetings by telegraph, and letters were read from Dr. Alexander Graham Bell, ex-presidents Taft and Roosevelt, and others.

Among those present were Theo. N. Vail, president, and John J. Carty, chief engineer, American Telephone and Telegraph Company; U. N. Bethell, president, New York Telephone Company; W. Marconi, E. J. Nally, vice-president and general manager, John Bottomley, vice-president, secretary and treasurer, and E. B. Pillsbury, general superintendent, transoceanic division, Marconi Wireless Telegraph Company of America; Newcomb Carlton, president, Western Union Telegraph Company; Gano Dunn, past-president, and Ralph W. Pope, honorary secretary, American Institute of Electrical Engineers; T. Commerford Martin, secretary, National Electric Light Association; Charles E. Scribner, chief engineer, Western Electric Company; Dr. C. P. Steinmetz, consulting engineer, and many others of prominence in the educational and industrial worlds.

The Telepost.

The select committee of the United States Senate appointed to investigate the use of the Telepost in connection with the post office department, made its report on March 4, just before adjournment. The report says:

"The Telepost, through its president, Mr. H. Lee Sellers, submitted the only system of rapid telegraphic transmission for consideration by the committee. The resolution did not authorize the committee to incur any expense in investigating the general efficiency and economy of the system, and, therefore, it was confined to statements by representatives of the company, to a personal inspection of a demonstration exhibited in a room at the capitol, to certain data gathered by letters from customers of the system now in operation between Chicago and St. Louis, certain reports by the Franklin Institute of Philadelphia, and certificates of awards by a number of international and national expositions. Senator Chamberlain, a member of the committee, while conversing over the lines of the Telepost in Chicago with a friend in St. Louis, noted messages were being sent over the same wire by the Telepost at a rate of about 750 words per minute.

"From all the data submitted, it is the opinion of the committee that the system is worthy of

and should receive careful investigation by the post office department with a view to utilizing it in connection with an electrical mail service, and that the postmaster-general, in his discretion, arrange for such experiments, without cost to the government, as will demonstrate its value to the post office department, and report the same to Congress."

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(4) Q.—What is the value of a line insulation test taken during a heavy downpour of rain?—E. H.

A.—Such a test is only useful in determining the workability of the circuit at the time the test was made, but it would give no reliable information as to the actual condition of the line conductor. Insulation tests are taken in dry weather because conditions all along the line are more nearly normal at such times.

(5) Q. Is ether and air the same thing? What are the characteristics of the ether? J. H. K.

A. No, they are not the same thing; they are vastly different. We know a great deal about air, but practically nothing about the ether, if such a thing really exists. Scientists assume that it exists, but they have no positive evidence that it does. A great many things in the realm of science are capable of explanation on the assumption that there is such a substance as the ether. The ether is supposed to be a highly attenuated substance, that it penetrates all substances, that it possesses elasticity and rigidity, that it has density and that it is incompressible. But whatever it is, it has proved to be very elusive, and man has not yet been able to reveal its actual nature or existence.

MICHIGAN PRESS OPERATORS.—Editors of Michigan papers and telegraph operators met recently in the Hotel Statler, Detroit, Mich., at the third annual convention and banquet of the Associated Press Goodfellowship Club of Michigan. The important part played by the operator in handling news was discussed by Mr. Paul Cowles, of Chicago, superintendent of the central division of the Associated Press, who declared the operators had the interest of the papers by which they were employed as much at heart as the other members of the staffs. "They are the aristocrats of telegraphers," he asserted. "Level-headed, of good habits, loyal and industrious, the newspapers should be congratulated for their association with that class of men."

Mr. D. S. MacRae, manager, Western Union Telegraph Company, Fayetteville, N. C., in remitting to cover his subscription writes: "Wars may come and wars may go but the AGE comes forever. It is in my opinion one of the very best periodicals published for the telegrapher and I would feel lost without its presence in my library."

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

Evil of Hurry.

Hurry always implies lack of definite method, confusion, impatience of slow growth. Everything that is great in life is the product of slow growth; the newer, and greater, and higher, and nobler the work, the slower is its growth, the surer is its lasting success. Mushrooms attain their full power in a night; oaks require decades.

Seventy-first Anniversary of the Telegraph.

The seventy-first anniversary of the transmission of the first telegraph message will occur on May 24. It is difficult to realize that the telegraph is so young, comparatively speaking, and yet such a power in the world. There are many persons alive to-day who were born before it came into existence and even they cannot realize what has happened telegraphically in the intervening seventy-odd years, so rapid has been the development. Apart from being a great invention in itself the telegraph led the way to many other great electrical wonders. The telephone, the electric light, the electric railway, wireless, etc., are blood relations of the telegraph; indeed, the latter may be said to be the parent of them all. No one has the wisdom to predict what electricity will be doing for the world

at the end of the next seventy-year period of its existence.

Modern Line Construction.

Present-day telegraph line construction is in marked contrast with the notions prevailing a few years ago. High poles were then considered to be the proper way of placing a line out of harm's way, but, with the constant accretion of wires and the increasing frequency of wind and sleet storms, a revision of former methods of construction became necessary. The only way to render a line proof against the extraordinary strains put upon it under modern conditions is to use shorter and stouter poles. This now is the rule, with beneficial results, although the mechanical load and the violence of nature's outbreaks still have to be reckoned with. The shorter poles are more durable and better able to carry their burden and withstand the attacks of the elements. Even the hunter who made it a practice to shoot at insulators and destroy them when there was no game to be had is desisting from his destructive work.

The Premium Plan of Paying Operators.

The premium method of paying operators which is being adopted by the Western Union Telegraph Company in its larger offices throughout the country, is based upon the principle of a fixed salary, plus a premium; that is to say, if a man on a premium circuit handles a greater number of messages in a day than his rating requires of him, he is paid extra for the surplus. As an example, suppose a man working a premium circuit receives three dollars a day; if he handles 350 messages and the circuit rate is a cent a message, his pay will amount to \$3.50. If he does not, for any reason, dispose of 300 messages he receives his full salary (\$3.00) just the same as if he had.

Operators are rated according to their ability to work circuits of different grades. It is understood, of course, that rapidity is not the only requirement necessary to secure a high rating. An operator must be careful and accurate in his work. The standing of operators is necessarily fixed upon the basis of all-round efficiency, and they are rated accordingly.

Under the premium plan an operator is encouraged to do his best, knowing that he will receive financial reward for all work he performs above his rating.

In the case of way wires, where there is not enough business to keep them continuously employed, they are grouped in such a way that one man can take care of several. He, too, receives a stated salary, plus a premium for excess work, and he will naturally try to have the small offices answer calls promptly, so that his earnings may be increased. In this way the business on such wires will be expedited under the stimulus of the possibility of greater earnings on the part of the operator, and he will see to it that all obstacles standing in the way of realizing this result are reduced to a minimum.

**The Assassination of President Lincoln, as Told
by Eight Survivors of the United States
Military Telegraph Corps.**

(Concluded from page 212, May 1)

ACCOUNT OF CAPTAIN SAMUEL H. BECKWITH, GRANT'S
CIPHER OPERATOR, NOW LIVING AT THE SOLDIERS'
HOME, FORTRESS MONROE, VA.

General Grant and staff left the Appomattox Court House immediately after the surrender of Lee's army and arrived in Washington on the morning of April 13, 1865.

General and Mrs. Grant had been invited to accompany president and Mrs. Lincoln to the theater the next evening and the invitations had been accepted, but because of secret service rumors of an attempt to kidnap the president, secretary Stanton urged general Grant to withdraw his acceptance. Accordingly, the general informed the president that he found it necessary to take Mrs. Grant to Burlington, New Jersey, at once, to see their daughter, Nellie, attending school there, instead of remaining over for the theater performance.

On the afternoon of Friday, the fourteenth, while lounging around in Willard's Hotel, general Rawlins, Grant's chief of staff, came to me and told me of the changed plans, and directed me to hurry to the train that was due to start in thirty minutes and accompany general and Mrs. Grant to Burlington. No incident of note occurred until we reached Philadelphia and were seated in Bloodgood's restaurant on Walnut street, eating a hasty meal before crossing the ferry for Camden. A telegraph operator, Geo. W. Porter, a one-legged man on crutches, entered the room and handed the general a dispatch, announcing the shooting of the president and the attack on secretary Seward. The general handed the dispatch to Mrs. Grant at his left, and she, in turn, handed it to me, no words being spoken.

A moment later the operator's hand was raised to attract my attention, and I was called out to receive the special order from the secretary of war, directing me to see that a pilot engine be put in front of our train to Burlington and return to Washington with general Grant.

I passed a sleepless night in the dingy telegraph office at Burlington, then returned to Nellie Grant's boarding-house for breakfast.

Our train was made special to Washington and I accompanied general Grant in a closed carriage to the war department, where he was closeted for a long time with secretary Stanton. We then started for Willard's Hotel on foot. In front of the White House I delivered to general Grant an urgent request from general Halleck, chief of staff of the army, to avoid Willard's Hotel. With his quick glance, he said, "Well, Beckwith, I reckon if they want me they will find me wherever I am. We'll go to Willard's." On parting from him at the hotel, he asked me to telegraph his wife, which I did in the following words:

"War Department, Washington, D. C.,

"April 15, 1865.

"Mrs. U. S. Grant,

"Burlington, N. J.:

"I am requested by the lieutenant-general to inform you of his safe arrival. Please inform Mrs. Dent.

"The president died this morning. There are still hopes of secretary Seward's recovery.

(Signed) "S. H. BECKWITH."

ACCOUNT OF ALBERT BROWN CHANDLER, CASHIER
AND CIPHER OPERATOR, WAR DEPARTMENT
TELEGRAPH OFFICE, 1865, NOW LIVING
IN BROOKLYN, N. Y.

I remember very vividly the evening of April 14, 1865. While I was at work preparing military telegraph pay-rolls in my room at the home of Mr. J. S. Brown, a lawyer, with whose family I was then boarding, Mr. Brown rushed in and exclaimed that Mr. Lincoln had been shot in Ford's theater. He had just come from the scene and had seen the whole tragic event enacted and was, of course, very much excited. I hastened to the theater, which was but a short distance from my room. Mr. Lincoln had just been taken to the house opposite, where his life went out early the next morning. A great crowd was there, and as there was nothing for me to do, I hurried to the war department telegraph office and devoted myself to the duties which there awaited all of us telegraphers who were present. I can only account for my dim recollection of just who else was on duty and what I myself did while there by the fact that I was so dazed by the dreadful occurrence that nothing else seems to have made much impression on my mind. Mr. Stanton's many telegrams were distributed over the country with promptness and were read with intense interest. His firm hand and calm judgment held the condition of affairs more safely than could have been done but for the prompt action of so brave and strong a man as he was. The nearly successful attack upon the life of secretary Seward added to the terrors of the time. As I recall the circumstances now, after so many years have gone by, it seems to me that we all acted with discretion and efficiency in the performance of the duties that then pressed heavily upon us. Mr. Stanton soon afterwards made an order, appointing a military commission for the trial of the conspirators. It was written in his swift, dashing hand, and with such interlineations and erasures made by himself as to make it desirable that a clear copy should be made, and it was handed to me for that purpose. I still preserve the original. The weather in Washington that night was most unpleasant, a light rain and raw atmosphere prevailing.

ACCOUNT OF CHARLES ALMERIN TINKER, CIPHER
OPERATOR, WAR DEPARTMENT TELEGRAPH
OFFICE, 1865, NOW RESIDING AT
STAMFORD, CONN.

I entered the military telegraph corps in 1861 and left it in 1869, my Certificate of Honorable Service, signed by secretary Alger, showing a longer

period of service in that branch of the army than any other member of the corps.

During those eight eventful years I was first with general McClellan's army, and from 1862 in the war department as cipher operator, and from 1866 until 1869 as manager.

During the Civil War I had the honor of meeting president Lincoln perhaps a thousand times, and had learned to look upon him in his daily and nightly visits almost as a companion, while we telegraph boys venerated him as a father.

My war diary of April 11, 1865, records that the president came to the office late that day, while I was alone on duty, and told one of his inimitable stories, illustrating its finale by gathering his coat-tails under his arms, and taking long strides, he passed out of the office, leaving me convulsed with laughter at his amusing performance, which Bates quotes in his "Lincoln in the Telegraph Office." That was the last time I saw him alive. I was not well and did not go to the office on the twelfth or the thirteenth, but on the fourteenth I spent an hour with Bates and Chandler, who gave me the news of the parole of Lee's army, and the grand illumination of the city of the preceding night.

Diary—*Saturday, April 15.*—At 7 a. m. a servant girl came into my room and reported a story she had heard on the street that the president and secretary Seward were killed at 5 o'clock this morning. I thought it an idle rumor, in which the colored people abound, but shortly after my wife returned from marketing and reported she had heard a similar story at the grocery.

I hurriedly dressed, and swallowing a hasty breakfast started for my office. On my way I found the streets lined with groups of people discussing the tragedy. I hurried on, knowing that at the office I could learn all the facts. As I passed secretary Seward's house, I saw it was guarded. A gentleman informed me that the president was dead. In front of the White House grounds I met our colored porter, John Bailey, just coming from the office, from whom I learned that president Lincoln was assassinated in Ford's theater last night about 10 o'clock, by J. Wilkes Booth, an actor. The president died at 7.25 a. m. Secretary Seward's residence was entered about the same hour (10 p. m.) by an assassin, who attempted to cut Mr. Seward's throat.

I went on to the office and found Frank Stewart on duty. Bates had been there all night—Chandler Maynard and Low also.

All departments were closed and being draped in mourning. Our office feels most keenly the affliction which has thus been brought to the whole country in the death of Abraham Lincoln. We had no heart to work—bitter tears flooded every eye, and grief choked utterance.

Major Eckert, our chief, was with the president all night until shortly before he died. He was unconscious from the moment he was shot until he breathed his last.

Mrs. Lincoln, Miss Harris and major Rathbone were in the box with the president. The audience was paralyzed for a moment, some believing it a part of the play. In that moment, the assassin,

whom many recognized as J. Wilkes Booth, sprang from the box onto the stage, drew a dagger, and exclaiming, "Sic semper tyrannis," rushed through the exit to the entrance door, where a horse was in waiting, which he mounted and rode away.

The country awoke this morning to a new life which calls for stern measures yet untried, which he, for whom we now mourn, in the goodness of his tender heart, would perhaps have forbore from administering. Every exertion is being made to catch the assassins. All avenues from the city are guarded and scouts are out in all directions, but they will probably effect their escape through the assistance of their friends, the secessionists, in which the district abounds. All places of business closed this p. m. and buildings generally throughout the city are draped in mourning.

Andrew Johnson was sworn in as president by chief justice Chase at the Kirkwood House.

Waste of Time.

It's a pity to waste time.

One of the most pitiful sights is the man or woman or child who dawdles.

Nature works all the time, and nature is the very best example to copy.

The sun, the moon, the grass, the trees, water, air, heat, cold, little seeds, are always busy.

Folks who hang onto a dead issue are dawdlers.

The trade of telegraphy is passing through a transformation. The old style operator is being shoved out of the game by the new mechanical telegraph, yet thousands of old operators are sitting in the coat-rooms of the big telegraph offices all over the country, waiting to be "put on."

Instead of letting go of the corpse and hunting a new kind of work, they are playing checkers and pedro—and waiting.

The companies don't appear to believe in trying to teach old fellows new tricks—they are not teaching old operators to run the new system.

Anyhow, they can get girls cheaper.

And so this editorial is for telegraph operators chiefly—but for the dawdlers, in effect.

It means: Hustle—get out—wake up.—Portland, Ore., *Daily News*.

Mr. J. E. Dillon, of the Western Union Telegraph Company, Dallas, Tex., in renewing his subscription for another year, writes: "Well, I just handed your agent, Harry Brown, \$2 for the dear old AGE. Regardless of the fact that the general system of telegraphy has varied in lots of ways, there does not seem to be any way too hard to reach, for the AGE has faithfully kept up the pace and tells us of all she sees as the onward march progresses, and the result is we are all made aware of the telegraphic scientific garden's most wonderful products, all because we have the AGE. When I count the many times I have renewed my subscription I find I'm a boy only in fancy. This is as near as I will tell my real age, but if one insists then for mine, it's the TELEGRAPH AND TELEPHONE AGE."

Old Man Kav.

BY J. FRANK HOWELL.

Probably Old Man Kav was the most illustrious personage that ever graced the pages of telegraphic mythology, and to this day no old timer, with red blood in his veins, will fail to straighten up at the mere mention of his name. His life was created in the near vicinity of 195 Broadway, New York, and his entire life centered thereabouts. Notwithstanding that his family tree was a large one, it is doubtful if much is known as to his progenitors. He was ubiquitous and may be said to have been omniscient. His daily doings and perambulations were so familiar to "N. Y." employes that there are hundreds in good health today who could describe him offhand. The same imaginative souls would also describe the night of the "Big Wind."

His name was bandied in the nearby beaneries and cafes with the same familiarity as the telegraph office and few operators that ever came to "N. Y." left without being bettered by the experience of acquaintanceship with the Old Man.

Some of his famous haunts were Pat Flynn's, "Pi," a hostelry on Coenties Slip; Sandy Spencer's, "Ss," where exhilarating viands went to make up a delightful cuisine; and Pat Dolan's "Pd," where "off'n the griddle and one up in the dark" was within the reach of the most dilapidated purse. Of a bohemian nature, the Old Man, as a rule, could be found at any of these places at all times other than that surrounding pay days, when, as long as the money held out, he might be found at the Shrine of Bacchus in Stewart's, or at the "A H" Astor House office end of 999 loop, or some other equally famous joss house in the upper realms of Fulton street's skyscrapers in the days of thirty years ago, where one might dally with the pasteboards of chance and spend other things besides time delving into the intricacies of pokeritis.

As an evidence of his undying fame, an operator, after being married for twenty-five years, asked his wife, who had risen from the ranks of a check girl, is she knew Old Man Kav. "Of course," she replied, a happy reminiscent look creeping into her blue eyes. "He used to wind the clocks at 195. I knew him well." Wonderful imagination! A trusting soul like that would not hesitate at purchasing building lots on the moon. As a matter of fact, the man who looked after the clocks was that silvery haired optimist, Mr. James Hamblet, who was the time-service man when 195 first saw the light of the day.

Looking backwards over time's ledger memory brings queer thoughts to one's mind, and through the narrations an accusing finger points straight at the Old Man, who chose to slight none. For instance, there was the new man from Charlotte, whose mushroom growth after reaching "N. Y." did not pass unnoticed by his colleagues; likewise his cranium, which had expanded at a remarkable rate, termed by some "swelled headitis." One very dull evening he happened to be the only extra man assigned to duty, when it occurred to the Old

Man that he would invite the stranger to get off duty and go to the theater. A note to that effect was tubed up to the operating room from the ground floor, and the new man got excused and hastened down stairs, only to learn that the Old Man, tired of waiting, had gone his way. The new man's angora having been gotten, he went his way chewing his cud.

The Old Man, while gallant with the ladies, never permitted that fact to interfere with opportunity, as evidenced in the fact of a prepossessing feminine telegrapher who made no secret of her affection for the nearest mirror.

It came to pass that she was assigned to another and more prominent wire than that already accustomed to, one overlooking the center of the operating room, and particularly that part where the extra force awaited assignment, many of whom were of the garden variety and youths who knew it all. This particular young lady was about as much interested in the glances from this direction as she was in her work, and she had nothing on the young men, particularly one bolder than the others, who made passing remarks indicating that opportunity awaited development. Cupid, with some one's assistance, informed the girl that there was a male in the building yearning to lay his heart at her feet. Similar good work was being done with the male object. The young lady expressed herself as being tickled to death to meet the ardent swain who was wearing his heart away for her. Very shortly, another note from the same ready letter writer brought about a meeting. The scene for the dramatic encounter was worthy of the ingenious mind of Belasco, and was well patronized. Strange to say, about everyone on duty appeared to be waiting for it. The girl received written instructions. Promptly at 11:30, or about the time that the noonday dinner-hour reliefs took place, she was to walk up the aisle nearest the manager's desk, but towards the east, bearing a number of messages with correction slips pasted thereon (evidencing her desire to quickly correct the same), holding a part of them in each hand, with her hands outwardly extended in such a position as not to fail of attraction.

The new man was to be decorated with roses, one in each lapel, that there might be no mistake of identity, and walk down the aisle by the manager's desk, but towards the city line department. I shall never forget the roses; they were purchased at the old United States Hotel stand and that, too, with the assistance and encouragement of John A. Torrence, of Pittsburgh fame, who happened along about the same time, on his way to the office to work extra; and he, too, obtained a posey, as was his custom, but in his encouragement of the young man's purchasing the larger jacks, it is doubtful but that it was with all innocence of the significance attached thereto.

At the appointed hour the girl came gliding along the aisle, a look of ineffable joy overspreading her features. When she caught a glimpse of her ardent admirer, who looked like a horticultural exhibit, she grasped both of his hands and gazed into the depths of his eyes, as if he were money from home.

But there was one onlooker who had no part in the little drama—manager A. S. Downer. Those acquainted with Mr. Downer will need no reminder of the fact that he was a character in himself. By clever maneuvering he got within close earshot of the happy couple. When he overheard them conversing in Laura Jean Libbey style he told them, in no uncertain language, that they were not seated on a bench in the park, thus shattering their fondest hopes. Cupid flew away with a sob; the youth was sent on his way, and the girl placed on a less conspicuous wire, where less time was had for thought other than telegraphic.

Another incident was that of two young women possessing sealskin coats, to the discomfort of their less fortunate sisters, and that of a young, middle-aged newcomer, who possessed a high hat, with which he was daily tiled as he appeared for duty, thus placing this trio in a class by themselves, and from a tonsorial point of view, highly distasteful to the better element in the profession. A correspondence, seemingly befitting to both sexes, and that, too, without discrimination between either of the fair ones, was begun with an indulgence that soon created a popularity with this Romeo heretofore unknown, and which ripened into a matinee invitation, which was unknown as being of interest one to the other of these young ladies, until the trio had procured substitutes for the afternoon in question and met face to face at the theater. There it dawned upon them that they had been hoaxed by an artful ready letter writer, but being sufficiently good sports, no one was the worse for an otherwise well-spent afternoon.

In the old stage-coach days on Broadway, one individual rode up and down the great divide a greater part of the evening before it dawned upon him that paying fares might become a continuous performance awaiting the Old Man's keeping of his engagement.

The Old Man and Tom Finnigan, the genial doorkeeper, were bosom pals, and many a pleasantry was furthered by the assistance of the wily Tom, particularly around payday, when the Jew tailor haunted the only entrance to the operating room, in hopes of obtaining a glance at a piece of kale in lieu of installment obligations. Finnigan would entice the Israelite to the coatroom long enough to permit a quick getaway for the talent and then report, "off duty for the afternoon."

Take the case of Charles W. Minier, an "irritation" character, otherwise one of the fastest senders the fraternity ever had, but unreliable because of his obstruction habits. He would fight if you broke, because you were naturally a ham, and fight if you did not break because it was a reflection on his swiftness, of which achievement he was extremely egotistic, and, as a rule, this element has many sympathizers, but the definition is generally spelled reversely. There was an operator in a nearby city, rather of a taciturn disposition. It was no effort whatever for him to receive, and that, too, most anything within reason. A key to him, when on the receiving side, under normal conditions, was a nonentity. Everyone loved to work with him, and

even "Charlie" had begun to look upon him with favor, often remarking how this fellow could take him and how apparently crazy everybody else must be. This hallucination was growing and it was feared that "Charlie's" mind was centering too greatly in one direction for safety. Strange, but this, too, preyed on the Old Man's mind lest "Charlie" become obsessed with a false idea of his own importance, and work was begun on his irascibility until such time as that "worthy" commenced to fight the other end, with the usual result, a general upheaval, "Charlie" was lifted.

"Skate" Donohoe, in one of his celebrated detours of the city, met and consoled with one of our erstwhile night managers, who spent part of his time in picking winners, known as long shots. These successes, which were by no means infrequent, generally carried with detention from the office. Upon his return, there were noticed a variety of callers, some of which were put to work, who had often been tried and found unreliable and otherwise unacceptable. "Skate" was among the class of "not wanted," but he gained admission, and while there on one occasion, sat down and wrote a note to the venerable Mr. Smith, who was then manager of the lunchroom, stating that he had left his lunch ticket at home and would not be able to get up to the lunchroom before it closed at 9 o'clock, and to please give the bearer "so and so" until the following evening. The note was signed "O. M. Kav." An office boy was found and the note dispatched with successful effect, and it is doubtful if ever Mr. Smith was much, if any, the wiser for it.

A new man receiving alongside of one of the regular "payday-ites" was made at home in his new surroundings to such an extent as to ingratiate the "regular" into his good graces, with the usual result, i. e., the "regular," after sizing up the new man, wrote him a touching gem, in which he signed it "Old Man Kav," and asked for a loan of fifty cents. Getting up from his work, he found an office boy, who followed directions and delivered the note to the new man. The "regular" saw the message delivered at his elbow and controlled his risibilities while the new man gently "Bk" "Bk" read the note and inserted the requested fifty cents. The boy, after a circuitous route, came back to the "regular" and slipped him the reply.

Joe Barley once told a story of Tom Finnigan chaperoning a party through the office, one of which inquired after Old Man Kav, much to Tom's amazement, and asked to have that famous character pointed out to him. "I will, I will," said Tom. Shortly thereafter, thinking that possibly the old gentleman had forgotten, asked again. "I will show yez him," said Tom, and at that moment, evidently acting on the impulse, pointed out Joe. The stranger gazed in awe at the genial Joe, and on the way out, paused to introduce himself. Joe, who never in those days missed an opportunity to make a touching impression, hinted that the stranger was speaking to one who seldom deigned to hold converse with ordinary mortals, and before the stranger recovered from his amazement, Joe separated him from a small loan of twenty-five cents.

Joe said that under ordinary conditions it might seem like a breach of etiquette, but this was extraordinary.

Tom Kennedy, eastern wire chief, popular, jovial, always ready with a good story. Under normal conditions he was a lovable man, but, in strenuous times, when storms played havoc with the wires, Tom was approached by those acquainted with him via note and the innocent office boy, but not so with the uninitiated, who generally walked in up to their ears. Tom was extremely irritable. The first Boston quadruplex was near the eastern switchboard, and on a particularly stormy night working one cornered, and that poorly. A raw recruit was sifting the messages through, regardless of conditions, and Joe Wood, at the Boston end, was receiving. Joe was a high-class man and took great pride in his work as long as things were consistent with his thinking. He had been wrestling with this more or less inexperienced man until he could no longer stand it, neither could he reason with him, because the man's experience did not warrant it. Finally he broke the sender and asked him to take a message and hand it to "Ky" in person and await a reply. It read: "Ky, N. Y. Come to the first Boston, give her a balance, believe that we can make it work all four cornered." Signed "O. M. K." The operator stood more or less in "Ky's" way until "Ky" could no longer endure, when he crabbedly exclaimed, "What do you want," at the same time looking at the message and catching a glance of the signature, when he began tearing the chords out of the switchboard, threw up his hands, and in the verbal explosion that followed, the panic-stricken operator got out of sight about as one might imagine seeing a dog going down the alley with a tin can tied to his tail.

Almost every new appointment to the force would put in the first night or day's work for Old Man Kav. After receiving an assignment to a wire and he had been working for a short time, if perchance he was on the day force, he would receive a note signed, "Old Man Kav," stating that he had just been informed that his wife was suddenly taken sick and that it would be necessary for him to put on a substitute that night. Would he work for him? No doubt, as he was a new man, he would be glad to obtain this extra work. The reply was invariably in the affirmative and the newcomer would continue to work well into the night, when the night chief operator would ask his name and for whom he was working. When the reply "Old Man Kav" was given the timekeeper said, "You're off! Look to Old Man Kav for your pay."

In the attached names we had the flower of the profession, and as such, ready food for thought was at all times available for Old Man Kav. Germs: James Largay, Gib. Merrill, Dave Mitchell, Gus Coleman, Monroe Labaugh, J. P. Bradt, Percy Jones, Denny Harmon, Denny Brown, Pat Tierney, Dwight Case, Abe Locke, Fred. Cushing, Fred. Catlin, Wm. Maver, jr., Billy Landy, Johnny Moreland, E. P. Griffith, Biff Cook, E. T. Barbaree, Gardner Irving, Jack (Gynx) Morrison, Ed. Keene, Bob Martin, E. W. H. Cogley, E. M. Anson, Fred.

W. Baldwin, E. A. Leslie, and numerous other celebrities either passed on to the great divide or into other professions.

How to Make Our Advertising Columns Yield Results to Those Who Patronize Them.

Mr. S. B. McMichael, general manager of the Dominion Messenger and Signal Company, Ltd., Toronto, Ont., under a recent date, writes:

"In connection with the TELEGRAPH AND TELEPHONE AGE of March 16, I am interested in your article on 'How to make our advertising columns yield results to those who patronize them.' I am sure that this article will do a lot of good, and I am myself writing to one of your advertisers today in reference to literature describing new apparatus.

"If you will permit me to make a suggestion, I should like to say that, in my opinion, the advertising columns of your paper would be more interesting to the reader if you would induce the advertisers to make frequent changes in copy. To me the advertising pages of the *Saturday Evening Post* and some of the principal magazines are of just as much interest, if not of more interest, than the other portions of the paper. Those advertisements contain interesting pictures and items of real news that are interesting to nearly everyone. A simple card, such as the telegraph companies run in your magazine issue after issue, without change, soon becomes so familiar to the readers that they are passed by without any particular notice. In my humble opinion this is decidedly bad practice for both the advertiser and the advertising medium."

Mr. McMichael's observations are worthy of considerable attention. Many times the publisher of this journal has endeavored to persuade advertisers to change copy more frequently and to add zest and ginger to what they had to bring to the attention of our readers. The replies to our communication were very unsatisfactory except from the humorist's standpoint. One prominent concern, who has carried space in our paper for over twenty-five years, replied: "We pay our bills promptly. We use copy that we think best suitable to our business, which is conducted along conservative lines. You should have no complaint to make." Another advertiser informed us that although they purchased considerable space in our paper, all they wished to do was to have their name and address and the nature of their business prominent. Many other advertisers stated that they simply regarded their advertisement as a sort of directory notice, and those who purchased from them merely referred to our paper for their address. Others again regarded running the same copy year after year as a sure indication of reliability and substantiality. A good doctor has a great fondness for an old sign.

Mr. J. M. Abbott, of the office of division plant superintendent of the Chesapeake and Potomac Telephone Company, Charleston, W. Va., writes: "TELEGRAPH AND TELEPHONE AGE is very practical and interesting."

Telegraph Tournament Postponed

The executive committee having the San Francisco Tournament in charge have unanimously decided to postpone the dates of the Tournament from May 27-29 to August 26 and 27. This action was deemed necessary because everyone identified with the project has found it impossible to complete the work incident to pulling off a successful telegraph tournament of this magnitude on the dates previously agreed upon. The postponement until three months later will afford the needed time to complete all of the details and will enable many telegraph operators to take part in the contest, which would not be the case if the Tournament occurred in May.

Address all communications to—

E. COX, Secretary
1092 POSTAL TELEGRAPH BUILDING
SAN FRANCISCO, CAL.



THE most extensive and only complete radio-system in North America, operating on over 1800 ships, having coast stations on the Pacific from Bering Strait to Mexico, and on the Atlantic from Labrador to the Rio Grande, connected by direct wires with Western Union land lines.

TRANS-ATLANTIC AND TRANS-PACIFIC SERVICE AT REDUCED RATES

Such messages should be marked:

"VIA MARCONI"

and filed with **WESTERN UNION**

or

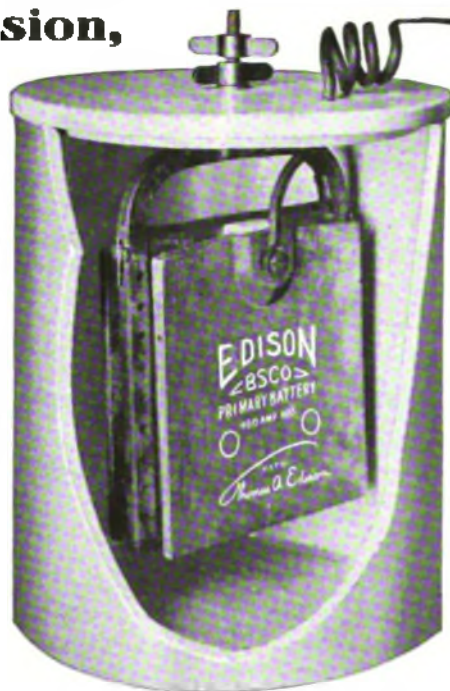
**MARCONI WIRELESS TELEGRAPH COMPANY
OF AMERICA**

42 Broad Street, New York

EDWARD J. NALLY, Vice-President and General Manager

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



THOMAS A. EDISON, Incorporated
247 Lakeside Avenue
ORANGE, N. J.

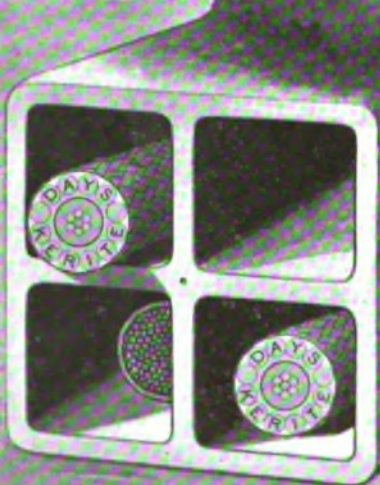
A Significant Fact

Of the three Cables in the Trans-Isthmian Duct Line, one is a paper-lead telephone cable - the other two are

KERITE

(taped and braided)-the Panama Railroad's signal cable, and the Central and South American Telegraph Company's connection between its Atlantic and Pacific cables.

The severity of the conditions and the importance of the service, determined the selection of Kerite for these installations



KERITE INSULATED WIRE & CABLE **COMPANY**
NEW YORK CHICAGO

Lillibridge 80-297

OKW&CO

THE RAILROAD.

Mr. M. H. CLAPP, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn., read a paper before the New York Telephone Society, April 27, on "A Comparison of the Application of the Telephone in Commercial Companies with its Application to Steam Railway Operation."

Mr. B. J. SCHWENDT, signal engineer of the Toledo and Ohio Central, and Zanesville and Western Railroads, has been appointed superintendent of telegraph and signals of the same roads, with headquarters at Columbus, Ohio.

CONTINENTAL ALPHABET ON RAILROAD WIRES.—An operator on a Western railroad has asked the *Railway Age Gazette* to advocate the use on railroad wires of the Continental code in place of Morse, in the interest of "safety first." The editor of the paper does not favor the idea altogether; he admits, however, that it is a debatable proposition.

Death of W. C. Walstrum.

W. C. Walstrum, aged sixty years, superintendent of telegraph, Norfolk and Western Railroad, Roanoke, Va., and president of the Association of Railway Telegraph Superintendents, died at his home, May 8, his remains being buried at Fredericksburg, Va., May 10. Mr. Walstrum was born at Charlottesville, Va., in 1855, and entered the telegraph service as messenger in 1869, becoming an operator a year later. His activities were wholly in the South. He was faithful to the interests he represented during his career and highly esteemed by his many friends. He became superintendent of telegraph of the Norfolk and Western Railroad sixteen years ago and was a very capable and just official.

Mr. Walstrum was elected president of the Association of Railway Telegraph Superintendents at the New Orleans Convention last May, and had given much thought and time toward making a great success of the Rochester convention next month. The funeral services were attended by many of his old associates.

The Rochester Convention of Railway Telegraph Superintendents.

The programme of the thirty-fourth annual convention of the Association of Railway Telegraph Superintendents at the Powers Hotel, Rochester, N. Y., June 22, 23, 24 and 25, both as regards work and entertainment will be satisfactory in all particulars. On June 23 there will be an automobile ride in the afternoon and a banquet in the evening, and on June 25 there will be a boat ride on Lake Ontario. The ladies of the party will receive special attention in the way of entertainment and every effort is being made to make the meeting profitable and enjoyable in every way. As already announced, several papers of particular and general interest will be presented at the meetings, and several prominent telegraph and telephone engineers will be present. Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, will be present in person and read a paper of special value to the superintendents.

Owing to the death of W. C. Walstrum, president of the association, the duties of that office will devolve upon Mr. E. C. Keenan, first vice-president. Arrangements for the Rochester convention are being completed by Mr. Keenan and secretary P. W. Drew, and there will be no change whatever in the plans.

OBITUARY.

EDWARD D. EASTON, aged fifty-nine years, president of the Columbia Graphophone Company, Bridgeport, Conn., died at Central Valley, N. Y., April 30. Mr. Easton was formerly a well-known Associated Press reporter in Washington.

H. S. STONE, eldest son of Mr. Melville E. Stone, general manager of the Associated Press, New York, was drowned in the sinking of the steamer *Lusitania* by German submarines off the Irish coast on May 7. Deceased was formerly in the publishing business and was the founder and editor of two magazines. He was a graduate of Harvard University and a member of various New York clubs.

The Late D. B. Mitchell.

A special meeting of the directors of the Serial Building Loan and Saving Institution was held on Friday evening, April 30, to take suitable action on the death of David B. Mitchell. Mr. Mitchell had been connected officially with the Serial since its organization, and for thirteen years acted as president of the institution. During his long term of office the institution, under his able presidency, was very successful and increased in resources and reputation, notwithstanding the two financial panics which caused much distress to other banking interests. Suitable resolutions of condolence were passed and a committee consisting of Thos. E. Fleming, T. M. Brennan and E. F. Howell was appointed to have them engrossed and presented to the family, as a testimonial of the appreciation in which Mr. Mitchell was held by the hundreds of members of the Serial Institution.

The funeral services at his late home at New Rochelle, N. Y., Friday evening, April 30, were attended by a large number of his former office associates and business acquaintances.

In business Mr. Mitchell was a man of the highest credit, whose word was as good as his bond. In his home, considerate and tender, and with his friends, a genial and faithful companion. He was a brilliant telegrapher of the old school.

THE ANNUAL BUSINESS MEETING of the American Institute of Electrical Engineers will be held at 39 West Thirty-ninth street, New York, at 8:15 p. m., May 18. The result of the election of officers will be announced. Following the meeting, Dr. Alexander Graham Bell will be presented with the Edison medal. An address will be made by Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, and Mr. Thomas A. Watson will follow with an address, entitled "How Bell Invented the Telephone."

INDUSTRIAL.

THE WESTERN ELECTRIC COMPANY distributing house in Kansas City, Mo., has been located in new quarters on Wyandotte Street, opposite the old building. The new building is five stories in height and has floor space of about 52,000 square feet.

Portable Electric Drills.

The Western Electric Temco line of electric portable drills are especially designed to give long and efficient service under the severe conditions and hard usage and are essentially all-around tools. These drills have the general shape of an ordinary breast drill, are compact in design and light in weight.

A special feature is the ease with which the motor may be reversed when the drill sticks. Whether working at high or low speed, a touch of the switch reverses the motor, loosening the drill or sending it ahead, as required. These drills will also tap holes, the reversing feature being here of great advantage. They are indispensable wherever holes are to be drilled or tapped and particularly where the material cannot be carried to a drill press, the tool is carried to the work.

The motors are built to operate on either direct or alternating current at standard voltages. Connection is made to the nearest lamp socket by means of a flexible cord and attachment plug. The two principal sizes are Model B and Model C, the former having one motor and the latter having two motors.

The Western Electric Temco line also includes a tool post grinder, a valve grinder for automobile engines and a buffer and polisher.

Thirtieth Anniversary of the Serial Savings Institution.

The Serial Building Loan and Savings Institution, New York, is celebrating its thirtieth anniversary. Its successful career in the service of telegraphers has brought this institution a well-deserved reputation for careful management, progressive methods, and the most scrupulous regard for the interest of its members. It is unquestionably conducted for the benefit of its individual clientele, and has become both popular and respected by the telegraph fraternity. The convenience of its membership is studied and provided for in every way possible, and as its growth has warranted, additional features have, from time to time, been provided.

A deposit in the treasury of the Serial has every advantage that a savings account in any other institution can offer, including the privileges of immediate withdrawal and dividends at a somewhat higher rate of interest.

In his annual report, president A. G. Saylor says: "It affords me pleasure to congratulate the members of the Serial Building Loan and Savings Institution upon the completion of their thirtieth anniversary. It would be meaningless to place before you an array of figures to show that many mil-

lions of dollars have been saved during that time, that many hundred homes have been built by telegraphers, that many are free from incumbrance, and that substantial material gain has been achieved by you. It does, however, mean much in the welfare, comfort and happiness of your lives, and counts in the progress of humanity. But far above and beyond stands out the character building which means most of all. Thrift, energy and perseverance have created a natural ambition, and the interest displayed by our members has kindled, fanned, and enflamed in the minds of the members of our profession the true spirit of co-operation."

Engineering Articles.

Important engineering and scientific articles that have appeared in this publication since January 1:

"Rules of the Postal Telegraph-Cable Company for the Wiring of Offices." January 1, January 16, February 16. Price, twenty-five cents per copy.

"Some Primary Battery History." By Donald McNicol. January 1. Price, twenty-five cents per copy.

"Improvements and Developments in Wheatstone Working." By W. Finn. January 16 and February 16. Price, twenty-five cents per copy.

"Opening of the New York-San Francisco Telephone Line." February 1, February 16.

"Western Union Ticker Service." By C. R. Tilghman. March 1, March 16.

"Electricity." By J. F. Skirrow. March 1. Price, ten cents per copy.

"Morkrum Telegraph Printers." March 16.

"Batteries." By J. F. Skirrow. March 16. Price, ten cents per copy.

"Western Union Quadruple Duplex, or Octuplex." April 1, April 16, May 1. Price, ten cents per copy.

Papers three or more months old cost twenty-five cents per copy. Papers over twelve months old, fifty cents per copy. Papers printed within three months, ten cents per copy.

Address TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

NEW CABLE CODE.—There are many cable codes on the market and each one has merit of its own. The latest production in this line is the Veslot cable code, which permits of instant and automatic translation into and from English, French, German, Spanish and Italian. The price of this work is \$25, and orders will be filled by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

The Greek—They have found iron wire at Athens in excavation among ancient ruins, proving that the ancient Greeks understood telegraphy.

The Egyptian—But at Cairo it is more remarkable. They have made excavations and found nothing!

The Greek—Found nothing! What does that prove?

The Egyptian—Why, that the ancient Egyptians understood wireless telegraphy!—*Le Rire*.

The San Francisco Tournament.

As was announced in our May 1 issue the telegraph tournament which was to have been held in San Francisco, Cal., May 27, 28 and 29, has been postponed until August 26 and 27, in order to give more time for the preparations. There is much detail work in connection with an enterprise of this character that the committee having charge of the affair has decided that it would be more satisfactory to all concerned to defer the tournament rather than hold it at the originally set time and not have everything ready for it.

Tournaments of the past have almost invariably been conducted as best the promoters knew how but without profiting by the mistakes of their predecessors. Judges are selected because of the illustrious names they bear, because they are known to be honest and their membership on committees will lend dignity to the occasion. It is no reflection upon these gentlemen to say, if they are not actively engaged in high-speed telegraphy, that they are unfitted, through long inactivity, to judge of the work of men who send Morse above fifty words per minute. Even one such old timer whose position in the world may be high, when placed on such a committee with men who are working at the key, naturally sways the opinions of his less illustrious and less fortunate co-judges. Hence it is a prime necessity that every judge on the active list should be elected for his ability to pass upon high-class work, as well as for his honesty of principle. Few men to-day who have not been actively engaged in telegraphy—in press or bonus or brokerage work—even for a year, are capable of reading Morse at fifty words, yet experts know that it can be sent with commercial value at fifty-five. The trouble is with the ears which have slowed down through inactivity, not with the Morse which has quickened with practice.

Now a word regarding medals and cups. Doubtless the gentlemen who give these prizes would as lief or rather give gold watches or diamond rings which would be of real use. They are usually solicited and the custom seems to be for the solicitors to mention a cup or a medal. The possession of either is honorable and ornamental, but a watch or a ring is just as honorable and far more serviceable. Then let us have more watches and rings, or money, if you will, and less of cups and medals in future. It cannot be considered looking a gift horse in the mouth to make such a suggestion, because a broad-minded man knows it is simply a better understanding of the matter, which brings it.

We have established records for the world's championship. In 1898 it was the old "Command of Gideon" matter, of which William M. Gibson sent 248 words in five minutes. In 1893 the same record had been made by Frank Catlin and F. J. Kihm. In Atlanta this record was beaten by both McClintic and Bruckner, the former sending 252 and the latter 251½ words, of the same matter. For the championship, however, new matter was used, and a new distance established. The time was doubled, making championship work include a qualification of receiving straight Morse, five minutes, and ten min-

utes sending straight Morse. The record established—517 words—was ignored in Philadelphia, as was the time-honored "Command of Gideon," because it was "known" matter and some operator might have taken advantage and been practicing on it since the last tournament. If an operator has so much perseverance, why not let him have the opportunity to win laurels with it? Why not take the "Command of Gideon," for instance, or the matter used at the first annual tournament in Atlanta in the Carnegie Medal contest, as a standard, or select new and suitable matter and perpetuate it as a mark for succeeding generations to hit at? There should be some established record which we should strive to excel. Taking new matter and establishing new distances in each tournament mixes us all up and does not give a line on whether we are improving or retrograding. In New York, May 14, 1898, H. V. Emanuel, of Philadelphia, established a record for thirty minutes receiving messages. He clinched the title in Atlanta and lost in Philadelphia to J. P. Gallagher by a close decision, but the fact that the same class was adopted by all three tournaments gave the fraternity a basis for judging the merits of such work from 1898 to 1903, and it had improved. The same messages should be used and the same identical class incorporated in every tournament. Side classes of from a minute to eight hours may be worked in, but these championship classes should be maintained always as a standard. A telegrapher, whether he be a commercial man, bonus, press or broker, is capable of sending and receiving straight Morse just as well or better than he is of handling telegrams. His particular specialty may be either of the four and he may be excellent in that class, but he can always transmit straight matter just as fast or faster, and receive it, too. For that reason, why ask a press operator or a brokerage operator who has been as fine as the finest, perhaps, at receiving and sending messages, before he was promoted to work just as difficult but more remunerative, and widely different from handling commercial telegrams, to include the sending and receiving of messages with the sending or receiving of straight matter to win a championship, as was the arbitrary ruling of the Philadelphia officers when McClintic, who had won in Atlanta by straight work, was forced, on short notice, to defend his prize in a different manner from which he had won it, including message work from which he had long since been separated.

If we are to have a definite, permanent organization to hold tournaments at stated periods, it is all very well to have the Carnegie medal or some other suitable trophy as a permanent inspiration. On the other hand, there is no regularity to the thing, and the medal won in Atlanta by McClintic and taken from him by Gibson in Philadelphia should be given to the telegrapher who can first win it three times, whether successively or otherwise, or else it should be given outright to its next winner. As the two former winners have an equity in the medal, however, this latter course hardly seems fair, and the three-time winner is the better one.

THE PROCEEDINGS of the forty-eighth annual meeting of the Telegraph and Telephone Life Insurance Association, held in New York, March 17, have been issued in pamphlet form and is being distributed among the members. It is a very complete presentation of the association's affairs. Mr. M. J. O'Leary, 16 Dey Street, New York, is secretary.

CONVENTION OF RAILWAY MEN IN NEW YORK.—The Order of Railroad Telegraphers, Dispatchers, Agents and Signalmen of North America will hold its annual convention in New York, May 17 to 22.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Elvin Lutz, a traffic supervisor in the New Jersey Division, died from the result of an operation for appendicitis on April 28. Mr. Lutz buried his mother about a month ago and his brother on April 24, just four days prior to his own death. He was a member of Cambridge Lodge, F. and A. M. and Syosset Tribe, I. O. R. M. He is survived by a brother. Mr. Lutz was thirty-four years of age.

Mr. E. J. Murphy, of the operating force, was married to Miss Catherine Slattery, of Mr. S. B. Haig's office, on April 28. The bride and groom were very popular and were the recipients of many handsome presents. Their honeymoon was spent at Niagara Falls. Their many friends wish them a long, happy and prosperous married life.

Mr. J. V. Riddick, of the marine department, has been appointed local agent and correspondent for TELEGRAPH AND TELEPHONE AGE. Mr. Riddick is a man of ability and enterprise. He taught school for five years and is well equipped to look after the affairs of this publication in the main operating department. Orders to place for subscriptions, electrical books, etc., by anyone identified with the service should be handed to Mr. Riddick. Our former agent, Mr. John Rathbone, was some time ago retired, and his infrequent visits at the office preclude his giving the agency work the attention that it requires.

The Grand Council of the Royal Arcanum, in session at Saratoga Springs, N. Y., April 27 and 28, selected Mr. P. J. Tierney, of the Central Cable

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.

office, New York, as the chairman of its committee on printing and supplies for the sixth successive term. Mr. Tierney, however, declined the re-election, expressing the opinion that grand council honors should not be retained indefinitely by one man.

Mr. R. F. Drehner has been placed in charge of the automatic department, vice Mr. J. T. Laidlaw, assigned to other duties. Mr. Drehner has a thorough practical and theoretical knowledge of all printer systems, which eminently fits him for his new position. Mr. Laidlaw was in charge of the automatic department for the past seven years, and was well thought of by all who knew him.

Mr. A. H. Miller has been placed in charge of the automatic department nights. He has an extensive knowledge of printer systems and is well capable to fill the requirements of his new position.

PHILADELPHIA POSTAL.

Our baseball team defeated the Western Union team on Saturday, May 8. The score was 16 to 2.

The Philadelphia Mutual Investment Association held its annual meeting May 3. The treasurer's report showed a very successful year. This association has now started on its fourth year.

CHICAGO WESTERN UNION.

Franklin C. Miller, an operator in this office, died suddenly, April 26, at Whittier, Cal., while on a vacation. The remains were brought to Chicago by Mrs. Miller for interment. Mr. Miller had been in the service for many years and is well known.

Mary Elizabeth Mullen, widow of Roger J. Mullen, who died March 19, has been paid \$1,200 by the Employees' Benefit Fund Committee.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 63c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 810, NEW YORK.

Telegraph and Telephone Age

No. 11.

NEW YORK, JUNE 1, 1915.

Thirty-third Year.

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Faults in Telephone Apparatus and Their Remedies.

A telephone line, like all other human contrivances, is not perfect, yet its approach to such a state is marvelous. The telephone is a delicate instrument, and requires constant supervision to keep it in a healthy and operative condition; it has its ailments which must be corrected, but if it is given the proper attention it renders faithful service.

The rapid detection of faults in telephone instruments and lines requires a thorough knowledge of the construction of both, combined with skill and experience. Large telephone companies employ "inspectors" whose duty is to locate and remove faults on subscribers' lines or instruments, and on their skill and experience depends much of the efficiency of the system.

Searching for faults should be made systematically and with care. To begin with, start at the source of the power—the battery—and proceed as follows:

Replace any zincs that may be unduly eaten away, and see that the cells are properly filled with solution. Crystals that may have formed on the carbon, zinc or glass jars must be scraped off, and, if necessary, wash out the jars and recharge them.

If dry batteries are used, they should be tested to ascertain their condition. This can best be done by the use of a battery gauge, which shows the state of a battery, wet or dry.

Connections at battery binding posts are a frequent cause of trouble. They should be carefully examined to see that none are loose. If any of the wires are corroded they should be scraped and cleaned to insure a good contact. A small galvanom-

eter is a great convenience in testing for faults and for ascertaining the condition of the battery.

Follow the wires from the battery to the instrument, repair them where they are damaged, and use staples to hold them in place where they are loose.

Next, inspect the magneto. Try the connections to see that they are tight, and make sure that the gravity hook works freely, carefully noting that good contact is made, whether the lever is up or down. Inspect the ringer adjustment, and see that the striker is properly adjusted. The automatic shunt should be tested to make sure that it works well.

The transmitter should next receive attention. First inspect the diaphragm to see that it is not cracked, and gently tap the transmitter to make sure that the granules of carbon are not packed.

The receiver should be next inspected. Unscrew the cap and see that there are no particles of dirt or iron between the pole pieces and the diaphragm; that the magnet spools are tight on the pole pieces; that the diaphragm is not bent, and that the cord is sound. Also see that the two ends of the receiver cord are not frayed.

If the receiver cord is suspected of being broken, it should be removed and tested for short circuit or continuity. Defects in cords are frequently difficult to detect, and if there is any doubt about the integrity of the cord it should be replaced at once by one that is known to be sound.

The most likely point in a magneto bell for a fault to occur is in the contact springs of the gravity hook, and trouble is sometimes due to the armature shunt of the generator not working properly. If after these matters have been attended to the generator still does not generate current the coils of the armature may be fused or broken. Should this be the case the coils will have to be unwound until the fault is found, first making certain by galvanometer test that the wire is really broken.

The ringer movement on the door of the magneto sometimes gets out of adjustment, which, however, can be easily remedied, as adjustments are usually provided for the striker, gongs and magnet of the bell.

The armature shunt or cut-out sometimes gives trouble owing to the wear of the different parts and sometimes from the accumulation of dust and dirty oil on the contacts.

When a wire breaks in a groove at the back of the instrument the only reliable way to locate it is by testing. Sometimes a wire will break at the point where it joins one of the hinges or contact points and will appear to be in perfect order until it is pulled away.

The magneto will occasionally become short circuited owing to the lightning arrester plates having become connected either from the warping of the woodwork or from some metallic substance having been laid or fallen on top of the instrument.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED MAY 4.

- 1,137,865. Telephone System. To E. E. Kleinschmidt, New York.
 1,137,894. Printing-Telegraph Sending Apparatus. To F. D. Pearne, Chicago, Ill.
 1,138,147. Method of Tuning Telephone Receivers. To H. J. Power, Everett, Mass.
 1,138,174. Telephone-Exchange System. To G. Babcock, Rochester, N. Y.
 1,138,175. Telephone System. To G. Babcock, Rochester, N. Y.
 1,138,255. Intercommunicating Telephone System. To H. T. Slee, Warwick, R. I.
 1,138,283. Telephone-Call Register. To W. G. Dodge and C. H. Leave, Boston, Mass.
 1,138,389. Attachment for Telephone Transmitters. To T. Luby, Philadelphia, Pa.

ISSUED MAY 11.

- 1,138,652. Wireless Telegraphy. To B. Graves, Thorntown, Ind.
 1,138,698. Telephone. To E. S. and C. D. Stewart, Ottawa, Ill.
 1,138,734. Automatic - Telephone Responding Apparatus. To E. J. Cressey, Wichita, Kan.
 1,138,830. Printing-Telegraph Receiver. To C. G. Ashley, Chicago, Ill.
 1,138,879. Trunking System for Telephone Exchanges. To F. R. McBerty, New Rochelle, N. Y.
 1,138,958. Printing - Telegraph. To O. L. Kleber, Pittsburgh, Pa.
 1,138,959. Telephone Transmitter. To D. Koenig, New York.
 1,139,226. Radiotelegraphy. To E. Raymond Barker, Wimbledon, Eng.
 1,139,413. Apparatus for Transmitting Sounds by Means of Hertzian Waves. To W. Harrison, New York.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on May 25:

American Telephone and Telegraph Co.	119
Mackay Companies	79
Mackay Company, preferred	66
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	23 3/4
Western Union Telegraph Co.	66 1/2

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which in many cases will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges

on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 1/2 cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

MR. FERNANDO GIL, formerly director of telegraph and telephones for the government of Mexico, has taken up his residence in New York.

MR. WILLIAM DUBILIER, connected with the engineering staff of Foote, Pierson and Company, New York, sailed for England on the steamer "St. Louis," May 15. He has gone abroad on business, in connection with several wireless specialties and other electrical apparatus.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. C. ADAMS, vice-president, spent a couple of days in Washington recently.

MR. M. M. DAVIS, electrical engineer of this company, left New York, May 17, on a business trip of two weeks to Chicago and the middle west.

MR. F. J. KERNAN, of New York, auditor of this company, who is also secretary and treasurer of the Mutual Investment Credit Union, an organization for the benefit of the employees of the company, reports its affairs in a very sound business condition. A large increase in the business as well as in the membership is noted. This is the association that put the money lenders in New York City and other points out of business so far as Postal employees are concerned.

THE NEW HAVEN, CONN., OFFICE of this company is being remodelled and modernized throughout. Mr. N. C. Hall is manager.

NEW JACKSONVILLE OFFICE.—This company has begun work on its new office in Jacksonville, Fla. When completed, this will be equipped in the most modern fashion. It was necessary to obtain better quarters to properly handle the increased Florida business. Mr. J. C. Dolive is manager.

AGAINST LEASING OF WIRES.—The Postal Telegraph-Cable Company and the Grain Receivers' Association of Chicago have filed briefs with the Interstate Commerce Commission at Washington, in opposition to leasing wires to others than press associations and industrial commercial houses.

POSTAL TELEPHONE SERVICE.—The Mackay Telegraph and Cable Company and the Postal Telegraph-Cable Company have opened long-distance telephone service at the following points: Memphis, Tenn.; Little Rock, Pine Bluff, Hot Springs, Arkadelphia, Prescott, Hope and Texarkana, Tex.; Dallas, Houston, Galveston, and Beaumont, Tex.; New Orleans, Shreveport, Alexandria, Eunice and De Quincy, La., and other smaller intermediate points. Further extensions are being made.

J. E. McCaw, aged sixty years, formerly manager for this company at Henderson, N. C., died at Richmond, Va., May 16.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

Mr. R. E. CHETWOOD, plant engineer, has returned from a business trip to Birmingham, Ala.

Mr. W. A. SAWYER, district commercial superintendent, New York, recently made a trip through lower New Jersey on company business.

Mr. J. W. GAFFEY, commercial agent, New York, gave an illustrated lecture in Willimantic, Conn., May 4, his subject being "The Story of the Telegraph." The lecture was given before the Board of Trade and Business Men's Association.

GENERAL T. H. HUBBARD, aged seventy-seven years, a member of the executive committee of this company, died in New York, May 19.

Mr. C. H. CADWALLADER, manager of the Detroit, Mich., office of this company, has been transferred to the management of the Toledo, Ohio, office, vice F. V. Moffit, retired to his old home at Iowa City, Iowa, after a service with the Western Union Telegraph Company, in various capacities, covering a period of forty-two years.

Mr. A. A. BURR, assistant manager at Detroit, Mich., has been promoted to be manager of that office, to succeed Mr. C. H. Cadwallader, transferred to Toledo, Ohio.

Mr. GEORGE R. SHULTZ, manager of the Punta Rassa, Fla., cable station of the Western Union Telegraph Company, celebrated his seventieth birthday on May 3. He has been in charge of the cable station at that point for fifty years, and is one of the youngest and most enterprising old timers in the State of Florida. The friends of Mr. Shultz wish him many more years of usefulness in the telegraph service.

AMONG RECENT EXECUTIVE OFFICE VISITORS were: Messrs. D. C. Dawson, former district traffic superintendent, St. John, N. B., now retired; A. Woodle, district commercial superintendent, Buffalo, N. Y.; M. J. McCarthy, manager, Gloversville, N. Y.; J. C. Smith, formerly district superintendent at Dallas, Tex.

W. A. COLLENDER, aged thirty-eight years, manager of the Keene, N. H., office, died on the steamer "Canopic," while en route to Italy.

ZONE MAP.—This company has issued a time zone map of the United States, to be furnished to its patrons to serve as a convenient means of determining the standard time used at the points from which their messages are received. The map shows the lines of division between the four time zones into which the country is divided.

Mr. M. H. KERNER, representing the Morse Electric Club, decorated the statue of professor S. F. B. Morse in Central Park, New York, on Decoration Day, May 30. Mr. Kerner has performed this duty for several years.

Mr. CHARLES E. HARRISON, chief operator for the Western Union Telegraph Company, at Jacksonville, Fla., whose appointment to that position was announced in our May 16 issue, was born at Ander-

sonville, Ga., January 28, 1883, and first entered the telegraph service as night operator at Union Springs, Ala., in September, 1898. He has held various positions in the South on railroads and for the Western Union and Postal Telegraph-Cable companies. He was chief operator at Montgomery, Ala., at the time of his latest appointment.

Mr. J. W. McLAIN, chief operator at Montgomery, Ala., whose appointment to the position was announced in our May 16 issue, was born in Montgomery, August 7, 1884, and entered the telegraph service as messenger at that point in 1899. He successively filled positions as operator, all-night chief, traffic chief and wire chief, which latter position he held at the time he was advanced to be chief operator. His entire career has been spent in Montgomery with the Western Union Company, with the exception of about six months, when he worked on a broker leased wire.

Western Union Employees' Benefit Fund.

The annual report of the Employees' Benefit Fund Committee of the Western Union Telegraph Company for the year ended December 31, 1914, has been issued. The report shows that 136 employees retired and were placed on the pension roll during the year, so that on December 31 there were 405 persons receiving pension benefits from the fund. Letters from many recipients of pensions show that the pensions are highly appreciated.

The committee consists of Messrs. A. R. Brewer, chairman; F. D. Giles, Wm. Holmes, F. J. McLain and Lewis McKisick. Mr. F. T. Albert is secretary.

The following is a statement of the operations during 1914:

Amount of Fund January 1, 1914.. \$1,000,000.00

DISBURSEMENTS CHARGED**TO FUND:**

For pensions	\$176,890.56
Accident and disability benefits and expenses.	48,492.72
Sickness disability benefits	109,729.16
Life insurance benefits..	74,135.04

Total disbursements 409,247.48

590,752.52

CREDITS TO FUND:

Interest at 4 per cent on monthly balances of Fund	\$31,712.70
Appropriation from company's earnings to restore Fund	\$377,534.78
	\$409,247.48

Amount of Fund, December, 31, 1914..... \$1,000,000.00

Reinforcing Light Sending.

Mr. G. A. Robinson, of the Western Union Corpus Christi, Tex., office, has devised a way to pass light sending from the polar side of a quadru-

plex, or a polar duplex, through a half set. He has found that if a repeating sounder is cut in on the back contact of the polar relay, as is done with the "bug catcher" on the common side, the light signals can be passed without straining the spring of the transmitter and with satisfaction to the receiving operators on the way wire.

He was led to this improvement by the fact that he was able to firmly pass signals from the common side to a single wire, while the polar side, although working perfectly, was invariably light. He states that this is due to the infinitesimal time of contact on the polar relay not being sufficient to permit the transmitter to make a firm contact.

Employing the Hours After Supper.

Following is a copy of a paper issued by the Western Union Educational Society of New York for the benefit of its members.

"Most careers are made or marred in the hours after supper. It may seem to some that the few hours between supper and bed-time afford small opportunity for education. But they were sufficient for Lincoln and for Franklin and for millions of men, who, by turning these hours to advantage through special studies, advanced themselves above their fellows.

"Dost thou love life? Then do not squander time, for that is the stuff life is made of." Benjamin Franklin, who said this, not only understood the value of time, but he put a price on it that made others appreciate its worth.

"Bradstreet, in a summary of business conditions, ascribes most business failures to what may be called 'the size of their scrap-heaps.' Nothing is at once more inexcusable and disastrous than waste, and the most disastrous waste of all with the average man is waste of time. The unused hours form the 'scrap-heap' that has wrecked many a man's career.

"That heap of waste which so many young men dump at the end of every day and consider useless, would, if rightly used, give priceless results in increased efficiency, higher service and better pay. Ambition, resolve, effort, purpose, persistency, confidence, courage, mental equipment and success may be manufactured out of this heap of waste time. Millions are doing it. Any man can who will.

"The most important item in the equipment of any establishment is men. It avails a manufacturer but little to have perfection itself in machinery if he finds it impossible to get trained minds to control and drive it. Several big concerns have organized schools in connection with their plants; others have arranged with school boards to allow students of suitable age to spend a part of the time in the shops; many are calling upon correspondence schools to prepare employes for advancement.

"The strikingly impressive thing about the situation is the opportunity it offers to young men willing to devote spare time to special studies that fit them for particular work. A large employer of skilled labor, of office managers and salesmen says: 'There are plenty of \$10,000 jobs; the trouble is to find \$10,000 men.'

"Many highly educated people are inefficient and

many efficient people are not highly educated. The world calls for educated people who are efficient and efficient people who are educated. Most of all is needed education for efficiency, for service.

"Real education is not so much the learning of what we do not now know as the doing of what we do not now do."

LEGAL.

CONDEMNATION PROCEEDINGS.—In the case of the Western Union Telegraph Company against the Louisville and Nashville Railroad Company for condemnation of right-of-way for telegraphic purposes, the court at Selma, Ala., on May 18 ordered the condemnation of approximately 190 miles of line, and the jury fixed the damage at one dollar. The railroad company gave notice of appeal.

THE CABLE.

MR. G. G. WARD, vice-president and general manager of the Commercial Cable Company, New York, sailed May 22 on the steamer "Kroonland" for San Francisco, via the Panama Canal. He was accompanied by Mrs. Ward.

MR. FREDERICK A. PIRIE, of the Commercial Cable Company, New York, like many others, has lost relatives on account of the war. He lost three cousins from Brooklyn and another cousin from Canada on the "Lusitania"; a cousin was killed in the trenches at the front in Belgium, and another cousin, a Red-Cross nurse, died at Bordeaux, France. His only sister is serving as a Red-Cross nurse in France.

THE INTERNATIONAL OFFICE AT BERNE, Switzerland, has circulated notice that deferred cablegrams will not be admitted to or from Italy. Full rate telegrams must be written in plain language, English or French. They are subject to censorship and at sender's risk.

CABLE STATION NOT RAIDED.—It was reported from Vancouver, B. C., May 15, that a raiding party had attempted to destroy the Bamfield, B. C. station of the All-British Cable, and that they had been driven off by the military guard. The story was denied officially the next day.

THE MANILA-SHANGHAI CABLE has been repaired, thus restoring direct communication with China. Code cablegrams for China may again be accepted without restriction. Hongkong is British territory. Macao is Portuguese territory. Both are subject to censorship and restrictions already published.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to May 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucemas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914, Paramaribo and Cayenne, April 17; Cayenne-Salinas, May 11.

CANADIAN NOTES.

CANADIAN PACIFIC CHANGES.—Mr. J. R. Richardson, superintendent of the Canadian Pacific Railway Company's Telegraph at Moose Jaw, Sask., has resigned and Mr. D. Coons has been re-transferred to the Saskatchewan Division as superintendent, with headquarters at Moose Jaw. Mr. D. L. Howard has been appointed superintendent of the Alberta Division, with headquarters at Calgary.

THE TELEPHONE.

Mr. W. T. GENTRY, president Southern Bell Telephone and Telegraph Company, Atlanta, Ga., was in New York last week on a business trip.

Mr. H. J. PETTENGILL, president Southwestern Telegraph and Telephone Company, St. Louis, Mo., was a recent New York visitor.

Mr. JOHN J. CARTY, chief engineer of the American Telephone and Telegraph Company, New York, was elected president of the American Institute of Electrical Engineers at the annual meeting, May 18.

NEW RATES IN NEW YORK.—New schedules of rates for telephone service within the city of New York will become effective July 1, as a result of an agreement reached by the Public Service Commission, second district, New York, and the New York Telephone Company.

BONUSES TO TELEPHONE EMPLOYEES.—During the year 1914 the New York Telephone Company made anniversary payments to 3,675 employes. These payments are made on the anniversary of the day on which they entered the company's service, and are proportionate to the length of time in the company's employ.

MONTREAL-SAN FRANCISCO.—Conversations were held between Montreal and San Francisco by telephone, May 11, by several officials and guests of the Bell Telephone Company, Mr. C. F. Sise, jr., general manager of the Bell Telephone Company of Canada, acting as host.

TELEPHONE BETWEEN NEW YORK AND LOS ANGELES.—Transcontinental telephone service was opened on May 6 between Los Angeles, Cal., and New York. The event was celebrated with appropriate exercises. Los Angeles leaders in the business and financial world extended greetings to an assemblage of similar character in New York, their conversations being heard by those present by means of numerous receivers connected to the circuit. Mayor Rose, of Los Angeles, extended a warm welcome to acting-mayor McAneny, of New York.

BOSTON PLANT CHAPTER ELECTION.—At the supper and annual election of the Boston Plant Chapter of the Telephone and Telegraph Society of New England, held Thursday evening, May 20, in Boston, Mass., the following officers were elected for the season 1915-1916: President, Charles E. Ames; vice-president, Edward P. Histen; secretary, Gordon S. Wallace (re-elected); treasurer, William J. Hadley (re-elected). The society now has 840 members.

Dr. Bell Presented with the Edison Medal.

At the annual meeting of the American Institute of Electrical Engineers in New York, May 18, Dr. Alexander Graham Bell was the recipient of the Edison medal "for meritorious achievement in electrical science." The presentation address was made by Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company.

In his reply to the address, Dr. Bell dwelt upon the remarkable advances that had been made in the application of electricity since the invention of the telephone. He asserted that the possibilities of further development were inconceivable. "Men can do nearly everything by electricity," he said, "and I can imagine them with coils of wire about their heads coming together for communication of thought by induction. But that is for you to make possible," he added, addressing the audience.

Mr. Thomas A. Watson, who was associated with Dr. Bell in the early days of the telephone, made an address, in which he told of their early experiences in the development of the instrument.

The Telephone Pioneers' Convention.

A complete programme of the fifth annual convention of the Telephone Pioneers of America, to be held in San Francisco, Cal., September 21, 22 and 23, is being distributed to the members. The main features of the meeting were outlined in our May 16 issue.

On the way West the special train which will leave New York, Boston and Philadelphia September 14 and Chicago September 15, will make short stops at Omaha, Neb., Denver and Colorado Springs, Col., and Salt Lake City, Utah, arriving at San Francisco September 20.

On September 26 a trip will be made to Los Angeles, where a two-days' stop will be made, and on September 29-30, there will be a trip to the San Diego fair, where there will be a stop of one day. On October 1 the Pioneers will return to Los Angeles, and it will be optional then to return East by direct route to Salt Lake and Chicago, or on the Pioneers' special, by way of the Grand Canyon, where one day will be devoted to sight-seeing. The trip will occupy twenty-three days from New York and eastern points, and the total estimated cost per person for all railroad expenses, hotel accommodation and transfer to and from station at stop-over points, is \$227.38 from New York or Philadelphia, \$166.05 from Chicago, and \$224.25 from Boston.

Wonders of the Microphone.

In Washington, William Collier, the actor, was once conversing with a man of much scientific attainment. The scientist narrated in detail a series of experiments he was conducting with the microphone.

"The microphone," said he, "magnifies sounds to the ear as the microscope magnifies objects to the eye. The foot-falls of a spider heard through a microphone sound like the tramping of marching infantry."

"That is amazing," politely commented Mr. Collier.

"This afternoon," continued the man of science, "I heard a fly walking across the pane. The noise resembled the hoof-beats of a cavalryman's mount."

"Perhaps it was a horse-fly," suggested the actor.

Review of Principal Articles in Contemporary Telephone Publications.

COMMISSION CONTROL OF TELEPHONE BUSINESS.

—Mr. A. H. McMillan is the author of an article in *Telephony*, in which he points out the benefits of commission control of telephone business. This article is a reprint of a paper read by the author before the Independent Telephone Association of Michigan.

THE TELEPHONE ON THE FIRING LINE. The *Telegraph and Telephone Journal*, of London, publishes an interesting story of the experiences of Lieut. Jayne with the British expeditionary force at the front. The great importance of the telephone in the conduct of the war is the keynote of the narrative.

TELEPHONE APPARATUS AND PRACTICE IN THE UNITED STATES ARMY is the title of an article in *Telephony*, by Mr. A. P. Connor. It describes the use of telephone equipment in the United States Army and the lines which this branch of the telephone art follow. The wireless section of the signal corps is also briefly referred to. The article is well illustrated.

COIN COLLECTING FROM PUBLIC TELEPHONES. Some interesting facts about the collection of coin from public telephones in Pittsburgh, Pa., are given in the May number of *Telephone News*, by P. B. Findley, and J. Murray describes the same service in Philadelphia. The methods of conducting the work make a very interesting story, and illustrations show some of the operations of handling the great quantities of coin.

THE INDIVIDUALITY OF THE GIRLS AT THE SWITCHBOARD is the title of an interesting article in the May 1 issue of *Telephony*, by G. R. Johnston. The author commends highly the faithfulness, loyalty and resourcefulness of switchboard operators, and points out the value of co-operation and teamwork among them. Mr. Johnston read a paper on this subject at the recent convention of the National Independent Telephone Association in Chicago.

WAR'S EFFECT ON LONDON'S TELEPHONE SYSTEM. The effect of the war upon the telephone system in London is described in the *Telephone News*. To meet the demand for a larger night staff woman operators have been employed all night to reinforce the small male staff adequate in peaceful times. The "Gerrard" exchange in London is described and illustrated. No one is allowed to talk over a telephone in any other language than English. Lord Kitchener has a camp bed in his London office and sleeps many nights with a telephone at his bedside. It is stated that he is connected di-

rectly with Sir John French in France. Along the English coast the telephone is being used as a means of communication in the watch for the appearance of invading fleets or suspicious vessels.

Mr. J. J. Carty, President, American Institute of Electrical Engineers.

Mr. John J. Carty, chief engineer, American Telephone and Telegraph Company, who was elected president of the American Institute of Electrical Engineers, May 18, ranks as one of the highest authorities in telephone engineering in the world and is qualified in every way—professionally and socially—to head the affairs of the Institute.

Mr. Carty was born in Cambridge, Mass., April 14, 1861, and was graduated from the Cambridge



JOHN J. CARTY.

Latin School with the intention of entering Harvard University, but owing to serious trouble with his eyesight, he was compelled to abandon further study. His first employment was in 1879, with the Telephone Dispatch Company of Boston, where he made a number of contributions to the telephonic art. For more than thirty years he has worked continuously for the development of the telephone business and has made many inventions that have contributed to make the American telephone system the admiration of the world. He designed and installed the first multiple switchboard. This was in Boston. The metallic circuit was his discovery and the "bridging bell," which makes the party line possible, was also his invention. Under his direction, all the multiple switchboards in New York City were constructed.

In 1889 he entered the service of the Metropolitan Telephone and Telegraph Company, now the New York Telephone Company, for the purpose of organizing all of the technical departments, building up its staff, and reconstructing the entire plant of the company—converting it from grounded circuits overhead and series switchboards to metallic

circuits placed underground, and to the then new bridging switchboards. In carrying out this work, he selected and trained a large staff of young men, fresh from college, many of whom have since attained positions of prominence in the telephone field. In the development of the personnel of his department, Mr. Carty has taken a particular pride, looking to the welfare of those already engaged and, through his touch with prominent technical educators, adding each year to this staff from the graduating classes of the principal technical schools.

Under Mr. Carty also the reconstruction of the New York Telephone Company's plant was carried out the second time, converting it from cables and switchboards of the old type to modern cables and the common-battery switchboard, and providing for the extraordinary extensions which to-day constitute the comprehensive telephone system of New York.

Mr. Carty was appointed chief engineer of the American Telephone and Telegraph Company in 1907, immediately after Mr. Theo. N. Vail became president of the company. In that position he was responsible for the engineering work of the Bell System, and under his direction most important developments have been carried to a successful completion in all phases of both plant and traffic engineering. By far the longest underground telephone cable in the world has been designed, manufactured, laid, and placed in operation, connecting Boston, Mass., with New York and with Washington, D. C., and through this cable successful underground telephone communication over the 450 miles is daily realized.

The telephone lines and the apparatus used with them, connecting New York City with the West, have been improved and extended until, about the first of 1912, telephone conversation was possible over a distance of 2,100 miles, from Denver, Col., to New York City. Immediately after the completion of the Denver circuits, engineering investigations and development work were started by Mr. Carty, the results of which were demonstrated on January 25, 1915, when the formal celebration of the completion of the transcontinental telephone circuits from San Francisco to New York and Boston was held in the presence of most distinguished gatherings in these cities.

Mr. Carty has always taken an active interest in the advancement of engineering education in its highest branches, and is a member of the Society for the Promotion of Engineering Education. He is also a member of the Society for the Promotion of Industrial Education, American Physical Society, the American Association for the Advancement of Science, and a Fellow of the American Academy of Arts and Sciences.

He has served as vice-president of the American Institute of Electrical Engineers, and is past-president of the New York Electrical Society; member of the Franklin Institute of Pennsylvania; member of the Society of Arts; honorary member of the American Electro-Therapeutic Association; the Telephone Society of Pennsylvania, the Tele-

phone Society of New England, the Telephone Society of New York and the Telephone Pioneers of America.

By invitation of the French Government, he became a member of the International Telephone and Telegraph Conference at the Sorbonne, Paris, in 1910, where he delivered a notable address, "Telephone Service in America." He was also invited to become a member of the International Telephone and Telegraph Conference at Berne, in 1914, but this conference was postponed on account of the war.

The Franklin Institute of Philadelphia awarded Mr. Carty the Edward Longstreth Medal of Merit for his engineering work. For his services in connection with the original establishment and subsequent development of the telephone system of Japan, Mr. Carty has twice received the formal thanks of the Japanese Imperial Government, and, by direction of the minister of state, valuable specimens of Japanese art, consisting of rare cloisonné were presented to him. He was decorated by the Emperor of Japan in 1909 with the Imperial Order of the Rising Sun, and again, in 1912, he received the Imperial Order of the Sacred Treasure of the Meiji. He is a member of the Japan Society.

RADIO-TELEGRAPHY.

DR. WILLIAM MARCONI sailed from New York for Italy, via England, on the steamer "St. Paul," on May 23, in answer to a call to return for military duty. He is an officer in the engineering corps of the Italian army. Dr. Marconi arrived in New York, April 24, on the steamer "Lusitania," to testify in the suit of the Marconi Wireless Telegraph Company of America against the Atlantic Communication Company for infringement of patents, but had not been called by the court to testify when he received the summons to return to Italy.

MESSRS. E. B. PILLSBURY, general superintendent, and C. H. Taylor, engineer, Marconi Wireless Telegraph Company of America, New York, have returned from an inspection trip to the company's stations at Boston, Wellfleet and Chatham, Mass.

MR. DAVID SARNOFF, assistant traffic manager, Marconi Wireless Telegraph Company of America, New York, has returned from New Orleans, where he went on official business.

CHARLES C. SHORT, the wireless operator on the steamer "Gulfight," which was recently sunk by a German torpedo, lost his life when the vessel sank. This was his first voyage on the steamer. He was twenty-two years of age.

TRANSATLANTIC WIRELESS INTERFERED WITH.—Wireless communication between the United States and Germany has been severely handicapped lately by static conditions prevailing in the north Atlantic at this season of the year. The wireless station at Sayville, L. I., has, within the past week or two, been frequently isolated from the sending plant at Nauen, Germany. The same conditions exist at the Tuckerton, N. J., plant. Such messages as are received at Sayville are, for the most part, fragmentary or often impossible to decipher.

MARCONI TELEGRAPH-CABLE COMPANY.—Condemnation commissioners have been appointed at Trenton, N. J., to fix upon a fair valuation for right-of-way for line of poles and wires along the highway connecting the high power wireless stations at New Brunswick and Belmar.

WIRELESS TELEPHONE USED ON TRAIN.—A passenger train on the Lackawanna a few days ago was reported by wireless telephone by an operator on board of the train to the dispatcher at Scranton as the train passed each station between Scranton and Cresco, a distance of forty miles.

ALASKAN WIRELESS SERVICE.—The Marconi Wireless Telegraph Company of America has issued a rate card for wireless service to Ketchikan, Alaska. The rates, compared with the present cable rates, show considerable reduction. This is the first link of the Marconi Alaskan chain of stations now nearing completion. Further extensions to Juneau will be announced shortly.

Marconi Wireless Aid Association.

At a meeting of the employees of the Marconi Wireless Telegraph Company of America, held at the company's office, 233 Broadway, New York, Monday, May 24, an association was organized, to be known as the "Marconi Wireless Aid Association." The following were elected officers: President, E. T. Edwards; vice-presidents, David Sarnoff, A. H. Ginman, T. M. Stevens and F. H. Mason; secretary, L. MacConnach; treasurer, K. P. Kirk.

The following were elected to serve as members of the executive committee: Messrs. G. S. De Sousa, E. B. Pillsbury, G. H. Porter, W. A. Winterbottom, L. Lemon and Miss T. N. Brown.

The objects of the Marconi Wireless Aid Association are similar to those of other aid associations and societies which have been formed in the telegraph service in various parts of the country.

Wireless Injunction Affirmed.

Circuit judges Lacombe, Ward and Rogers, of the Circuit Court of Appeals, handed down a decision on May 13, affirming the order of judge Hough, granting a preliminary injunction restraining the DeForest Radio Telephone and Telegraph Company, the Standard Oil Company of New York and Lee DeForest from infringing the fundamental Marconi and Lodge patents relating to wireless telegraphy.

It was urged before judge Hough and the Court of Appeals that it was inequitable to grant the injunction because the Marconi Company had recently raised its rental price to steamship companies to \$100 a month. Judge Hough, in his opinion, said:

"The action of judge Veeder and that of the courts of the third circuit in respect of the Fessenden patents, followed by a treaty of peace between the complainant and the Fessenden party, has undoubtedly put the Marconi Company in a much stronger position than it previously occupied. I am convinced that down to the present time the expense of operation (and of litigation) has been so enormous that complainant has received no fair

return from the invention which, under decisions now ruling, I must hold to be of the greatest value and worthy of both praise and reward."

The decision of the Circuit Court of Appeals in effect affirms this ruling of judge Hough. The decision also affirms the orders of judge Hough denying the motions to vacate or modify the injunction, as well as motions to suspend the operation. The court stated that it was not necessary to add anything to the discussion as the Marconi and Lodge patents and the prior art had been fully and carefully considered by judge Veeder in the suit of Marconi Company vs. National Electric Signaling Company.

Another Medal for Mr. Edison.

On the evening of May 19 the Franklin Institute of Philadelphia presented the Franklin medal to Mr. Thomas A. Edison, in recognition of the value of his numerous basic inventions and discoveries forming the foundation of world-wide industries, signally contributing to the well-being, comfort and pleasure of the human race. Mr. Edison received the medal in person.

New Book.

A new edition of *A B C of Electricity*, by W. H. Meadowcroft, is now ready for distribution. It describes clearly for the amateur the various methods of producing electricity and how it is applied to the world's uses. The terms "ohm," "ampere," resistance, magnetism, etc., are also described. The contents of the book cover the telegraph, the telephone, wireless telegraphy, the electric light—both arc and incandescent—electric power and electric batteries.

Mr. Meadowcroft, the author of the book, is private secretary to Mr. Thomas A. Edison and is well qualified to write a book of this character. This volume is in reality his old work brought up to date.

Hundreds of thousands of copies of the former edition were sold and it is expected that the new edition will meet with as ready a sale.

The price of the book is fifty cents per copy. Address, TELEGRAPH AND TELEPHONE AGE, John B. Taltavall, publisher, 253 Broadway, New York.

"BILLY" SUNDAY HELPS TELEGRAPH BUSINESS.—The Rev. "Billy" Sunday's revival meetings in Paterson, N. J., caused a great increase in the telegraph service in the "silk city." Manager D. L. Doran, of the Western Union Telegraph Company, had twenty wires run into the improvised telegraph office in the tabernacle, and a large force of operators from New York helped out each day. The Postal Company, under the management of Mr. E. J. McCabe, also did a large press business. Several additional operators being employed to assist in transmitting the matter during the rush.

EDISON "TELESCRIBE." Mr. Thomas A. Edison has announced the perfection of the "Telescribe," which is a combination of the telephone and phonograph, for the purpose of recording telephone conversations. This instrument was described in our issue dated October 1, 1914.

The Ownership of Wireless Equipment.

(Concluded from page 220, May 16.)

A message of twelve words is carried anywhere in the United Kingdom for sixpence (twelve cents), the minimum charge; additional words being charged for at a half penny each. Both address and signature are counted, however, and these, say American telegraph companies, average fourteen words. A ten-word message, as we know it, is therefore a twenty-four word one in England, costing twenty-four cents.

This charge is certainly below American figures, but there is, of course, the difference in distance of transmission to be considered.

All England is within about six hours' railway journey from London. The telegraph business is mainly between the large cities and there is no legal liability for errors or delay in transmission of messages. These two factors, and particularly because the traffic is what we would term short-line business, greatly affect the rate.

To illustrate this latter point is the case of J. G. Smith and G. S. Mott, who organized the Commercial Telegraph Company about thirty-five years ago, maintained service between New York and Philadelphia only, and found it profitable.

Seeking a parallel for present-day short-line business between New York and Philadelphia the service between London and Manchester will be found just as good and cheaper than ours. But consider the difference in maintenance charges necessitated by a service throughout the three and one-half million square miles of the United States, as against that of England proper, with one-seventieth of that area, or acreage less than the state of Alabama.

How important this matter of distance becomes is revealed by a careful examination of the tables of rates not only in England but throughout Europe. The figures are misleading in ways other than the word count.

In an address recently given before the National Civic Federation in New York it was pointed out that a message going any appreciable distance in Europe passed through more than one country and the rates as given were "split up" on cost; that is, a single message passing through two countries is counted as two; if it passes through three countries it is made to count for three messages. If this same condition prevailed here it would be much as if a message from Massachusetts to Pennsylvania counted as three messages, with the state cost divided so that the rate appeared as one-third of what it really was. Taking the charge for address and signature into proper consideration again and glancing at communication conditions over longer distances, we find that for the 1,000 miles between Stockholm and Paris the message rate is 72 cents, while from New York to Chicago, about the same distance, the 10-word rate is 50 cents.

On the whole, then, it is possible that exhaustive investigation would reveal the cost of telegrams to the active trader is really higher in Great Britain than in the United States.

For the sake of argument, however, let it be granted that telegraphing is cheaper than with us.

Because less money in charges is passed over the counter it does not necessarily follow that the public finds telegraphing cheaper in the end.

The British Post-office report for the year ending March 31, 1913, shows that the loss for the twelve months was \$5,723,940. The following year it was a little more. The year before it was over six million dollars. An average of the last few years shows an annual loss of five millions.

Yet it is reported that under the former private ownership the system showed an average annual profit of \$1,600,000.

Since the British nation took over the telegraphs in 1870 the loss is estimated at \$200,000,000.

Some contend that this loss—which the taxpayers have to bear—is more than offset by the cheaper rates.

But are the rates really cheaper?

And if they are, who is benefited? The bulk of the messages is sent by the bankers, the merchants, the manufacturers—about 10 per cent of the population!

The government-owned system pays no taxes. The private corporation does. Not only does the privately owned system pay its stockholders dividends from profits, it furnishes a source of revenue to the government in place of being a very material drain on the nation's treasury.

Take it from another viewpoint. In England the annual expenses of the telegraph system are thirty to forty per cent more than gross receipts. This means that the charges for a message pay for only two-thirds of the service. The public treasury—the taxpayer's money—has to make up the one-third difference.

This condition remains after forty-five years' experience, during which time the message traffic has increased nearly tenfold. The post-office has grown up in the telegraph business and still loses money on every message it sends. The American telegraph companies, on the other hand, show a profit as private corporations, charge little if any more for service, even under immeasurably greater geographical problems, and are a source of revenue to the nation instead of a burden.

Consider also that Great Britain's operation of the telegraph is the shining light held up by advocates of government-owned systems. Admitting all their favorable contentions—which most emphatically should not be done—it is still rather difficult to see how even this theoretical success is any guarantee of Great Britain's, or any other country's, success in wireless, an infinitely more difficult business. The monumental fiasco attendant upon government operation of the British telephone contrasted with its amazing success under private control in the United States, would furnish a fair comparison, if the details were not too painful for disclosure.

In all of England's experience with publicly owned means of communication, therefore, there is nothing to base an argument on for government ownership in the United States.

Government-owned wireless systems for ships are unknown as yet, and will no doubt remain so, for it is reasonable to suppose that the legislators of many

nations have recognized that where governments operate telegraph systems after years of experience and show a loss, while private ownership shows a profit, wireless, a new business and a difficult one, would prove many times more unprofitable under federal operation.

In association with the type of citizen mind that leans blindly toward government ownership is the much abused and greatly misunderstood word "monopoly." With the hysteria of "muckraking" days still fresh in the memory of the people, anything bearing a resemblance to control of an industry is vaguely condemned as a subject for federal intervention. Even though a rational period has since come and discredited indiscriminate attack much of the old "down-with-the-big-fellow" spirit still obtains with the light thinkers.

Certain, if not all, public utilities—under which heading wireless logically belongs—are natural monopolies. Full appreciation of this statement can only be arrived at by a lengthy economic dissertation, which has no place in this article, but consideration, from a service point alone, of that thoroughly dependable social and business asset, the American telephone, will supply more than sufficient material to settle the question. And an incidental trip to any important city in Europe will end forever any doubts as to the undesirability of government ownership and the merits of monopoly control in private hands.

Monopoly in a publicly used communication system invariably produces efficiency. The very largest corporation and the keeper of a country store are much in the same position: both have to please their customers. Otherwise the public will buy as little as possible, and there is no money in that. Whether it is a can of tomatoes or a wireless message the purchaser expects prompt delivery of exactly what was ordered, and if he does not get it more money will be spent for the same thing only when it is absolutely necessary.

Service pays. Big business recognizes that. The increasing popularity of the telephone in this country carries a heavy lesson to other nations. New York City has more telephones than six European countries taken together—Austria, Italy, Belgium, Norway, Denmark and the Netherlands. Chicago has more telephones than the whole of France. New York City equipment alone is only 200,000 short of the number of telephones throughout the whole of Great Britain and Ireland. The telephones of the civilized globe added together total about 14,000,000. More than seventy per cent, or 10,000,000, are in the United States.

Americans consider the telephone indispensable, other nationalities look upon it as an aggravation. Its popularity is attested by the growth in this country to the staggering number of 10,000,000 instruments in use to-day, against 650,000 fourteen years ago. In point of equipment, England stands to-day exactly where we stood in 1900.

Any American business man who has had occasion to travel on the Continent knows how infinitely superior our service is, how much better it is operated under private control than are those run by

governments. Monopoly is no longer the bugaboo it used to be. It is gradually becoming recognized that it makes for better service. An industry controlled by a private corporation must make money or go out of business. Taxpayers will not make up the deficit. Good service means growth; poor service, stagnation. And because the public utility's profit is proportionate to its popularity the constant aim is for progressive support, secured only through continuous betterment. It is now generally recognized that the size of the corporation is not necessarily a menace. President Woodrow Wilson reflected the new order of thinking when he said: "I am not jealous of the size of any business. I am not jealous of any progress or growth no matter how huge the result, provided the result was indeed obtained by the processes of wholesome development, which are the processes of efficiency, of economy, of intelligence, and of invention."

And it is with exactly this—wholesome development through efficiency, economy, intelligence, and invention—that the Marconi Company has qualified for commercial preëminence in the field of wireless communication.

MUNICIPAL ELECTRICIANS.

Convention of Municipal Electricians.

The International Association of Municipal Electricians will hold its twentieth annual convention in Cincinnati, Ohio, at the Gibson Hotel, August 24, 25, 26 and 27.

The officers of the association are: President, W. H. Flandreau, Mount Vernon, N. Y.; Dr. Charles P. Steinmetz, R. J. Gaskill, C. E. Converse and G. V. Tudhope, first, second, third and fourth vice-presidents, respectively; Clarence R. George, Houston, Tex., secretary; C. E. Diehl, Harrisburg, Pa., treasurer.

Convention of Fire Protective Association.

At the convention of the National Fire Protective Association, held in New York, May 11, 12 and 13, acting-mayor George McAneny announced that an up-to-date fire-alarm telegraph system is to be installed in New York. The cost will be over \$1,000,000. Fire-commissioner Robert Adamson stated it would take at least two years to install the system.

Mr. Ralph Sweetland, chairman of the committee on signaling systems, recommended regulations for fire-alarm systems for use in factories, workshops and institutions where the occupants are under discipline and control.

Mr. Fidel Villacorta, government telegraphis, San Salvador, El Salvador, C. A., who is an old subscriber to our publication, writes: "TELEGRAPH AND TELEPHONE AGE has been for me the best companion, and thanks to it I have not yet forgotten my English."

Story of the Telegraph and Telephone and State Regulation.

Mr. William H. O'Brien, an old-time telegrapher, chief, telephone and telegraph bureau, Massachusetts Public Service Commission, Boston, Mass., addressed the Boston Chapter, Knights of Columbus, May 2, his subject being, "The Story of the Telegraph and the Telephone and the Work of the State in Regulation of Public Utilities."

Mr. O'Brien briefly referred to early methods of communicating intelligence over long distances, and gave a history of professor Morse's invention of the telegraph. The rapid development of the telephone and wireless were also touched upon.

"In the development of these great services, as in other things that have been developed as a result of franchises granted by the people and financed by aggregations of private capital," Mr. O'Brien said, "have come abuses and misuses of these franchises and capital, as a result of which the national government established a form of regulation and supervision in the shape of the Interstate Commerce Commission, first with recommendatory powers, extended from time to time, until now the power of that commission is almost absolute."

"Supplementing this form of national regulation has come similar work by various states in the appointments of Public Service Commissions, to which has been entrusted the power to regulate intrastate rates and service. One of the first states to take up this form of regulation was our own commonwealth, and on the reorganization of the old Railroad Commission in 1913, the recommendatory powers in the matter of telephone and telegraph rates and service enjoyed by the Highway Commission for several years, was transferred to the newly created Public Service Commission and changed to correspond with the same measure of authority as applied to railroad matters. In January, 1914, a division known as the telephone and telegraph department was given authority to adjust local rates, investigate complaints of service and work out such changes in operating practices, commercial routines and plant methods of the companies under supervision as from time to time appeared necessary to afford the users of telephone and telegraph service, a standard of service and treatment to which they are entitled within reason, with proper consideration for the rights of invested capital, and in the working out of these problems the department is attempting, above all things, to eliminate red tape."

"The annual report of our commission just presented to the legislature shows a very large number of changes in the routines and practices of the telephone and telegraph companies within the commonwealth that have been of decided advantage to the public, and in the last analysis will be admitted to have been of equally as great benefit to the companies themselves. As far as the telephone companies are concerned, they have co-operated in every way with the commission and in not a single instance during the year was an appeal made from the decision of the department to the full commission."

"The commission was the first in the United States to seriously consider and attempt to solve, as far as possible, the irritating matter of excessive use of service on party lines, and as a result of its propaganda, both the telephone companies and the commission have been given every evidence of the desire on the part of a large portion of the users of such service to recognize their responsibility towards other subscribers upon the same lines and govern their use of the service accordingly. As a result of the commission's work along these lines, the various local boards of trade throughout the state have become interested and are identifying themselves with this propaganda."

"That mistakes have been made," continued Mr. O'Brien, "has been clearly shown, but you cannot repair with an axe, and the man who sits as the representative of the public in administrative capacity must realize, above all else, that his first duty is to create a situation where both parties to every controversy over matters of public service of whatever kind or character will have confidence that there is a place where they can be assured of fair treatment without prejudice regarding the view point of either and enable each to secure somewhere near the maximum results to which they are entitled, on one side reasonable returns on capital honestly invested and managed, and on the other, just and equitable rates; a reasonable standard of service and treatment, with due allowance for the ordinary errors that will always occur in every form of service furnished the public where the human element is present. On one hand, the demands of the public must be reasonable, and, on the other, it is now admitted that the one intrusted with the administration of private capital is securing the best returns for that interest when he realizes that the public also has an interest in the results which are attempted by the use of that capital, and that, co-equal with the interest of the investor and the public, is that of the human organization which must henceforth be reckoned with equitably in every distribution of revenue."

"It is admitted by many earnest advocates of public ownership," said Mr. O'Brien in conclusion, "that with the fundamental changes in our fiscal and industrial policies which have recently taken place by acts of Congress, and with the big things the government still has in the works, the time may not be ripe for serious consideration of this problem, but to say, as is being urged in paid and gratuitous opinions, that the people is not capable of handling the problem efficiently and economically is the greatest insult that has ever been offered to an intelligent people. In the meantime it is trying the experiment of regulation through public service commissions, and if it gets somewhere near the results which it has a right to expect from such a policy, it will probably defer action. Otherwise it will take over the work, and if it does, do not let anyone worry, it will be handled all right."

Mr. O'Brien has had a wide range of telephone, telegraph, newspaper and legislative experience. He was, at one time, president of the Boston Central Labor Union, and a member of the legislature for three years.

Promotions.

In reference to the article printed in our issue for March 16, on page 132, under the title, "Promotions," by "An Old-Time Telegrapher," we are in receipt of many comments on the subject. One writer states that it would be most difficult to say what would be the best method of procedure in selecting individuals for promotion, but he thinks that local men should be considered more than they are. According to the records there are many cities in the United States in which changes in the management have occurred as many as seven times during the past five years. Never once have the claims of a local man been considered. The business community undoubtedly wonders why this is.

Most of the writers do not favor seniority promotions. They claim that this method of selection would stifle ambition and inventive genius.

One writer asks if a system will ever be adopted that will give all an equal chance for promotion. "On all large railroad systems," he says, "all telegraphers have an equal chance, according to their qualifications, every man being lined up by number as he enters the service. When there is a vacancy the oldest qualified man steps up. The commercial telegraph companies could adopt such a system by divisions and districts.

"Another point," he continues, "is the inequality of salaries paid. There are good men managing offices, receiving less salary than those paid to the managers in neighboring towns, where the receipts may be much lower. Often a new office is opened in the neighborhood of an old-established office, where the manager has served for several years. The new manager, frequently inexperienced, is paid a higher salary than the older man. The new man would frequently be unable to hold his position without help and advice from the older employe. Still he receives more compensation. Some men are more favored by their superiors and are given more desirable positions while many a good, capable man, older in the service, is kept down and never gets anywhere. Such conditions as these are the reason why many good men leave the service."

Another correspondent writes:

"In my opinion, fitness for the position to be filled should, at all times, be the first consideration. Other things being equal, time of service should come next, and gray hairs should not bar a man from promotion, provided he is qualified to fill the vacancy.

"To determine an employe's fitness for a higher position to be filled, a system similar to that of the government civil service, or the methods employed by the railroads when appointing a train dispatcher from the ranks of operators, a conductor from the ranks of trainmen or engineer from the ranks of firemen, might be employed. The vacancy is first announced upon the bulletin boards, so that every employe may know that it exists, thus giving the men an opportunity to brush up on the requirements of the position. A competitive examination is held before a board of examiners which gets an absolute record of what the applicants know and what they do not know. The oldest man in point of service who qualifies, other things being equal,

gets the appointment. But be he old or young, he must qualify, proving to the board of examiners that he knows the practical as well as the theoretical ends of the business. It gives men who have been in the service for a long time an opportunity to make a bid for something more than working a wire without the I-want-to-be-a-chief idea.

"In the telegraph business too often promotions are made as acts of friendship by those in charge, without first being assured that the appointee is qualified for the vacancy. It stands to reason that if you and I are friends and you have an opportunity to throw something better in my way you will do so; that is human nature.

"How many of our supervisors, wire chiefs or repeater chiefs have given study to the theories of the different apparatus and wires; to the layout of the wires; the geography of their territory and the many other things necessary to enable them to intelligently perform their duties; how many study before getting the positions; how many more, even after they had been appointed, rested on their laurels, relying upon absorbing the necessary routine from day to day; how many met an emergency, and how many were overwhelmed by the emergency?

"How many of our supervisors could, in an emergency, test and regulate employes, and be of any assistance? On the other hand, how many of our testing and regulating men could go to the floor and properly handle the traffic during an interruption of the wires? Do the people on the one side appreciate the difficulties under which their co-workers are laboring when they have never been in the same positions themselves?

"In the event of one of our test-board men making an approximately close Varley test for a trouble on his lines, can he tell the why and wherefore, or does he make it mechanically from specifications?

"What inducements are there for a man to go deep into the study of electricity, as well as familiarizing himself with the layout of his wires, both in his immediate locality, as well as that of the adjoining territory?

"How many supervisors have operators working under them getting more money than the supervisors, and have they not a right to think the higher paid man is the most valuable to the company?"

Mr. James H. Nichols, an old time and military telegrapher at Denver, Col., in renewing his subscription for another year, writes: "I would like to suggest to the young, ambitious members employed by great telegraph, telephone and electrical companies of America and the world, to subscribe for, read and study every page of TELEGRAPH AND TELEPHONE AGE. There is always a place, and promotion in due time, for an agreeable, efficient man or woman. Mr. Taltavall, the editor and the publisher, tells all about it for two dollars a year. I take pleasure in enclosing my two dollars herewith. If permissible, and not officious, I would like to say that your circulation should be at least fifty thousand for each issue. The wonder is that it has not reached that number ere this."

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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 1, 1915.

Time for Everything.

It is generally the idle who complain they cannot find time to do that which they fancy they wish. In truth, people can generally find time for what they choose to do; it is not really the time but the will that is wanting.—Sir John Lubbock.

New Ideas.

Of the thousands of telegraph employes throughout the country there are many who have ideas that would be of benefit to their employing companies could they be practically applied. Many large industrial companies pay their employes in one form or another for suggestions along the line of improving processes and apparatus that lead to positive results, and it seems to us that the telegraph companies might pursue a similar course with advantage and profit. A practical plan would be to submit new ideas to headquarters for consideration and test. No doubt, many would prove worthless, while others might possess sufficient promise to warrant investigation. Such a procedure on the part of the company might lead to material improvement in the various branches of the business and it would encourage the employes to do their best for the company if they had the assurance that

any new ideas that they might advance would receive due consideration and reward.

It is acknowledged that there is room for improvement in every department of the telegraph business and among so many minds employed in the work there certainly must be some ideas that would prove profitable to the companies were they put into execution.

Promotions.

It is safe to say that every employe in the telegraph service hopes to receive promotion some day, but how it is to be brought about depends very much upon the mental attitude and efforts of the individual.

The human mind is a puzzling thing to deal with. Some persons sit down and expect the good things of life to come to them, while others work to get them. The passive waiting man does his work in a perfunctory manner and sometimes nurses a grievance against his company and his superiors. Such a state of mind frequently arises from the belief that his work and knowledge are not appreciated and that his ambitions are officially discouraged. If he possesses the knowledge he thinks he has why does he not apply it to some good and useful purpose and not keep it locked up in the dark recesses of his brain, where it never sees the light of day? The wide-awake man bides his time, keeps his eyes and ears open and absorbs knowledge from things going on around him, storing it up for future use. He experiments and studies and discovers things. He is never idle.

The companies want men with useful knowledge, and the more one knows about the details of his line of work the more likely he is to be selected when vacancies are to be filled. Favoritism is not practiced so much now as it was formerly; ability is what counts in determining the fitness of a candidate for a position.

Many still hold that the seniority principle should be the guiding one in making promotions. Seniority alone is not sufficient, it should be accompanied by ability. This is the rule practiced on railroads and in many other lines of business and is admitted to be fair to all concerned. Because a man has been in the service for many years it is not sufficient reason why he should be placed in a position he is not qualified to fill. Every employe should be ambitious to qualify and the older employes should not yield to the belief that they are too old to learn.

In this issue we publish some views on the subject of promotions which should be carefully read by everyone interested, and in our issue of May 1 appeared on account of how promotions are made on the Canadian Pacific Railway. It will be noticed that both of these articles recognize the seniority principle when it is accompanied by ability.

TELEGRAPHS IN CUBA.—The report of the Cuban director-general of posts shows that the number of telegraph offices in Cuba increased from 77 in 1902 to 226 in 1915. The number of telegrams dispatched in 1914 was 1,341,831, an increase of 300 per cent over the number sent in 1905.

Magnetism and Magnets.*

BY JOHN F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.
(Copyrighted.)

We have seen in the articles on Electricity and Batteries [see March 1 and March 16 issue] how a current of electricity may be produced and sent over a wire. To utilize this current to transmit

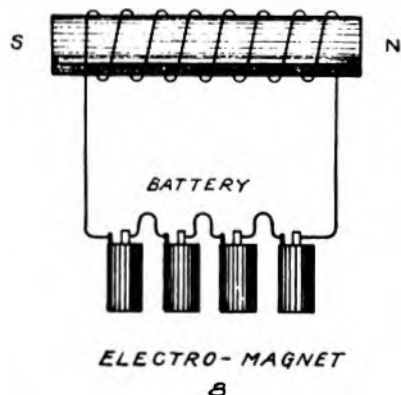


FIG. 1—ELECTRO MAGNET.

signals we must have something which will respond when the current flows or ceases to flow over the wire. This something is preferably an electromagnet, or, in other words, a magnet produced by the action of electricity.

Magnets in their simplest form are pieces of a kind of iron ore, known as lodestone, which has a peculiar property of attracting iron and steel to itself. The ends of a freely suspended lodestone will also point north and south. Pieces of hard-

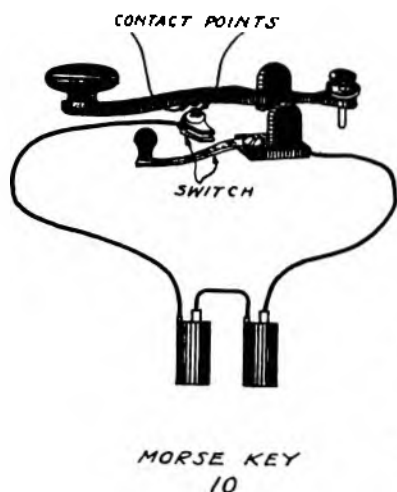


FIG. 3—THE MORSE KEY.

ened steel rubbed with a lodestone take on the properties of the lodestone and become what we call magnets. One of the commonly used forms of magnets is the compass needle used by seamen everywhere to indicate the points of the compass. Another common form is the horseshoe magnet

(so named on account of its shape), often used to pick up nails, etc.

We call the end of a magnet that points to the north when it is freely suspended the north pole, and the other end the south pole of the magnet.

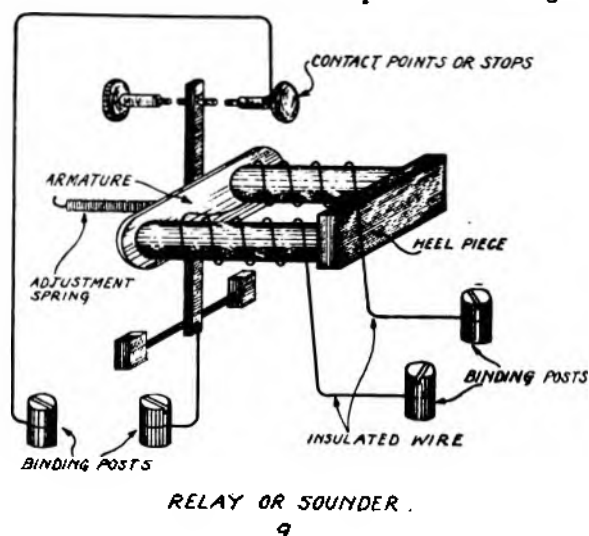


FIG. 2—ELEMENTS OF RELAY OR SOUNDER.

Magnetism resembles electricity, in that unlike poles attract and like poles repel. Thus a north and south pole of separate magnets are attracted to each other, and the north poles or south poles of separate magnets repel each other.

If we wrap a piece of insulated wire around a bar of so-called soft iron, and pass a current of electricity through this wire, we find that the iron becomes a magnet as long as the current flows, but that it loses its magnetic properties immediately the current ceases to flow.

Thus, while the current flows this electromagnet will attract iron or steel, and will attract or repel other magnets, and if freely suspended, will adjust itself so that its ends point relatively north and south. The strength of this electromagnet will depend largely upon the number of turns of wire around its iron core and the quantity of current flowing through this wire.

If we make an electromagnet in the shape of a horseshoe, we will have both poles so located that

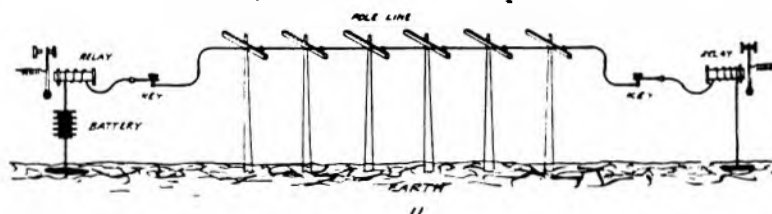


FIG. 4—A TELEGRAPH CIRCUIT.

we can put them to work at the same time, and thus secure double the attraction that one pole only would give. Now we will arrange a piece of soft iron, which we will call an armature on hinges directly in front of these poles and fasten an adjustable spring to it, so that after being attracted

* From Postal Telegraph

by the magnet and released it will return to its original position.

Look at a telegraph sounder or relay and you can trace the resemblance to the above description. The two spools are coils of insulated wire wound on each leg of the horseshoe, the horseshoe in this case being two cores of iron coupled together with what is called a heel piece. The coils of wire are connected together, but are placed on the legs only, the effect being practically the same, however, as if there was one continuous coil from one pole to the other.

The binding-posts are so arranged that the wires from the coils may be conveniently connected to a battery, the line wire or to other instruments.

Let us now suppose that an electric current of sufficient quantity comes over a line wire from a distant point, and flows through the coils of this electromagnetic instrument and thence to earth. When the current flows the iron cores of the instrument are magnetized and attract the iron armature. When the current is removed there is no magnetism and the spring on the armature returns to its original position.

To transmit current over a line it is necessary to make the battery, line and instrument connections complete; that is, from the earth to the battery, from the battery to the coils of the instrument, from the coils of the instrument to the line and from the line to the earth. Any disconnection in this "circuit" will prevent the flow of current. A simple switch for conveniently connecting and disconnecting, or, as it is called, closing and opening the circuit, may be included in the circuit. The ordinary Morse telegraph key is such a switch, the contact points being used to close or open the circuit as desired, and the side lever to close the circuit independently of the contact points.

If we also provide the distant station with a sounder or relay and a key inserted in the line circuit, either station can control the flow of current over the line by "closing" or "opening" the key at that station, and the instruments at both stations will respond to each such closing or opening of the circuit.

We have, therefore, means for transmitting and receiving signals, such as the Morse telegraph code, by the control of electromagnets, these signals being made by closing a circuit momentarily to make a "dot" and for a longer period to make a "dash"; combinations of such dots and dashes being used to form the various letters of the alphabet, etc.

The armature of the electromagnet may be used directly to make the audible signals known as dots and dashes, or may be employed to close the contact points of another circuit, and thus retransmit the signals received. The armature may also be used to directly record signals upon a tape, as in the register used upon call circuits.

The officials of a western city informed both telegraph companies that after a certain date there would be no place on the streets of that town for telegraph poles to stand.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What is an electric generator, and in what respects does it differ from a chemical cell?

How are electric currents generated in a generator?

What is the magnetic field of a generator, and where is it found?

How may the electromotive force of a generator be increased?

How was the principle of the generator discovered?

When the needle of a galvanometer is deflected what does it indicate?

In order to induce an electric current in the coils of a generator armature, what are the conditions necessary?

Do the wires of an armature coil cut an equal number of lines of force at every point in their revolution?

What is a direct-current generator and an alternating-current generator, and what is the difference in the action of the two machines.

What are the three factors of every electric circuit?

Why does the value of the current fluctuate with variation in resistance?

What is the unit of resistance and what are its physical dimensions.

Study the various formulas given on pages 24 and 25, and their applications. Show by the transposition of the various symbols how current, electromotive force and resistance can be ascertained.

Why are magnet coils of telegraph instruments not wound uniformly?

What is the danger of permitting a heavy current on a line?

Why are weak currents used on long lines, and how are relays wound to utilize such currents?

Why could relay magnets not be wound with coarser wire in order to reduce their resistance?

If one turn of wire around the iron core of a relay will give a magnetic strength of say one, what will be the magnetic strength produced by two turns of the same wire?

Why is it that several sounders requiring a current of one-fourth of an ampere each can be supplied from one electric generator while one cell of battery cannot supply enough current to operate one sounder?

The internal resistance of a cell of battery is two ohms. In what part of the cell does this resistance exist?

To be continued

Wet Batteries and Their Uses.*

BY J. C. WRIGHT, ENGINEERING DEPARTMENT,
WESTERN ELECTRIC COMPANY.

The first primary cell was discovered about the year 1800, and from then until about 1870, when the first practical electric generator was invented, primary cells were the chief source of electric current. During this period a number of different types were developed, all of which were of the wet form. The telegraph, which was brought out in 1844, provided a large field for these cells, and even at the present time, large numbers are used in this work. A few years ago the wet cell was also used extensively in the telephone field, but at the present time the dry cell, because of its advantages in size and convenience of handling, has practically crowded it out of this work.

In order to study the principle of operation of the primary cell, let us suppose we have a plate of carbon and a plate of zinc placed in a jar of dilute sulphuric acid with the ends of the plates above the surface of the acid and with the two plates separated from each other. A difference of electrical pressure or voltage will then be established between the plates. This arrangement is shown in Fig. 1, in which A is the carbon plate, B is the zinc plate and C is the sulphuric acid. The two plates in the liquid are known as electrodes, and the solution in which they are placed is called the electrolyte. The upper end of the carbon plate is called the positive (+) pole and the upper end of the zinc plate, the negative (—) pole of the cell.

If we now take an instrument for measuring cur-

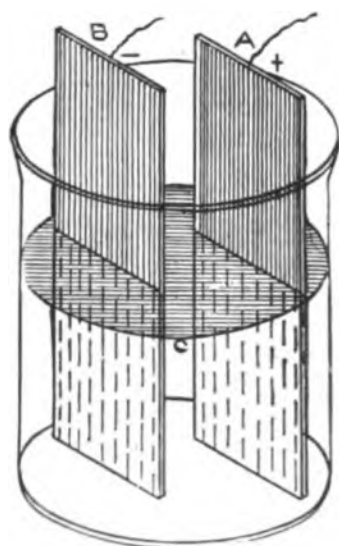


FIG. 1—SIMPLE PRIMARY CELL.

rent, such as an ammeter, and with a wire connect one terminal of this meter to the + pole of the cell, and with another wire connect the other terminal of the meter to the — pole of the cell, we have a complete circuit. Our ammeter will now indicate that a current is flowing from the + pole through the ammeter to the — pole of the cell. It will be noticed after the circuit has been closed a short

time that the current is less than it was at first, and that it gradually decreases. It will also be noticed that bubbles of gas have collected on that part of the carbon plate which is in the electrolyte. These bubbles, which are filled with hydrogen, oppose the flow of the current. The formation of these bubbles is known as polarization, and in a commercial cell it is necessary to provide some means for removing them. The material which does this is known as the depolarizer, and removes the hydrogen by chemical action. After this cell has been in operation for a considerable length of time it will be noticed that the zinc electrode has been partially eaten away, and if the operation of the cell is continued long enough, all of the zinc will be consumed.

In a cell of this kind it is not necessary to use the materials mentioned, but plates of other materials which will carry current may be used, and they may be placed in different kinds of solutions or electrolytes. It is necessary, however, that a solution be used which attacks one plate more than the other.

The more common types of wet cells in use in the United States in connection with telephone and telegraph service are as follows:

THE LECLANCHÉ CELL.

This is one of the early forms of wet cell, the original type having been brought out about 1868. Early types of the LeClanché cell consisted of a hard carbon plate or rod, surrounded by lump carbon or coke mixed with manganese dioxide. The



FIG. 2—LECLANCHÉ CELL.

carbon and manganese were contained in a porous earthen-ware cup which was surrounded by the electrolyte. This electrolyte consisted of a solution of sal ammoniac and water. The zinc electrode was usually in the form of a rod which stood in a vertical position in the electrolyte and had a terminal post at the upper end. A terminal post was also placed at the upper end of the carbon plate.

*From *Western Electric News*.

The porous earthen-ware cup served to keep the manganese and carbon in close contact with each other and with the carbon plate so that the manganese dioxide united with the hydrogen which was formed and thus acted as the depolarizer. Its action, however, was somewhat slow, so that this cell was suitable only for service where current was taken for short periods of time.

In the later types of LeClanché cells, the porous cup is omitted. In some cells powdered manganese and carbon are placed in a cloth bag and are then moulded by pressure around a hard carbon rod. In some types the zinc electrode, instead of being in the form of a rod, is in the form of a sheet zinc cylinder surrounding the carbon element. There are other variations in the form of this cell, but all are similar in action to the original type. The LeClanché cell has a voltage of approximately 1.4 to 1.5.

LeClanché cells are used considerably for operating electric bells and in other classes of work where the current drains are light and of short duration. A few years ago they were used extensively for the batteries in subscribers' telephone instruments, but at the present time, in this country, dry cells have largely taken their place in this field. The LeClanché cell uses no corrosive substances and gives off no fumes during action. In these points it has a decided advantage over many other forms of wet cells, and in addition, the cost of new cells and renewals is low, and but little attention is required to keep the cell in good condition.

One of the types of LeClanché cell is shown in Fig. 2.

THE GRAVITY CELL.

The gravity cell consists of a glass jar, in the bottom of which is placed a sheet copper electrode, the latter being usually formed by standing on edge a number of sheets of copper, fastened at the center,



FIG. 3—GRAVITY CELL.

with the ends bent out to expose a large surface. This is illustrated in Fig. 3. An insulated wire, which is attached to this electrode, extends to the top of the jar and forms one terminal of the cell. The copper electrode is surrounded by crystals of copper sulphate or blue vitriol. At the top of the

jar is suspended the zinc electrode, in the form of a heavy casting, commonly called a "crow foot," shaped so that it has a number of radiating arms which expose a large surface.

In starting this cell, the blue vitriol is placed around the copper electrode and the jar is filled with water. The zinc electrode is then suspended at the top of the jar. Before the cell is ready for use it is necessary to short-circuit it for about twenty-four hours—that is, to connect the + pole and the — pole together with a short, heavy copper wire. At the end of this time there are two different colored solutions in the jar; the one at the bottom being of a deep blue color, while the one at the top has a whitish color. The blue liquid at the bottom, which is a solution of copper sulphate, has a weight considerably greater than that of the liquid at the top, which is a solution of zinc sulphate.

This difference in weight, or specific gravity, keeps the two solutions from mixing, and shows a sharp line of separation between them. The cell obtains its name from this characteristic. In service this line should be kept about midway between the two electrodes and should never reach either. This cell has a voltage of approximately 1.0.

The gravity cell is well adapted for service where a small current is required continuously. At present it is used extensively in telegraph work. Numbers of gravity cells are also used in telephone work for supplying the current for the operators' telephones in the switchboards in small exchanges which do not use storage batteries.

THE EDISON LALANDE CELL.

The Edison Lalande cell consists of a plate of copper oxide with a zinc plate on each side of, and parallel to it. The three plates are fastened to the



FIG. 4—EDISON LALANDE CELL.

cover and when this is in position, they are suspended in a solution of caustic soda, as shown in Fig. 4. This cell has a low voltage, 0.7 to 0.9, but is adapted to many different classes of service, and is very satisfactory when heavy currents are taken from it. At present the principal use of this cell

in telephone work is for operating the magnets of the pole changers used in small exchanges to supply alternating current for operating the ringers in the subscribers' telephones.

THE FULLER CELL.

The zinc electrode of the Fuller cell consists of a heavy zinc block molded in the form of a cone. From the top of this cone extends a copper wire, which forms one terminal of the cell. This cone is placed in the bottom of a porous earthen-ware cup, which is surrounded by an electrolyte consisting of sodium bichromate, sulphuric acid and water. The carbon electrode consists of one or more carbon plates which are suspended in the electrolyte outside of the porous pot. In setting up this cell the zinc cone is coated with mercury and placed in a small amount of mercury at the bottom of the porous cup. The cup is then filled with a solution of salt and water. The voltage of the Fuller cell is approximately 2.1.

Before the adoption of common battery telephone systems which employ storage batteries at the central office, the Fuller cell was used by the Bell companies with telephones employed in their long distance work. At present, however, its use in the telephone field is limited. There are a few test boards in which Fuller cells supply the battery used to test the telephone lines in cases of trouble. These cells have been used to a limited extent at inaccessible pay stations and at private branch exchange boards which have no central office battery supply.

There are many other fields of electrical work in which we find wet cells, but the above covers their principal uses in connection with telephone and telegraph service.

The Magic Nail.

BY THOMAS M. RAGEN, NEW YORK.

One night about eleven-thirty a group of men were lounging in the vicinity of the telegraph counter in one of New York's large hotels, situated in the section of the city most frequented by theatrical people, of which profession the group, no doubt, were all members.

One member of the little party asked another, a tall, well-built and finely groomed gentleman of probable middle age, if he had not once been connected with telegraphy, to which he answered in the affirmative.

The conversation then drifted on to telegraphy, which eventually brought out one of the boyhood experiences of the ex-telegrapher.

He told how he, together with another youth, had begun life as messenger boys in the town of Hillsdale, Mich.; of how, with a little knowledge of telegraphy, came a desire to know "how it was done." Daily, unknown to the manager, they made experiments of one kind or another.

They did not confine their activities to the office wires and equipment. They also began to experiment with the trunk lines on the poles that followed the Lake Shore Railroad. The wires cleared a railroad bridge by but a few inches, and here the boys

would sometimes experiment with the heavy iron wires that carried high currents.

One day they got an old relay, and unwound the fine wire from the coils. Having no use for it at the time, they stored it away for future service. In a few days one of the boys hit on a novel use for the very fine conductor.

One end of this copper wire was fastened to the largest of the trunk lines that passed under the bridge. The fine wire was then carefully connected to an old girder of the bridge, which it followed for several feet, and was then taken over to an old fence, along which it was strung for a considerable distance. Where the wire ended it was invisibly connected with a large nail driven deeply into one of the fence posts.

Here, each day, the boys would hold a show, where they exhibited a "magic nail," which was the nail they had driven into the fence post, at the end of the relay wire, the other end of which was connected with the telegraph line.

Boys, and sometimes girls, flocked to the show, where, in the majority of cases, they stood bare-foot and touched the "magic nail," diverting some of the telegraph current to the ground, which would, of course, also shock the urchin. Considerable current also found its way to the ground between where it tapped the telegraph wire and the "magic nail."

The show became so large and popular that the boys who managed it conceived the idea of charging for the privilege of touching this "magic nail," so long as any pennies were in sight.

No. 116, which was worked quadruplex, began to act badly, and, on being tested by the wire chief, showed a varying escape. Lineman "Tom" Rippon was immediately sent out to find the trouble. For days he travelled between the two test stations where the trouble was reported on various kinds of trains, handcars and even buggies, looking for the trouble. Wire chiefs kept after him daily to "clear No. 116 and advise what found," and Tom Rippon surely was worried.

Finally, he began to walk over the line, but, somehow the fine wire on No. 116 in the shadow of the bridge escaped him. Day and night he worked on the trouble trying every means to locate it, but with no success.

One day he heard the story of a "magic nail." He seemed to have a premonition that this phenomenon had something to do with the trouble on No. 116, and immediately set out to locate it. After considerable search and inquiry throughout the town he saw a collection of urchins along an old fence and went there to investigate. There were the two messenger boys demonstrating their "magic nail," wholly innocent of any wrong-doing, and Tom Rippon cleared No. 116.

It took some explaining and a lot of forgiving, so the story went, before the boys were restored to good standing, both at the office and in their homes, where the irate lineman had made duplicate reports of the trouble on No. 116.

"No," the former telegraph man said in answer to a question, "the telegraph company did not share in the profits of this, my first venture in the show business, when we exhibited our magic nail."

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

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"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."

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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 Jones' Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students, 1915 edition now ready, price \$2.00; 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.

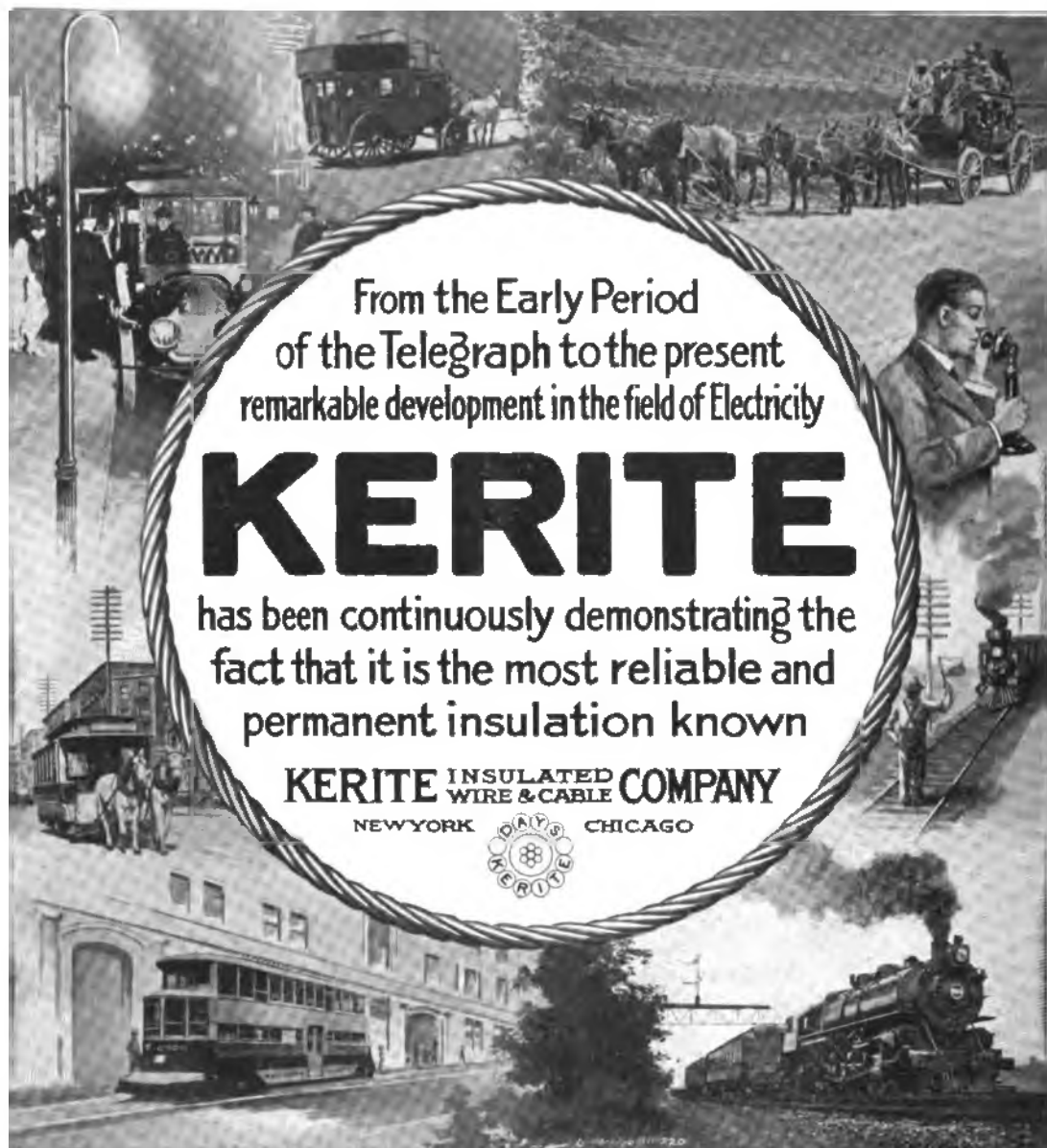
Books on the telephone are Cummings' Electricity and Magnetism in Telephone Maintenance, price \$1.50; McMeen and Miller's Telephony, price \$4.00; Van Deventer's Telephonology, price \$4.00.

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.

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19  15

THE RAILROAD.

Mr. G. MASUNAGA, engineer of the Imperial Government Railways, Tokyo, Japan, accompanied by Mr. Matushiro, identified with the electrical industry at Osaka, Japan, in company with Mr. L. B. Foley, superintendent of telegraph of the Lackawanna Railroad, and G. K. Heyer, of New York, railway sales engineer of the Western Electric Company, a few days ago examined the wireless apparatus on the Lackawanna Railroad system, as well as the loud-speaking telephones used for train-dispatching purposes on that railroad. These Japanese engineers are on a visit to the United States, inspecting electrical systems as applied to railroad service.

THE RAILWAY SIGNAL ASSOCIATION will hold its next annual convention at Salt Lake City, Utah, September 14, 15 and 16. Mr. C. C. Rosenberg, Bethlehem, Pa., is secretary of the association.

G. W. Jett, Superintendent of Telegraph, Norfolk and Western Railroad.

Mr. George W. Jett has been appointed superintendent of telegraph of this road, with headquarters at Roanoke, Va., to fill the vacancy caused by the death of W. C. Walstrum. Mr. Jett is a native of Washington, D. C., where he was born, February 22, 1868. He entered the telegraph service in 1882 and worked for commercial telegraph companies until 1886, when he took up railway work. In that year he entered the dispatcher's office of the Chesapeake and Ohio railroad at Hinton, W. Va., and a year later went to Washington for the Baltimore and Ohio Railroad. In 1888 he became manager of the general telegraph office of the Norfolk and Western Railroad at Roanoke, Va., which position he held at the time of his appointment as superintendent of telegraph.

The Rochester Convention of Railway Telegraph Superintendents.

The committee of arrangements held a meeting in Rochester, N. Y., last week to complete the plans for the convention of the Association of Railway Telegraph Superintendents which will be held in that city June 22, 23, 24 and 25.

The programme was outlined in our May 16 issue. Among the papers to be presented and discussed are the following:

John J. Carty, chief engineer, American Telephone and Telegraph Company, New York, subject to be announced. To be discussed by M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn.

N. E. Smith, superintendent of telegraph, New York, New Haven and Hartford Railroad, New Haven, Conn. "Interference from Single-Phase, High-Tension Power Lines." To be discussed by J. C. Johnson, superintendent of telegraph, Pennsylvania Railroad, Philadelphia; G. A. Cellar, superintendent of telegraph, Pennsylvania Lines West of Pittsburgh, and S. L. VanAkin, assistant superintendent of telegraph, New York Central and Hudson River Railroad, Syracuse, N. Y.

G. A. Nelson, Gordon Primary Battery Company, New York, and E. E. Hudson, sales manager,

Thomas A. Edison, Inc., "Primary Batteries for Transmitter Purposes on Train and Other Telegraph Lines vs. Dry Batteries." To be discussed by W. E. Harkness, New York, and C. S. Pfisterer, National Carbon Company, Cleveland, Ohio.

W. H. Hall, superintendent of telegraph, Missouri, Kansas and Texas Railroad, Denison, Texas, "Censorship of Messages." To be discussed by H. D. Teed, superintendent of telegraph, St. Louis and San Francisco Railroad, Springfield, Mo., and J. F. Caskey, superintendent of telegraph, Lehigh Valley Railroad, South Bethlehem, Pa.

The Telephone in Railway Operation.

Mr. M. H. Clapp, superintendent of telegraph, Northern Pacific Railroad, St. Paul, Minn., read a lengthy paper before the Telephone Society of New York, on April 27, entitled "A Comparison of the Application of the Telephone in Commercial Companies with its Application on Steam Railroads."

Mr. Clapp pointed out the most important differences between those two applications and stated some of the present and future needs in the development of the telephone on the railroad.

The miles of main line track dispatched by telephone, he said, grew from none in 1907, to about 80,000 miles the first of the present year.

He then passed on to a brief description of the plant of the commercial companies and the conditions under which they are operating, and followed with a detailed account of the application of the telephone on the railroads. One of the reasons for the long delay in using the telephone in train dispatching, he said, was the lack of a reliable selector. The selector problem was finally successfully solved and there are now several kinds which give satisfactory results. The various uses of selectors and selector circuits were described.

Other points touched upon by Mr. Clapp were the use of telephone switchboards on the railroads; the use of telephones in booths and cabinets along the right-of-way; portable telephones; loading coils, etc.

In conclusion, Mr. Clapp summarized the advantages of the telegraph and the telephone in railroad operation. For the telegraph, the advantages are:

1. Flexibility in handling circuits when necessary to make changes and patches in the wires.
2. Simplicity in installation, operation and maintenance.
3. Adaptability for minimum cost for long-distance service.

4. Low cost of installation and maintenance.

The advantages of the telephone he enumerated as follows:

1. Universality.
2. Rapidity in the handling of business either by carrying on conversations or by sending messages.
3. Psychological; the employes hear the voices of one another on the line, become better acquainted and learn to co-operate with one another.
4. Reliability in heavy weather.
5. Savings in the expenses of operation.

Atoms and Electrons.

At the meeting of the British Association in Sydney, Australia, Sir Ernest Rutherford gave a lecture on "Atoms and Electrons."

Science, the lecturer began, believed that everything on earth was ultimately divisible into tiny particles called atoms. The atom was considered the one permanent thing in the whole universe. But now it was discovered that the atoms themselves were divisible into collections of still smaller particles—electrons. First came Crookes' experiment, in which electricity was passed through a tube from which the air was gradually exhausted. The lecturer repeated the experiment.

Crookes considered that the rays produced consisted of matter in a new or fourth state. In 1897 Sir J. J. Thomson found they consisted of a stream of negatively charged particles shot out at enormous speed—as much as 50,000 miles per second. He also found that the mass of these flying particles was only one eighteen-hundredth of that of an atom of hydrogen. They were the electrons of which the atoms were made up. They were liberated from substances in various ways. Every electric lamp liberated electrons, and they were thrown out at enormous speeds by radio-active substances. An electron was simply a unit of electricity apart from matter. It had nothing of the ordinary atom of matter associated with it.

This discovery altered all existing ideas of the structure of things, and of the connection between matter and electricity. But the atom itself remained the same—even after an electron had left it. With atoms of certain substances, however, such as radium, it was different. Their life was limited; they tended to break up and disappear. Radium shot off, among other things, a stream of tiny particles—"alpha particles"—which travelled at about 10,000 miles a second, and consisted of a particle of the rare gas helium, together with a charge of electricity. Helium and radium being different, this amounted to a transmutation of elements. When the radium atom had fired off its particle of helium, it became a quite different substance, and that in turn became another through a long series of changes, beginning with uranium. Some of the links in the chain had a life of only a few minutes, whereas uranium would last as long as five thousand million years. Most of these "transition elements" were discovered in Sir Ernest Rutherford's laboratory, by himself and his assistants.

It was possible, Sir Ernest went on, that the atoms of every substance had a similar tendency to break down, but their life was so long that no change in them was noticeable. The transformations of the atoms of radio-active substances could not be controlled by man, though the energy set free was enormous—from three to ten million times as great as by our most powerful explosives.

It had been thought that we should never be able to reach the atom—it was so small. But actually the tracks of some atoms had been registered in various ways. The alpha particles shot out of radium—atoms of helium—caused a gas to conduct

electricity, "ionized" it, and by several ingenious contrivances the setting up of this ionization was used as a means to register the passage of the alpha particles through the gas. One means—a string electrometer—had been invented by Prof. Laby, a Sydney University graduate. The ionization of the gas caused by the passage of the alpha particles caused this string to vibrate, and thus a record was set up, in which each vibration represented an atom.

Sir Ernest went on to the structure of the atom. At the centre, he explained, was a nucleus, almost as tiny as an electron, and containing a positive charge of electricity. Round about it, in concentric rings, circled the electrons, with their negative charges. The nucleus was so small and the electrons were relatively so far from it that if it were taken as represented by an ordinary table glass, some of them would be miles distant from it, so that the atom was actually very far indeed from "solid" in the ordinary sense. The arrangement of the electrons in an atom depended on the charge carried by the nucleus; and it had been suggested that the smallest atom—of hydrogen—consisted of one charge and one electron, and that gold, for instance, consisted of seventy-nine charges and seventy-nine electrons.

He said that the element lead might have either of two origins, and, according as it originated in one way or another, its atomic weight might vary. There might be, apparently, a couple of pieces of lead, which looked just the same, and yet their physical qualities would be quite different. That, perhaps, would not be believed now, but it would be later. The nucleus of an atom might differ in different atoms, though their chemical and physical properties were the same. And gravitation itself was most probably a property of the nucleus. In a heavy atom it would be most complex, and bound together by most powerful forces. It would be the work of the future to explore it, as the rest of the atom had been explored.

A vote of thanks was carried with enthusiasm, on the motion of Sir Oliver Lodge, who said that Sir Ernest Rutherford had described what might be called the astronomy of the atom, and it was found that through it, as through the visible universe, law reigned. Personally, he did not think that, part from the relation to the body of man, there was such a thing as "great" or "small."—*Electrical Review*, London.

DISTRICT MESSENGER COMPANIES are frequently called upon to send officers to capture robbers and thieves. Recently an automatic burglar alarm summoned aid from the Missouri District Telegraph Company of St. Louis, and as a result a burglar was captured in a millinery establishment.

Mr. C. F. Mason, district commercial superintendent, Pacific Telephone and Telegraph Company, Los Angeles, Cal., formerly identified with the Postal Telegraph-Cable service in New York, in remitting to cover his subscription for another year, writes: "You evidently realized that without the AGE I would lose track of all my old friends. Continue to send it to me always."

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(6) Q.—In studying the operation of a telephone ringer I came across two points I would like to ask about, namely: (1) Is the number of magnets in a generator any criterion of the strength of the current generated, and, (2) how many times is the ringer armature attracted in each revolution—once or twice? C. J. W.

A.—(1) The strength of the current depends upon the cross section of the magnets and not upon their number. For instance, a generator with four magnets, $\frac{3}{8}$ by $\frac{1}{2}$ -inch square, is stronger than one with six magnets, $\frac{1}{4}$ by $\frac{1}{2}$ -inch square. (2) The ringer armature is attracted twice during each revolution, once in one direction during half of the cycle and once in the opposite direction during the other half of the cycle.

(7) Q.—Is air the best conductor of sound waves? W. B. N.

A.—No; as a rule solid substances conduct sound better than air. The sound of a bell struck under water is heard a greater distance than if struck in air.

(8) Q.—Can the spaced letters of the American Morse alphabet be transmitted over the Atlantic cable and received on the syphon recorder?

A.—No. Spaced letters cannot be so recorded, that is why the continental or universal alphabet, which does not contain any spaced letters, has to be used for cable purposes.

(9) Q.—In what principal respect does the D'Arsonval galvanometer differ from the ordinary instrument? C. O.

A.—In the ordinary galvanometer the magnetic field produced by a current in the coils of the instrument is compared with the value of the field of the earth, whereas in the D'Arsonval galvanometer the interaction is between the magnetic field of the coil and that of a strong permanent magnet. This is the essential difference between the two instruments. The D'Arsonval is a dead beat galvanometer; that is, the needle comes to rest quickly, through the influence of the strong field of the permanent magnet. A good description of the D'Arsonval galvanometer was published in our issue, dated October 1, 1913.

(10) Q.—How are platinum points attached to instruments? F. T. G.

A.—The modern method of making platinum contacts is to weld a thin disk of platinum to the surface. A modern welding machine takes a strip of platinum sheet 0.005-inch thick and 0.115-inch wide, or a coil of platinum wire, depending upon whether a flat contact or a pointed form is to be made. The proper sized piece is cut off automatically and deposited upon the surface where it is to be clamped and a current of electricity sent through it, causing the platinum to weld to the base.

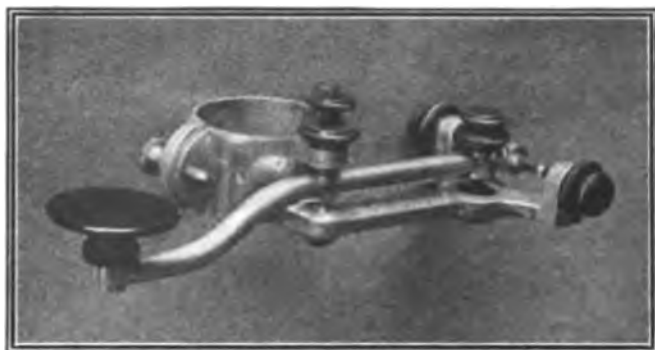
(11) Q.—Please explain what eddy currents are? W. E. C.

A.—If an electromagnet or permanent magnet is moved near a solid mass or plate of metal it induces currents in the latter, which, in flowing through the mass of the metal from one point to another, have their energy finally frittered down into heat and which, while they last, produce electromagnetic forces, tending to stop the motion which caused them. These currents circulate wholly within the metal and are called "eddy" currents.

INDUSTRIAL.

Telegraphing Over a Telephone Circuit.

A unique method of using a telephone circuit for telegraphic purposes has been devised by Mr. Paul P. Banholzer, of Philadelphia, Pa. He clamps a modified telegraph key to the post of a desk telephone, and when the key is manipulated the Morse characters are received on the telephone receiver at the distant end of the circuit clearly and distinctly. The dots and dashes on the key are transmitted mechanically to the diaphragm of the telephone receiver through the metal parts and are transmitted over the line as are voice currents, and reconverted into sound waves in the receiver at the



KEY FOR DESK TELEPHONE.

other end. A desk telephone, with this device attached, can be "jacked" into the primary of any telephone circuit and used as an extension telephone. In this way the hinged fastener can be used anywhere without having to change fastener or use bushings.

This instrument is stated to be an especially useful device in connection with telephone train dispatching, since the telegraph could be used when telephone conversation is not understood or is otherwise difficult.

It is also claimed that this key could be used with advantage in branch offices where there is but one telegraph wire. Such offices, as a rule, have a telephone, and this circuit could be used to forward their messages without having to wait their turn on the telegraph circuit.

THE BROOKFIELD GLASS COMPANY, New York, has just issued a pamphlet giving specifications of a few of its standard insulators, brackets, pins, etc. Cross-section illustrations of the various styles of insulators are shown. This company's products meet very rigid requirements.

The San Francisco Tournament.

Interest among telegraphers in the San Francisco telegraph tournament is growing and from present indications there will be a fine array of talent present when the time of the contest arrives. The tournament is scheduled to take place August 26 and 27.

Mr. Andrew S. Weir, of Philadelphia, Pa., takes exception to the criticism made in our May 16 issue of the executive committee of the Philadelphia tournament for its "arbitrary ruling" in the McClintic case. Mr. McClintic, Mr. Weir says, was not "forced to defend his prize on short notice." When McClintic arrived in Philadelphia he was offered every opportunity to practice. If he did not take advantage of the offers, it was his own fault and not the fault of the officials of the tournament association, of which Mr. Weir was chairman of the committee on prizes. Fair dealing and impartiality, he says, ruled throughout. Mr. Weir suggests that the Philadelphia tournament would be well worth patterning after.

ELECTRICAL PROSPERITY WEEK.—Mr. J. M. Wakeman, general manager of the Society for Electrical Development, delivered an address on "Electrical Prosperity Week" before the New York Electrical Society, May 19. "Electrical Prosperity Week" commences November 29.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 586 to meet the claims arising from the deaths of G. H. Flanley, at Chicago, Ill.; N. J. Petrich, at San Antonio, Tex.; D. B. Mitchell, at New Rochelle, N. Y.; J. F. E. Rowe, at Philadelphia, Pa.; G. Smith, at Amityville, N. Y.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Printer chief W. F. Horton, of this office, left May 9 for San Francisco. Mr. Horton goes to San Francisco as multiplex expert, in connection with the demonstration of this apparatus at the exposition grounds.

Mr. W. S. Hamilton, night printer chief, has assumed Mr. Horton's duties, being relieved nights by H. J. Rounds.

The offices of district plant superintendent W. S. Barker and district commercial superintendent C. F. Ames have been moved to the new quarters at 175 Congress street. It is expected the operating

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.

department will be moved June 6 or 13, to the same address.

F. W. Hill, of the printer department, spent a week in New York recently, familiarizing himself with the automatic apparatus there.

Mr. Wm. Rogers, division wire chief, New York, was in Boston recently on company business.

The following premium circuits have been added to those already established: Cleveland, covered by Charles Dolan; Worcester, covered by J. W. Kane; Portland, covered by E. L. Chase. Eddie Fisher was sent to Portland to cover that end of this circuit.

NEW YORK WESTERN UNION.

Mr. Harry Butland, who has been on a two-months' leave of absence following the death of his mother, has returned to the office. Mr. Butland is supervisor in the southern division.

PHILADELPHIA POSTAL.

Superintendent C. F. Bagley's executive and bookkeeping departments have moved to their new quarters in the Finance Building.

All-night chief operator F. P. McElroy was granted a certificate in electrical engineering on May 21 by the Drexel Institute.

The strawberry business on the peninsula has taken a decided boom and additional men have been assigned to this department to insure fast service.

CHICAGO WESTERN UNION.

Miss Christine Fraker, formerly employed in the Wheatstone department, died May 17.

William P. Dinsley died May 14.

LOS ANGELES WESTERN UNION.

Mr. G. A. Lawrence, manager of this office, told "The Story of the Telegraph" to the Rotary Club at the club's weekly luncheon, May 7.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

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Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

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M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 12.

NEW YORK, JUNE 16, 1915.

Thirty-third Year.

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Faults in Telephone Apparatus and Their Remedies.

(Concluded from page 243, June 1)

Faults in Receivers. One of the commonest faults in receivers is the gradual decadence of the speaking. This may be due to the accumulation of filings, dirt and rust on the pole-pieces which damp the vibrations of the diaphragm. To remedy this fault, remove the ear cap and the diaphragm and dislodge the objectionable substances by gently shaking them out and carefully wiping the pole-pieces with a clean rag. If rust is the cause of the trouble the pole-pieces should be wiped off and a little oil applied to them and afterwards cleaned off. Sometimes the diaphragm touches the pole-pieces. This is usually caused by the magnetic attraction of the pole-pieces. To remedy this fault remove the cap and turn the diaphragm over and replace the cap. When a diaphragm is bent or buckled a new one should be substituted.

Transmitter Faults. A very common fault in transmitters of the Hunning type is the breaking of the carbon diaphragm. The remedy for this is obviously to put in a new diaphragm. Sometimes the coils of a receiver become fused during thunder storms. New receivers should be substituted, and the damaged coils rewound.

Faults in Induction Coils. Troubles in induction coils are usually found in the secondary winding which is liable to be fused by lightning or by an abnormal current from some outside source. The defective coil should be substituted by a new one, or the secondary winding may be rewound. It is preferable, however, to put in a new coil.

Faults in Batteries. Several things may happen to a battery which will cause trouble, but by watchfulness many of the troubles may be avoided. Batteries frequently run dry, either through the solution evaporating, siphoning over by creeping salts and by reason of leakage from a cracked cell. The connections with the carbon and zinc poles of the battery sometimes become corroded by becoming wet with the sal ammoniac solution. These connections should be carefully cleaned and the ends of the wires brightened with emery paper or with the blade of a knife. It is important to keep the points of connection perfectly dry. Dry batteries are much favored in telephone work, as they are cleaner, easier to handle and free from many of the objections of wet batteries.

Line Faults. There are three principal kinds of troubles met with on the line, viz., breaks, contacts and grounds. A break is a total disconnection somewhere on the outside line, and is generally caused by falling trees or by other strains put upon the wire and weak spots in the wire itself. Contacts are usually caused by wires becoming crossed, and a ground is caused by a wire having come in contact directly or partially with the ground. All of these faults occur in different degrees. Thus we may have partial grounds or positive grounds, intermittent swings, etc. The only way to remove line wire faults is to send a lineman over the route to locate them and apply the proper remedy.

Much excellent information on the subject of maintaining telephone apparatus is contained in a book entitled "Practical Telephone Handbook and Guide to Telephonic Exchange," by T. S. Baldwin. This book covers the subject very thoroughly, and is recommended for its practicability. In a long list of faults and their probable causes the following are taken:

Transmitter. Speech received too strong, but transmission weak. Cause: speaker too far from transmitter; batteries weak or exhausted; carbon packed. Speech indistinct, with grating or scratching noise. Cause: loose connection; battery too strong; zinc or carbon connections poor.

Ringers. Bell rings feebly. Cause: out of adjustment; poor connections; too many instruments on line; partial ground; poor adjustment of armature; weak generator. Bells do not ring. Cause: poor connections; broken wire; short circuit; armature open.

Magneto. Receives and transmits a ring feebly. Cause: broken wire; short circuit, if bridging metallic; grounded, if bridged grounded line. Magneto bell rings other bells strongly but its own bell weakly. Cause: poor connection or poor ground; resistance cross, if bridged metallic; resistance ground, if bridged grounded line. Magneto bell receives a ring but will not ring its own bells. Cause: wire broken in generator; armature short circuited, or striker in ringer needs adjustment. Magneto bell

cannot ring or receive a ring. Cause: wire broken or line short circuited if bridged metallic; grounded if bridged to ground. Magneto bell can ring but can get no response. Cause: line grounded; line open if bridged. Call but get no answer. Cause: central office line relays or signals open or out of adjustment; burnt out, if lamps; open, ground, or short circuit in condenser. Speech indistinct, with grating, rasping noise. Cause: poor transmitter; carbon diaphragm; loose connection.

Telegraph and Telephone Patents.

ISSUED MAY 18.

- 1,130,906. Telephone-Exchange System. To L. Polinkowsky, Brussels, Belgium.
 1,140,048. Telephone Guard. To E. O. Loeber, Cleveland, Ohio.
 1,140,120. Selective Calling Apparatus. To E. B. Craft, Hackensack, N. J.
 1,140,150. Wireless Transmission of Electric Energy. To R. C. Galletti, London, Eng.
 1,140,151. Telegraphic Instrument. To J. J. Ghegan, Newark, N. J.
 1,140,263. Loud-Speaking Telephone. To W. Harrison, New York.
 1,140,320. Telephone Signaling System. To E. A. Mellinger, Chicago, Ill.

ISSUED MAY 25.

- 1,140,366. Telephonic Apparatus. To H. C. Egerton, Passaic, N. J.
 1,140,378. Selective Signaling System. To E. E. Kleinschmidt, New York.
 1,140,658. Telephone System. To P. G. Bernholz, Schenectady, N. Y.
 1,140,739. Polarized Relay. To G. B. Gray, Pittsburgh, Pa.
 1,140,749. Selective Switch. To E. E. Kleinschmidt, New York.
 1,140,861. Printing Telegraph Receiver. To J. E. Wright, Pittsburgh, Pa.
 1,140,946. Compensating Device for Telephonic Circuits. To S. G. Brown, London, England.
 1,140,954. Telephone Mouthpiece Protector. To L. A. Collins, Louisville, Ky.
 1,140,996. Sanitary Telephone Attachment. To T. H. R. Miller, New York.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on June 12:

American Telephone and Telegraph Co.	122 $\frac{3}{4}$
Mackay Companies	80
Mackay Company, preferred	65 $\frac{3}{4}$
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	21 $\frac{1}{2}$
Western Union Telegraph Co.	67 $\frac{1}{2}$

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on

the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

MR. GEORGE W. HICKEY, of New York, formerly identified with the service at Watertown, N. Y., and other points, is spending the summer at Bethlehem, N. H.

MR. THOMAS A. EDISON has been awarded the gold medal of the first class at the electrical exhibition at the Panama-Pacific Exposition at San Francisco, for the new Edison storage battery.

MR. H. H. HALL, the old-time telegrapher of Ashtabula, Ohio, who began his telegraphic career in 1852, was a recent New York visitor. Mr. Hall has, for the past twenty years, devoted his life to charity work.

MR. J. FRANK HOWELL, member of the Consolidated Stock Exchange, New York, and a former telegrapher, has issued a large folding sheet, giving an account of the past development and future outlook of the American Telephone and Telegraph Company. It is neatly gotten up, and a map shows the route of the transcontinental line.

MR. A. W. ORTON, the old-time and military telegrapher of Rome, N. Y., who, in 1900, established, in a very modest way, in that city, a manufactory for making packing boxes, has met with excellent success in his undertaking, the establishment now being one of the largest of its kind in the United States. He is assisted by his son, A. W. Orton, jr., in the management of the plant, which employs seventy-five men and consumes an enormous amount of lumber each day in the construction of packing boxes of all sizes. The lumber in the rough is fed into the mill at one end and comes out in complete boxes at the other. The machinery used in the making of boxes drives thirty nails at once. The by-product was formerly burned under the boilers as fuel, but the shavings and sawdust have been found to be more valuable than the soft coal now used. The lumber used in the manufacture of boxes comes from all sections of the United States and Canada. Mr. Orton is well known to the older members of the telegraph profession. He was a member of the United States Military Telegraph Corps during the Civil War and rendered valuable services to the nation during the Civil War period.

MR. THOMAS J. RODGERS, an old-time telegrapher, now in the insurance business in New Orleans, La., was a recent New York visitor, en route to his old home in Boston, and while in New York called

on many of his old-time friends. In 1859 Mr. Rodgers was a member of the New York force of the American Telegraph Company, at 145 Broadway. Mr. Rodgers remained on the force until 1864, when he identified himself with the United States Military Telegraph Corps and was sent to New Orleans by general Anson Stager. He remained in the military service at New Orleans until 1866, when he was assigned to duty and to report to Mr. Charles S. Buckley at San Francisco, for service in the Collins Expedition, which was organized to construct overland telegraph lines connecting the United States with Europe, via Bering Straits, Siberia and Russia. This expedition was abandoned in 1868 on the successful completion of the Atlantic cable. Mr. Rodgers returned to New Orleans and entered the service of the city fire alarm telegraph, occupying a position therewith for many years. He was later detailed for duty in the police telegraph department, which position he held until 1907, when he engaged in the insurance business. When Mr. Rodgers entered the service in the New York office, Mr. Moses S. Roberts was the manager, and the entire force consisted of not more than thirty-five or forty operators. Mr. Rodgers says that while Mr. Charles S. Buckley was superintendent of the National Telegraph Company in New Orleans he invented the first hotel annunciator and the device was installed in the St. Charles Hotel, the City Hotel and the Hotel St. Louis at the time. This was in the year 1858. Mr. Rodgers has the distinction of having taught the art of telegraphy to Mr. Thomas M. Brennan, now and for so many years past prominently identified with the telegraphs in New York City. In 1860 Mr. Rodgers had charge of the branch office of the Bull's Head Allerton Stock Yards, which was located on Forty-fourth street, between Fourth and Fifth avenues, and Mr. Brennan became his assistant. When Mr. Rodgers left New York with his regiment at the breaking out of the Civil War, Mr. Brennan assumed charge of the office.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, will leave New York on June 16 on a business trip through the middle west and to Pacific Coast points, including Los Angeles, San Francisco, Cal.; Portland, Ore., and Seattle, Wash. He will be absent two months.

MR. H. A. TUTTLE, president and general manager of the North American Telegraph Company, Minneapolis, Minn., was a recent New York visitor. He was accompanied by Mrs. Tuttle.

MR. C. F. LEONARD, superintendent, New York, recently made an inspection trip through Connecticut.

MR. W. C. DAVIET, superintendent, Louisville, Ky., was a candidate for president of the Rotary Club of that city. He was regarded as the candidate of the "live wire ticket," but out of the total of 175 votes Mr. Daviet was beaten by only seven votes, which is a very complimentary showing.

MR. M. M. DAVIS, electrical engineer of this company, New York, has returned from a two-weeks' business trip to Chicago and other points in the middle west.

MR. W. I. CAPEN, vice-president, and Mr. C. A. Lane, superintendent of construction, recently made an inspection trip over the company's line in New Jersey.

MR. H. K. PERKINS, assistant manager at Poughkeepsie, N. Y., has been appointed manager in place of T. F. Burke, deceased.

THOS. F. BURKE, aged thirty-five years, manager of the Poughkeepsie, N. Y., office, died at Athens, N. Y., May 24.

MR. R. MILLER, manager at Butler, Pa., is absent on sick leave.

MR. MARTIN KAIN, for many years night traffic chief, Washington, D. C., and known among telegraphers the country over, is absent from duty owing to illness.

MR. F. S. FELL, formerly chief clerk to superintendent C. L. Lewis, has been appointed acting manager of the Los Angeles, Cal., office during manager Dorsey's absence on sick leave. Mr. C. D. Jones has been appointed chief clerk in Mr. Fell's place.

MR. F. N. COOK, chief operator at Worcester, Mass., has been granted an indefinite leave of absence and will make a trip to the Pacific Coast, accompanied by his wife.

MR. G. M. EITEMILLER.—In the *Postal Telegraph* for June, under the head of "Records of Detroit, Mich., Operators for December, 1914," Mr. George M. Eitemüller is credited with having sent during the month, consisting of 169½ hours, 4,824 messages, an average of twenty-eight messages per hour for the entire time. The work was perfectly performed. Old timers will recognize the name of this veteran. Mr. Eitemüller is one of the few remaining members of the old-school of brilliant telegraphers. Because of his extraordinary ability as an operator he has always been assigned to the busiest of wires. Notwithstanding the fact that he has been a hard worker at the key for fifty-five years, his sending by hand and receiving with a pen is as perfectly performed as at any time during his long career.

MANAGERS APPOINTED.—W. A. Toombs at Portsmouth, Ohio; C. E. Shumate at Pulaski, Tenn.; T. D. Marlow at Sidney, Ohio; Mrs. A. D. Phillips (branch manager) at Jacksonville, Fla.; D. J. Brock at Greenville, N. C.; G. S. Pierce at Culpeper, Va.; J. R. Shannon at Wilson, N. C.; W. L. Joyce at Willimantic, Conn.; George Russ at Pulaski, Tenn.; Clifford Clow at Edwardsville, Ill.

BRANCH MANAGERS' OUTING.—The eighth annual outing of the branch managers of the first district, Eastern Division, will be held at Witzel's Point View Island, College Point, L. I., on Saturday afternoon, June 26. The party will leave on the steamboat "Montauk" at 1:30 p. m. from the foot of East Thirty-fourth street. There will be games in the afternoon and a dinner in the evening, followed by a vaudeville entertainment.

NEW FLORIDA OFFICES.—New offices have been opened at Williston and Oxford, Fla. Mr. B. M. Smith is manager at Williston and Mr. G. B. A. Kinard at Oxford.

SUMMER OFFICE FOR GERMAN EMBASSY.—This company has opened a temporary office at Cedarhurst, L. I., to handle the business incident to the establishment of the summer residence of the German embassy at that place. Mr. G. M. Foote, manager of the Washington, D. C., office will be at Cedarhurst for a few days. Mr. Martin Jurist, solicitor for the Postal company at New York, has been appointed manager of the office.

MUTUAL INVESTMENT CREDIT UNION.—A meeting of the board of directors of the Mutual Investment Credit Union, New York, was held at the office of the treasurer, Thursday, June 3, this being the first quarterly meeting of the board of the new Credit Union. The treasurer submitted a very satisfactory report, showing, among other things, assets of \$10,000, nearly all of which represents the savings since February 1 of employees who hold shares in the Credit Union.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president, left New York June 12 for San Francisco, Cal., where he will spend his vacation. He is accompanied by his family and will be absent about a month.

MR. H. W. DE FOREST was elected a member of the executive committee by the board of directors, June 9, in place of the late general T. H. Hubbard. The usual quarterly dividend of one per cent was declared, payable to stockholders of record June 19.

MR. W. A. SAWYER, district commercial superintendent, New York, has returned from a trip of inspection through the northern part of New York State.

MR. C. H. MURPHY, of the time service, New York, was in Boston recently looking over the time-service equipment of the new main office in that city.

AMONG RECENT NEW YORK VISITORS were Messrs. J. C. Smith, commercial agent at Dallas, Tex.; M. H. Compton, division supply man for Mr. M. B. Wyrick, division plant superintendent, Chicago; E. T. Jones, chief operator, Chicago.

MR. A. P. CARSTENSEN, former district commercial manager of the Chicago district, has been appointed assistant manager of the St. Louis, Mo., office.

MR. F. C. SIDDALL, formerly district commercial manager of the first district at Chicago, has been appointed district commercial manager of the Chicago district, vice A. P. Carstensen, transferred to St. Louis.

MR. C. A. CRANE, manager of the St. Paul, Minn., office, represented the St. Paul Commercial Club at the automobile races in Indianapolis, Ind., June 4.

MR. T. E. FLEMING, manager of the messenger service, New York, recently inspected the service in the Chicago offices.

MR. C. B. KRUEGER, operator in the Charles City, Iowa, office, has been appointed manager of the office, vice Mrs. C. W. Penfield, who has been transferred to Chicago Heights, Ill., as manager. Mrs. Penfield succeeds Mr. O. W. St. John, who has been promoted to be manager at Mason City, Iowa, vice J. P. O'Rourke, resigned.

MR. C. M. FULTON.—The *St. George* (N. Y.) *Staten Islander* recently published a portrait and very complimentary reference to Mr. C. M. Fulton, manager for the Western Union Telegraph Company at St. George, Staten Island. "His courtesy to senders and recipients of telegrams," says the article, "has a tendency to make people in love with the telegraph company."

C. N. MCNEILL, aged fifty-six years, manager of branch offices at St. Louis, Mo., died on April 24.

W. G. STANNARD, aged sixty years, who has been manager at Paris, Tex., for thirty years, was stricken while in his office, May 26, and died within three hours. To know Mr. Stannard meant to love him. He was the essence of courtesy on and off the wire. In his death the Western Union Company has lost one of its most efficient managers. His wife and several children survive him. One son, E. Stannard, is chief operator for Western Union Company at Shreveport, La.

E. E. WILLIAMS, until recently superintendent of the Western Union Telegraph Company at Atlanta, Ga., who relinquished the duties of that office a short time ago on account of illness, died on June 6. Interment was at Burgaw, N. C. For twenty years Mr. Williams was manager of the Birmingham office before he was advanced to the position of superintendent. He was a brother of Mr. W. F. Williams, superintendent of telegraph of the Seaboard Air Line, Portsmouth, Va., and was a brilliant telegrapher. He was fifty-six years of age and a musician of note.

MANAGERS APPOINTED.—Mr. A. N. Wooldridge, of Oklahama, at Idaho Falls, vice L. H. James, resigned; G. H. Vogel, at Caldwell, Idaho; C. A. Sederlund, at Grangeville, Idaho, vice J. C. Maddox.

THE NEW 195 BROADWAY BUILDING.—The steel framework of the section of this company's new building at the corner of Broadway and Dey street is being rapidly erected. This structure occupies the site of the old headquarters of the company and is an extension of the present section at 16 Dey street, which is now occupied by the general offices. The wing extending from the Dey street building to Fulton street is entirely enclosed. A figure typifying Electricity will surmount the tower on the Fulton street wing.

SUMMER OFFICES.—About twenty-five summer offices have been opened during the past month in the Adirondacks, the Catskills, Long Island and along the New Jersey shore resorts.

NEW YORK-CHICAGO MULTIPLEX.—A multiplex circuit has just been put into operation between New York and Chicago. There are repeaters at Elmira, N. Y., and Akron, Ohio. Other multiplex circuits will be established between the same points.

THE MORSE ELECTRIC CLUB will hold its summer outing on July 17, at Donnelly's Grove, College Point, L. I., N. Y. The party will be conveyed to the grounds on one of the Western Union steamers and the usual games will be held, followed by a dinner. Additional information, if desired, may be obtained of Mr. W. C. Merly, secretary, 16 Dey street, New York.

EDUCATIONAL SOCIETY.—The eighth regular meeting of the Western Union Educational Society of New York was held Tuesday, June 8. Mr. Francis Raymond Stark, of the Western Union Law Department, gave an informal talk upon "The Relations of the Law to the Telegraph." Mr. J. P. Edwards, first vice-president of the society, made some remarks of special interest to the members.

NEW BOSTON OFFICE.—The office of this company in Boston, Mass., was moved to the new location at 175 Congress street, Saturday, June 12. A detailed account of the new quarters will be printed in a later issue.

NEW HAVEN MESSENGER FORCE.—A group portrait of Mr. S. E. Lonergan, manager; E. L. Mealie, chief clerk, and the messenger force at New Haven, Conn., was published in the *New Haven Register* of June 6. It is a bright-looking crowd.

TICKER SERVICE IN CHICAGO.—This company has discontinued the financial news on the ticker service in Chicago. The service has been taken up by the Chicago News Bureau.

AN INDEPENDENT OFFICE has been opened at Three Rivers, Mich., Mr. O. I. Taylor, formerly operator at Traverse City, Mich., has been appointed manager.

THE POUGHKEEPSIE OFFICE of this company has been moved into new quarters. Mr. George Card is manager.

Western Union Havana Officials.

In our May 1 issue was published an account of the "Friendly Invasion of Cuba" by a large staff



WESTERN UNION HAVANA OFFICIALS.

of Western Union operators, headed by Mr. J. J. Welch, traffic engineer of New York, on the occasion of the Willard-Johnson contest. Reference was made therein to the manager of the Havana office, Mr. Eugenio Fortun Y. Varona, and his assistants,

G. W. Carey and chief operator H. B. Peters. We are enabled, through the courtesy of the *Western Union News*, to present herewith the portraits of these three gentlemen, who manage the company's affairs in the Cuban capital with much efficiency. Manager Varona is shown in the centre of the group, while at his right is Mr. Carey, assistant manager, and at his left, Mr. Peters, chief operator.

Make Good in a Big Way.*

There are three different classes of men in this busy world, and the world has all of them tagged.

In the class of the great majority are placed all the men who are just "getting by." The men who "get by" are the men who stay in bed as late as is possible, and quit work as soon as they can. They watch the clock and try to beat it out of a few minutes every day. They do just enough to hold on, but they never get anywhere in their work, or in their wages. They start low, they aim low, they stay low all their lives, and they die low.

In the next class there is also a large army. This army is made up of the men who "make good." There are hundreds and thousands of them who "just make good" and no more; not because they lack the wit, the ability, the energy, the power or the gift of making good. But they abandon too many things for their pleasure. They know they are making good, and they know that their employers know they are making good; and they get such increases as may come to them from time to time because of an increase in business, an improvement of conditions and what not.

Then there is the class of men who are "making good in a big way." This is smaller, much smaller, than either of the other classes, but they are the leaven that leavens the whole loaf. They are the men who do not stop at the performance of a duty, but go farther. They look for other duties to perform. They plan ways of economizing their time, the time of their employers, and the property and capital of their employers. They think as well as work. They spend their time planning better things for their employers, not so much in the hope of greater rewards, but in the hope of improving themselves. They know that every firm that has anything to do, is looking for the man who will do it in a big way.

The quality to make good in a big way lies in every man of ordinary ability and capacity. Every man has the raw material in him. If he thinks and plans for himself, and seeks better things and higher places, he will think along right lines, and will lay thereby the foundation to build the biggest things in life.

MR. FIDEL VILLACORTA, of the government telegraph and telephone service, San Salvador, Salvador, has assumed the publication of a paper entitled "El Telegrafista Moderno," which is devoted to the improvement of the technical knowledge of the telegraph and telephone employes of that country. Mr. Villacorta returned home last October after spending over a year in this country studying the telegraphs and telephones.

* Leaflet issued by the Western Union Educational Society.

THE CABLE.

G. SCOTT, aged thirty-eight years, chief of the Pacific Cable Board's office at Vancouver, B. C., died at English Bay, May 14.

MR. DANIEL P. KINGSFORD has been elected a director of the Central and South American Telegraph Company, to succeed the late William D. Sloan.

THE GERMAN ATLANTIC TELEGRAPH COMPANY will pay a dividend of six per cent, as compared with seven and a half per cent in 1913.

NEW ATLANTIC CABLE.—A statement has appeared in the German press to the effect that a new cable is about to be laid between the Scandinavian States and the United States direct. The preliminary work has been carried out, and the estimated cost will amount to \$9,600,000.

CABLEGRAMS TO ITALY.—Cablegrams to and from, or in transit through Italy or the Italian colonies, must be written exclusively in plain language, English or French. They must bear a plain and complete address and a proper name signature. Cablegrams without text are not admitted. All cablegrams are subject to censorship. Government cablegrams exchanged between the Italian Government, the allies or neutral governments and their diplomatic representatives, may be in secret language.

COMMUNICATION WITH GERMANY DIFFICULT.—Count von Bernstorff, German ambassador to the United States, recently sent Mr. Meyer Gerard, an attaché of the embassy at Washington, to Berlin to present the American view of the "Lusitania" tragedy to Emperor William of Germany, giving as the reason for this action the difficulties he experienced in transmitting information to his government. He cannot use the cables which are controlled by the Allies, he said, and so far as wireless is concerned, conditions make it impossible to send anything but the briefest dispatches.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to June 12, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Cayenne-Salinas, May 11.

CANADIAN NOTES.

MR. JAMES KENT, who recently retired from the position of manager of the telegraph department of the Canadian Pacific Railway Company's Telegraph, was presented on May 26 with a handsome case of tableware. Those contributing were the officials, and the agents and chief operators in the principal cities of the telegraph department, who desired to give some tangible expression of the esteem in which they held Mr. Kent during his connection with the service for nearly thirty years, the latter half of the time being the head of the department.

MR. C. E. DAVIES, traffic superintendent, Great North Western Telegraph Company, Toronto, Ont., was a recent New York business visitor.

MR. WILLIAM MARSHALL, assistant manager of telegraphs, Canadian Pacific Railway Company's Telegraph, Winnipeg, Man., was presented with an address, a gold watch and a cabinet of silver by the Toronto staff, May 12.

ENLISTMENTS.—Mr. J. H. Baker, ticker inspector for the Great North Western Telegraph Company at Montreal, Que., has resigned and enlisted for war duty, and Mr. D. Ruttenberg, former assistant collector at the same point, has enlisted in the heavy artillery.

H. J. Lillie, Superintendent, Ontario Division, Canadian Pacific Railway Company's Telegraph, Toronto, Ont.

Mr. H. J. Lillie, who was recently appointed superintendent of the Ontario Division of the Canadian Pacific Railway Company's Telegraph, with headquarters at Toronto, Ont., is a native of that city, where he was born November 16, 1867. He



H. J. LILLIE, SUPERINTENDENT, TORONTO.

entered the telegraph business as messenger at Toronto for the Great North Western Telegraph Company in July, 1881. He became an operator in due course and remained with this company until November, 1886, when he entered the service of the Canadian Pacific Railway Company's Telegraph at Toronto. His advancement was rapid and he successively filled the positions of assistant traffic chief, wire chief and chief operator, which latter position he occupied at the time he received the appointment as superintendent.

Great North Western Traffic Officials.

The accompanying illustration, loaned by the *Western Union News*, shows the traffic officials of the Great North Western Telegraph Company, who held a conference in Toronto, Ont., April 2, which was referred to in previous issues of this journal. The names of the gentlemen shown are:

First row (sitting) left to right:—Geo. Watt, superintendent of supplies, Toronto; W. J. Duckworth, plant superintendent, Toronto; C. W. Dawzy, inspector, Toronto; R. J. Foster, chief operator, London; W. G. Barber, district superintendent, Toronto; A. C. McConnell, secretary and auditor, Toronto; Geo. D. Perry, general manager, Toronto; L. S. Humes, district superintendent, Montreal; S. B. McMichael, general assistant to general manager, and general manager of Dominion Messenger and Signal Company, Toronto; C. E. Davies, traffic superintendent, Toronto; G. Hogarth, local manager, Toronto.

Second row (standing):—J. L. Curry, assistant wire chief, Toronto; C. C. Hamilton, assistant night chief operator, Toronto; Ross Bodell, commercial

THE TELEPHONE.

MR. N. C. KINGSBURY, vice-president, American Telephone and Telegraph Company, New York, delivered an address before the Detroit, Mich., Chamber of Commerce, June 8, in which he described the construction and operation of the transcontinental telephone line. After the address conversations were exchanged over the line between Detroit and San Francisco.

MR. U. N. BETHELL.—Much sympathy is expressed for Mr. Union N. Bethell, president of the New York Telephone Company, and his brother, Mr. F. H. Bethell, president of the Bell Telephone Company of Pennsylvania, etc., whose mother died suddenly in Newburg, Ind., June 3. A burglar entered her home, and pointed a revolver at her, which



GREAT NORTH WESTERN TRAFFIC OFFICIALS.

supervisor, Toronto; H. K. Clark, chief electrician, Toronto; W. T. Leslie, chief operator, Quebec; E. A. Titus, all-night chief, Toronto; B. S. Round, chief operator, Winnipeg; G. Sallaway, chief operator, Montreal; G. L. Thompson, wire chief, Toronto; F. Timms, superintendent Dominion Messenger and Signal Company, Toronto; H. A. Baker, wire chief, Montreal; A. Peden, traffic chief, Toronto; F. McTaggart, inspector, Toronto.

Third row (standing):—E. C. Menger, chief operator, Hamilton; J. B. Thompson, printer chief, Montreal; J. H. Yost, printer chief, Toronto; W. Lister, night printer chief, Toronto; E. Tennyson, stenographer, Toronto; G. D. Matthews, assistant traffic chief, Toronto; J. B. Rogers, chief operator, Toronto; E. O. Bergholdt, traffic chief, Montreal; R. J. Daley, chief operator, Ottawa; J. Moore, night chief operator, Montreal; R. H. Hathaway, superintendent Press and Commercial News Department, Toronto; C. E. Lillie, office manager, Toronto; G. H. Walters, night chief operator, Toronto.

THE PROCEEDINGS of the thirty-seventh annual meeting of the Gold and Stock Life Insurance Association, which was held in New York, January 18, have been issued in the usual form. In an accompanying circular letter to the members, president Gardner Irving makes a strong appeal for their co-operation in securing new members.

frightened her so that she died half an hour later. She was seventy-six years of age.

MR. E. P. MAYNARD, director of the New York Telephone Company, has been appointed a member of the executive committee in place of Mr. O. H. Cutler.

CHANGES IN EASTERN GROUP COMPANIES.—Mr. J. L. Swayze, former general attorney of the New York Telephone Company, the Bell Telephone Company of Pennsylvania, the Central District Telephone Company and the Chesapeake and Potomac Telephone Company, has been appointed general counsel for the same interests, and Mr. R. V. Marye has been appointed general attorney for the same companies. Mr. C. T. Russell, former counsel of the New York company, has been appointed general solicitor of the company.

MR. J. F. DAYMUDE, repeater operator of the American Telephone and Telegraph Company, Boston, Mass., was in New York and Philadelphia last week on vacation, and he made it the occasion to call on many of his old friends.

TELEPHONY IN CUBA.—The Cuban Telephone Company proposes to inaugurate in Santiago on September 1, an automatic telephone system, and to extend its service to Vista Alegre and Fomento. This company has 1,550 miles of telephone lines in operation and maintains a telephone service with 212 towns.

RATE TO LOS ANGELES.—The rate for a three-minute conversation over the transcontinental telephone line between New York and Los Angeles, Cal., is \$22.20, and for each additional minute, \$7.10.

TELEPHONE STOCKHOLDERS.—The American Telephone and Telegraph Company had 62,000 stockholders on May 1. The largest individual holder is Joseph J. Slocum, of New York, who owns 20,400 shares. The Bankers' Trust Company appears as trustee for 55,314 shares and Harvard University holds 3,691 shares.

NORWEGIAN TELEGRAPHS AND TELEPHONES.—The number of telegrams transmitted in Norway during the year 1913-14 amounted to 3,870,000, or 73,000 more than during the period 1912-13. Telephone messages over long distances numbered 6,270,000, an increase of 688,000 as compared with the previous period. The total revenue from the telegraph and telephone lines amounted to \$3,691,000, as compared with \$2,021,500, and the working expenses amounted to \$1,595,000, as compared with \$1,474,500 during 1912-13.

"THE STORY OF A GREAT ACHIEVEMENT" is the title of an artistic booklet, issued by the American Telephone and Telegraph Company, for distribution at the Panama-Pacific Exposition at San Francisco. The story covers the development of the telephone from its birth to the successful completion of the transcontinental line, dwelling particularly on the latter achievement. The pamphlet contains excellent portraits of Dr. A. G. Bell, president Theo. N. Vail, T. A. Watson and John J. Carty, chief engineer of the company. There are other appropriate and interesting illustrations.

Chinamen Talk Across the Continent.

The honorary Chinese commercial commissioners, who are now visiting the United States, talked with San Francisco from New York over the transcontinental telephone line, June 5. They conversed with fellow countrymen in San Francisco in their native language. The circuit was presided over by Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company. The distinguished Chinamen were also guests of the Western Electric Company the same day at a "tea" which, with other dishes, was cooked by electricity.

Telephone Pioneers' Convention.

From present indications there will be a large attendance at the fifth annual convention of the Telephone Pioneers of America, which will be held at the Francis Hotel, San Francisco, Cal., September 21, 22 and 23. A large party will go from the East and Middle West on the special Telephone Pioneers' Limited, which will leave New York, Boston and Philadelphia, Tuesday, September 14. The entire trip will occupy twenty-three days, from New York and eastern points.

The programme of the convention and trip was given in our May 16 and June 1 issues. Additional information may be obtained of Mr. R. H. Starrett, 15 Dey street, New York, who is secretary of the association.

Review of Principal Articles in Contemporary Telephone Publications.

ELEANOR V. FOLEY, evening operator at Far Rockaway, Long Island, tells an interesting story of her experience and impressions as a student, in the May-June number of *The Telephone Review*. It is well written and no doubt reflects the experiences of thousands of other switchboard operators.

DR. BELL AND THE EDISON MEDAL.—An excellent reproduction of a photograph taken of the distinguished guests at the ceremony of presenting Dr. Alexander Graham Bell with the Edison medal at the annual meeting of the American Institute of Electrical Engineers in New York, May 18, is given in the June number of *The Telephone News*.

MAKING "MOVIES" BY TELEPHONE.—*The Telephone Review* for May-June contains an interesting account of how the telephone was used in producing the photo-drama, "The Birth of a Nation." The instrument was employed to direct the movements of 12,000 men over twelve square miles of Civil War battleground. Two illustrations show battle scenes as reproduced for the occasion.

The Telephone News for June contains an interesting account of the celebration of Jersey Day at the San Francisco Exposition, on which occasion communication was had with Trenton, N. J., over the transcontinental telephone line. Governor Fielder was at the exposition and talked to over four hundred persons in the Assembly Room at the state capitol in Trenton.

"THE TELEPHONE OPERATOR—HER DUTIES IN SERVING THE PUBLIC," is the title of an article by Gertrude A. Trittipio in *Telephony* for May 29. The article points out that the aim of the operator is to give good service, and presents some rules to be observed in local and long-distance work. Miss Trittipio's paper was awarded first prize in a competition conducted by the Mount Vernon (Ohio) Telephone Company.

BLUE PRINTING.—The modern blue-printing outfit, as used by the engineering departments of all large telephone companies, is a very complete equipment and rapid in producing copies of tracings, etc. Such an outfit is described and illustrated in *The Telephone Review* for May-June by Mr. R. H. Bauman, jr., of the engineering department of the New York Telephone Company. Five men employed on this work can turn out 25,000 square feet of blue prints in a day of eight hours.

ACCOUNTING SYSTEMS FOR TELEPHONE COMPANIES.—Mr. LeRoy Parker read a paper at the recent convention of the Tri-State Independent Telephone Association, in which he referred to the accounting systems prescribed by the Interstate Commerce Commission for the use of telephone companies. The paper is published in full in *Telephony* for May 22. Mr. Parker reviews the authority and jurisdiction of the Interstate Commerce Commission and emphasizes the importance of one member of the commission being a telephone man.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, is en route to the Pacific Coast and Hawaii, in connection with wireless service soon to be extended to Japan, for which preliminary tests are now in progress with the Japanese governmental stations, now approaching completion. He will be absent several weeks. Mr. Nally is accompanied by his family.

MR. SYDNEY ST. JOHN STEADMAN, an official of the English Marconi Company, London, who has been in New York for several weeks, has gone to San Francisco on a business trip.

MR. FREDERICK M. SAMMIS, chief engineer of the Marconi Wireless Telegraph Company of America, New York, has returned from an extended trip to the high-power stations of the company in Alaska and along the coast as far as Catalina Islands.

MR. CHARLES S. FRANKLIN, of the engineering staff of the English Marconi Company, London, who came to America recently with Dr. William Marconi, sailed for home on the steamer "Lapland," June 3.

MR. G. H. CLARK, radio expert of the Navy Department, delivered an address on "Wireless Telegraphy" before the Washington Navy Yard Branch of the American Society of Marine Draftsmen, May 27.

MR. JOHN HAYS HAMMOND, JR., the well-known wireless expert, Gloucester, Mass., proposes a system of aero-radio scouting districts or zones along the seaboard of the United States as a defensive measure against attacks. With such a system, he says, the land forces could co-operate with the fleet of warships in preventing landing operations on the part of an enemy.

ECUADOR.—A wireless station is being erected at Machacala, Ecuador.

THE DARIEN, Canal Zone, station is now in regular communication with the Navy station at Arlington, Va. The equipment at Darien was furnished by the Federal Telegraph Company of San Francisco.

WIRELESS ON THE PANAMA CANAL.—In order to avoid confusion in the sending of wireless telegrams, a general order has been issued by the authorities of the Panama Canal prohibiting the sending of long-distance messages by vessels within the jurisdiction of the canal.

A PERSISTENT WIRELESS MESSAGE.—Two years ago a wireless message was sent from a steamer off the coast of Japan to a man in Peking, China. The message went all over China in search of the man, and was finally delivered to him in December, last year, after being twenty-two months on the way. This is a victory for wireless. If it had been sent over land lines it probably would never have been delivered.

RADIO ENGINEERS.—The proceedings of the Institute of Radio Engineers for the quarter up to June has been issued. It contains much timely and valuable radio telegraph matter.

THE ITALIAN GOVERNMENT has suspended tele-

grams and radiotelegrams on Italian and Italian colonial lines, except such as are written exclusively in plain language, Italian, French or English. Registered addresses and signatures and telegrams without text are not admitted. All telegrams and radiotelegrams are subject to censorship and are admitted only at the risk of the senders. All Italian and colonial radiotelegraphic coast stations are closed to private service.

FEDERAL TELEGRAPH ELECTION.—The following officers and directors were elected at the recent annual meeting of the Federal Telegraph Company, San Francisco, Cal.: John L. Deahl, president; E. W. Hopkins, vice-president; H. P. Veeder, vice-president and general manager; Augustus Taylor, secretary; A. G. Kellogg, treasurer; H. L. Burross, commercial superintendent. Directors: John L. Deahl, Alexander Hamilton, E. W. Hopkins, Geo. A. Pope, H. P. Veeder.

Institute of Radio Engineers.

The regular monthly meeting of the Institute of Radio Engineers was held Wednesday evening, June 9, at Columbia University, New York.

A paper on "Engineering Precautions in Radio Installations," by Mr. Robert H. Marriott, was read.

An address on "Static Elimination—Some Suggested Methods," was made by Dr. Alfred N. G. Goldsmith. It contained material of interest to those working at the question of minimizing atmospheric disturbance of received signals.

Radio Stations of the World.

Messrs. A. Coleman and J. B. Harriets, two wireless experts of New York, have compiled a list of the radio stations of the world and published it in a 197-page book of vest-pocket size. In order to keep the list up to date a supplement will be issued monthly, and the new stations may be inserted in the blank spaces provided for the purpose throughout the book. The book is divided into three parts. Part I gives a list of radio ship stations of the world, arranged alphabetically; Part II, a list of radio land stations, likewise arranged, including commercial and government stations, and Part III, a list of call letters which have been assigned to the various countries, followed by the name of the ship or station to which each call has been assigned. Where the call is not yet assigned the line has been left blank so that the name of the station may be filled in when new stations have been advised by supplement.

The book is substantially bound. It measures 3 inches wide by 5½ inches long, and can be very conveniently carried in the vest pocket. It bears evidence of careful preparation.

The price of this useful little book is 60 cents per copy, and copies may be had of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

CONVENTION OF A. I. E. E.—The thirty-second annual convention of the American Institute of Electrical Engineers will be held at Deer Park, Md., June 29 to July 2.

Bit of Interesting Telegraph History.

Mr. E. H. Hogshead, of Meridian, Miss., a well-known old-time and military telegrapher, spent a few days in New York recently on his return from Rochester, N. Y., where he attended the recent Presbyterian General Assembly as a delegate from his state. He visited old-time friends in New York, among them Mr. Oscar C. Hatton, of Brooklyn, who preceded him as manager of the Meridian office. Mr. Hatton was the last manager of Meridian office when the Southern Telegraph lines were in charge of the United States Military Telegraph Corps, and the first manager for the civil companies. When Mr. Hatton resigned from that office in 1867 Mr. Hogshead succeeded him and continued as manager until 1902.

The career of these two men has been curiously alike—and opposite. Mr. Hogshead was originally a private in the Confederate army and in the Confederate telegraph service. Mr. Hatton was a private in a Union regiment and afterwards an operator in the United States Military Telegraph Corps. Friendship formed while Mr. Hatton was at Meridian has never been interrupted. The office force at Meridian, when Mr. Hatton took charge for the government in 1865, was Mr. E. H. Hogshead, J. C. Hueston and Gustav M. Heiss. The last three were Confederate soldiers and operators, Mr. Hatton being the same on the Union side.

Among Mr. Hogshead's curiosities and relics he has preserved the original message announcing the consolidation of the different telegraph companies operating in the South with the Western Union. The message is on the blanks of the South Western Telegraph Company and is in the handwriting of Mr. O. C. Hatton. That was before operators' wire "signs" were invented. Office calls and message numbers did not appear on the copy and the check was the last thing transmitted, appearing in the lower left-hand corner after the signature. Dead head business was not counted or checked. Following is the official announcement of the consolidation:

"SOUTH WESTERN TELEGRAPH COMPANY.

"BY TELEGRAPH FROM NEW YORK, June 18, 1866.

"To All Offices and Employees, American Telegraph Co.:

"Having made a perpetual lease to the Western Union Telegraph Co. with a provision for consolidation of stocks the Western Union Co. has become and will be regarded as sole proprietor of the lines, property and business of the American Telegraph Co., and the officers of the Western Union Co., J. H. Wade, Prest.; Wm. Orton, Vice-Prest.; O. H. Palmer, Secty. and Treas., and Anson Stager, Gen. Supt., will be considered as having supreme authority and control, but until otherwise determined and ordered the business will continue to be conducted in the name and through the officers of the American Co. as heretofore. (Signed) N. Green, Vice-Prest.; M. Lefferts, Engr.; T. Morris, Treas.

"FROM ENGINEERS' OFFICE, AMERICAN TEL. CO.

"NEW YORK, June 18, 1866.

"To All Employees of the American, Western Union and U. S. Co.'s lines:

"The lines of business of these companies having been united under the control of the Western Union Company you are hereby directed to confer together concerning the best means for the rapid transmission of business in case of interruption or break of the line. You will send business by whatever route or line will most promptly secure this result it being no longer of consequence to regard anything but the speedy and correct transmission of business offering at any of the offices heretofore controlled by either of the three companies above named.

(Signed) "M. LEFFERTS, Engr.

"ANSON STAGER,

"Genl. Supt."

Every man whose name appears in the correspondence is dead.

Telegraph Oddities.

We are in receipt of a letter from a manager of a very small office, who states that she hopes the company will not install the octuplex in her office which, according to TELEGRAPH AND TELEPHONE AGE, is a contrivance to send eight messages over one wire at the same time. She does not know where she will be able to get the eight messages in the first place, and in the second place, she is afraid these new fangled inventions will mix the messages and cause endless confusion and annoyance to her customers.

A Hartford, Conn., paper informs us that the credit belongs to a telegraph operator in that city for falling out of a boat while fishing in a Connecticut pond, recently. The size or weight of the fish that caused the ducking is not stated.

Every day we are informed of automobiles crashing into telegraph poles, in some cases severely injuring the occupants. Are the automobiles subsidized to remove the overhead wires?

MEASURING INDUCTANCES.—The Bureau of Standards, Washington, D. C., has issued a pamphlet (No. 246) on "Methods of Measuring the Inductances of Low Resistance Standards," by F. Wenner, E. Werbel and F. B. Silsbee. It is illustrated by five diagrams.

MR. JERRY NEWTON, of San Antonio, Tex., the well-known old-time and military telegrapher, is the author of a story of the life of professor S. F. B. Morse told in verse. It covers the entire life of the famous inventor, and gives an account of the part he played in connection with the discovery of the electromagnetic telegraph and its adaptation to commercial uses, with comments as to the origin of the dot, dash and space alphabet. The story has been very neatly and attractively bound in pamphlet form. The price of the booklet is fifty cents per copy. See advertisement of Mr. Newton elsewhere in this issue.

The Western Union Multiplex.

BY DONALD MURRAY, LONDON, ENGLAND.

In the leading article in your issue of April 1, you were good enough to mention that the Murray multiplex printing telegraph had been incorporated in the Western Union multiplex. I am much obliged to you for that act of justice, which, I am sorry to say, is not accorded to me by the author of the description of the Western Union multiplex in the same issue of your excellent journal. The introduction to that description expressly states that the Western Union multiplex is the result of "the combined effort and experience of the engineers" of the Western Union and Western Electric companies, with the exception of a studiously vague reference to me at the end of the articles. Not a word is said about my very considerable share in the matter. If the articles describing the Western Union multiplex had originated with the Western Union I know that just acknowledgment of my part in the work of development would have been made, because the Western Union has always behaved towards me in a fair and upright way. I regret that I cannot pay the same compliment to the Western Electric Company, which has allowed its desire for gain to obscure its sense of righteous dealing. It is quite in accordance with the policy of the Western Electric Company towards me, that the writer of these articles (an employe of the Western Electric Company) should represent that the Western Union multiplex is the result of the labors of the Western Union and Western Electric engineers and should avoid any explicit reference to my part in the undertaking.

I believe that the Western Union multiplex and its European twin brother, the Murray multiplex, are so important that their origin and development will in time have some historical interest for telegraph men. I must therefore ask you to be good enough to mention the following facts. If my facts are disputed, let the matter be thrashed out fairly and openly in your columns.

At the beginning of 1912 I sold my United States rights in the Murray multiplex printing telegraph to the Western Union for a substantial sum. As soon as the purchase was decided upon by the Western Union, the Western Union and Western Electric engineers started collaborating on the work of development along the lines recommended by me. With the single exception of the printer, the Western Union multiplex has adhered substantially to the lines I recommended, and it embodies numerous inventive features due to me. The Western Electric Company had been developing a "short-line" printing system, described in the article in your issue of April 1 as the "one way method of operation." I have had nothing whatever to do with that system, and it is in no respect a multiplex. It was, however, provided with a printer having a number of good features, and for various reasons, among others the desirableness of having uniform and interchangeable printers for the multiplex and the short-line system, the Western Union adopted this Western Electric printer in place of mine. That is

the only important feature of the Western Union multiplex in which I had no share.

The bedrock foundations of any printing telegraph system consist of two things (1) the code or alphabet employed, and (2) the method of synchronism. Forty years ago Baudot had applied the five unit code with success to his multiplex printing telegraph, but the importance of the five-unit alphabet was not generally recognized until I gave prominence to it and explained its advantages in my paper on "Setting Type by Telegraph," read before the Institution of Electrical Engineers in London, in 1905. Following the example of Baudot, I had adopted the five-unit alphabet with success in the Murray automatic printing telegraph, and I also, of course, used it with the Murray multiplex system. Since then the Siemens and Halske Company had to change over to the five-unit alphabet for the Siemens automatic printing telegraph. The Morkrum Company adopted the five-unit alphabet, so Mr. Krum informed me, as the direct result of reading my paper of 1905. The Wright system was compelled to adopt it, and the Western Union, in taking over my United States multiplex rights, not only adopted the five-unit alphabet, but also adopted my arrangement of the letters and numerals and operation signals. My arrangement is quite different from the Baudot arrangement. I allocated the letters so that the most frequently used were represented by the fewest holes in the perforated paper tape, the alphabet being graduated in this way from E and T with one hole in the tape to V, X, Q and K with four holes. That means stronger tape and less wear and tear on the punching mechanism. Baudot used the five positive unit combination (00000 in the tape) to represent P. I allotted P to the combination .00.0 so as to leave 00000 available for invisible correction of errors. The Western Union has adopted my arrangement, with the single exception of the punctuation marks, which have been altered to suit American requirements. Fig. 6 in the description of the Western Union multiplex shows my arrangement of the alphabet, with the one exception of the punctuation marks, and yet anyone reading the description would believe that it was the Baudot arrangement, whereas it is mine.

The second fundamental feature, the method of synchronism, is also due to me, although various changes in the mechanical design have been made in it by the Western Union and Western Electric engineers. On my recommendation the Western Union started the development work by purchasing two Baudot distributors. I had recommended the application of the phonic wheel and vibrator drive to the Baudot distributors with the Baudot method of "shift-the-hands" correction, and it was specifically mentioned in the Western Union agreement with me that I was to patent this combination for the Western Union in the United States. Distributors are *clocks*, and the new combination I recommended embodied the vitally important principles of "shift-the-hands" correction of phase and resonant control (pendulum or vibrator control) of speed. The Western Union apparently did not

recognize its importance, and it struggled along at thirty words a minute with the Baudot distributors for more than a year. A day or two after my return visit to New York in 1914, the Western Union applied to its Baudot distributors two phonic motors and vibrators that it had purchased from me in 1912, and forthwith all synchronism troubles disappeared and it had no difficulty in raising the speed to forty and forty-five words a minute. The Western Union engineers have since added to this arrangement, mechanism for correction of synchronism from the signals themselves on lines practically identical with those employed for some years past on the Baudot multiplex between Marseilles and Algiers, a description of which is given in Caminade's book on the Baudot. My clock method of synchronism, however, remains the fundamental feature.

In 1912 when the Western Union bought my American rights, I recommended it to adopt cross-perforated tape with my arrangement of the five-unit alphabet and I explained to it the general design of a suitable keyboard perforator and transmitter. The Western Union adopted my recommendations and the Western Union keyboard perforator and transmitter made by the Western Electric Company follow substantially the general lines that I recommended. It included also the back-spacing key feature of the Murray multiplex with its provision for instant and invisible correction of errors. It adopted my manual start and stop for the transmitter, and after I had repeatedly pointed out the importance of the automatic start and stop for the transmitter it adopted that feature also.

I mentioned in 1912 the advantage in certain cases of using locking local relays for the printer and I gave the Western Union engineers a blueprint of the arrangement. It was an old device, but I do not remember having seen it applied to a multiplex printing telegraph before. That recommendation is also embodied in the Western Union multiplex, and when I was in New York in 1914, I was informed that it was an important element in the success of the system.

Among other apparatus that I sold to the Western Union in 1912 was a receiving tape perforator for perforating tape at the receiving end of the line simultaneously with the printing of the message in page form direct from the line signals, and with it I explained how to provide for switching this re-perforator in or out of action by signals from the distant sending station. Briefly, the machine was a keyboard perforator with five small magnets substituted for the keyboard. The Western Union receiving perforator is of substantially the same design modified to produce cross-perforated tape.

I have recommended several other features to the Western Union which may or may not be adopted, among them being an automatic cut page feed using ordinary cut printed telegraph blanks.

In setting forth these facts I do not in any way wish to belittle the work of the Western Union and Western Electric engineers. They have done a great deal of excellent detail development work on the multiplex and have put it into excellent shape for

Western Union requirements. I have done the same with the Murray multiplex in Europe, my line of development having been chiefly in the direction of meeting the requirements of administrations using the Baudot multiplex, of which there are more than 400 circuits in use in various parts of the world. All I am asking is that my very considerable share in the development of the Western Union multiplex shall receive due acknowledgment.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What is the rule for determining the strength of current in a circuit?

If one cell of battery gives a current of one-sixth of an ampere in a circuit with six ohms resistance, will two cells give twice the amount of current? If not, give the reasons for it.

Is it possible to obtain more than half an ampere of current from any number of cells connected in series? Give reasons.

Why is it possible to obtain large quantities of current from a machine generator, or what is commonly known as a "dynamo"?

Does a mechanical generator possess any internal resistance?

Is all of the current generated in such a machine available for practical use on a wire?

If several circuits are connected to one machine which generates, say one volt, what proportion of the one volt does each circuit take?

When several sounder circuits are connected in multiple and are fed by one machine, what is the effect on the closed circuits when a number of the keys are opened?

Is there any ground connection in a metallic or multiple circuit?

Study Fig. 13, on page 35, in connection with the arrangement of sounders in multiple.

What size of wire is used for the purpose of extending multiple circuits to different parts of the office?

Are the sounder circuits connected directly to the generator conductors?

How many sounders are usually grouped together for connection with the generator wires?

What is the purpose of using fuses in connection with groups of sounders?

When a fuse of one group of sounders melts, does it affect the other groups connected with the same generator wires?

What is the cause of induction?

If two wires, independent of each other, run close together parallel, under what conditions are they repelled and attracted?

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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. Issues over one year old, 50 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

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 of followers. The demand is for leaders.

The Welfare of Operators.

Telegraphers in all the large cities throughout the country, and in many of the smaller towns, are enjoying advantages to-day that were never dreamed of a few years ago. Their welfare has become an important consideration on the part of the telegraph companies, and in every way their interests are being safeguarded. The companies, in establishing new offices and remodeling old ones, fit them out in the most sanitary and pleasing manner. They recognize the economic value of providing good light, plenty of fresh air and generally healthful surroundings. Under such conditions the employes turn out better work and are better satisfied in the knowledge that the companies are doing all that is possible to promote their well being. If the employes become sick or are otherwise incapacitated they are taken care of until they are

able to return to duty. In many ways their life is rendered more pleasant through the generosity of the companies. While the employes are enjoying these benefits the companies are also gainers. There is nothing so promotive of success in a large business corporation as a satisfied body of employes, and operators and others in the telegraph service have reason for congratulations on the improved conditions of to-day.

Convention of Railway Telegraph Superintendents.

The Association of Railway Superintendents, which will meet in Rochester, N. Y., June 22, is one of the oldest organizations of its kind in the United States. The oldest of them all is the New York Electrical Society, which came into being in the late seventies. The Association of Railway Telegraph Superintendents was organized in 1882, and the American Institute of Electrical Engineers was launched into active existence two years later.

The Rochester meeting will be the thirty-fourth held by the Association of Railway Telegraph Superintendents, which means that the association is thirty-four years old. Any organization that lives that length of time must be a useful one or it could not have survived so long. This association has greater potentiality now than ever before. Its utility increases from year to year and the brightest of minds in the technical and practical branches of the electrical arts contribute to its activities. The railroad telegraph service has been greatly advanced by reason of the existence of the organization and were it not for these annual gatherings it could easily be conceived that the use of the telephone in train dispatching and for other railway work would not be in such a forward state as it is to-day, if, indeed, it were used at all. This is one instance of the great benefit the association has been to the railroads of the country.

The work of the association is progressive and has always kept to the front. The members gather together to learn the newest things pertaining to their line of business, and many admirable papers have been presented at the meetings in late years. The papers for the Rochester meeting bring the record of progress right up to date and the expected attendance of many distinguished members of the electrical profession will add greatly to the interest of the meeting. The entire programme is an exceptionally interesting one.

Since the meeting at New Orleans last year the president of the association, who was elected on that occasion, has closed his earthly career and the members will greatly miss his presence. Suitable action will be taken by the convention to mark its deep respect for its dead president.

BLOW TO TELEGRAPH COMPANY.—One of the state commissions having charge of the regulation of telegraph tolls recently served notice on one of the companies that it must not raise the rates without authority in any of the counties of the state. The business between offices in the same county averages from one to two messages a year.

Promotions.

The discussions on the subject of "Promotions," which have appeared in these columns recently, continue to excite much interest. In addition to the views expressed in our issue of June 1, we have received the following:

Mr. A. D. Campbell, of the Great North Western Telegraph Company, Winnipeg, Man., writes:

"The matter of promotions is probably one of the most important items of consideration in the business of every person or corporation employing labor. Its successful use has made many and possibly all of our captains of industry, and the failure to give this question proper or intelligent consideration has strewn the United States with financial wrecks and failures.

"In the telegraph the manager should regard this among his most important duties. He should consider that he has all time before him and immediately on taking office begin the perfection of his organization. If he fails, then his chief operator and the higher officials will have poor material to draw from.

"The place to begin with is the messenger force. He should take note of the messengers who are neat in their personal appearance, polite in their intercourse with other employes, who always turn in their collections correctly and promptly, and, above all, those who hold their employer's interest above their own personal comfort. When such a boy is employed he should be promoted as quickly as circumstances will permit to prevent some other firm securing his services. After he has been placed, probably as an assistant to the delivery clerk, if he is the bright boy these specifications promise, and he surely will be, his own taste and inclinations will push him toward one of the many departments of the telegraph office.

"In the case of the operating department the choice is somewhat more limited, the material being more or less experienced when it reaches that department. The chief operator should always have two or three persons in mind and in training for his different departments.

"For the traffic the selection is easy, providing it is in the office, and it usually is, and is sometimes overlooked, a good jawbone being selected rather than real ability.

"A man with a chronic grouch should never be selected. The one chosen should be a man who can treat his superiors politely and his subordinates in the same way, if he is to get the best results. He must hold the company's interest, like the messenger, ahead of his own personal comfort or convenience. If he does not, then he is not the man for the place; he is simply working for a salary and is not worth it. He should be a good operator, or course; a man of fairly sound judgment and not afraid to use it, and he should not 'leave his pick in the air' when the whistle blows.

"For service on the board and in the 'quad' room, a man of pleasant temper, steady habits and one who has a fairly good working knowledge of Ohm's law should be selected. If he has acquired a fairly good knowledge of that law, without promo-

tion, he will make good; if he has not, some other man should be selected."

Another writer states that these are days of reform and it is pleasing to note that telegraph companies are not proving exceptions to this rule. The recent order of the Western Union Telegraph Company, granting an eight-hour day to the female operators, is the beginning of other needed reforms. The male employes should be granted an eight-hour day. The companies should also make it compulsory on the part of employes to eat their luncheon outside of the operating room. At the present time in many offices the operators eat while working their wires. This is neither conducive to health nor the benefit of the service. Another reform that should receive the consideration of those in charge of the company is the abolition of the split trick and a better regulation of the bonus work, which is undoubtedly shortening the lives of many of our good telegraph operators. What is meant by regulation is that if the companies desire to maintain the bonus circuits and operators are contented to work at a maximum speed, the number of hours of such work should be limited. No man, however expert he may be, can, with safety to his health, handle from seventy to ninety messages per hour for more than five or six hours out of each twenty-four hours. The company must see the need of conserving the health of its employes. The operators themselves, in many cases, are urged to make records, and they work at bonus speed until their entire strength has been exhausted. There is a safe and sane limit to speedy work and this should be observed whether the individual operator likes it or not. The company should make and enforce rules for bonus working.

Valuable Books for Telegraphers.

There are two books which every ambitious and progressive telegrapher should possess in order to prepare himself for advancement.

The fundamental principles of the telegraph are clearly set forth in "Correspondence School Lessons in Elementary Telegraphy" (price, \$2.00 per copy), and the study of this excellent work prepares the student to take up the practical side of telegraphy, etc., as presented in "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by W. H. Jones (price, \$2.00 per copy). This latter work has been recently revised throughout and is brought up to date. It covers a vast field, and describes all kinds of apparatus very clearly and in detail. Testing, the telephone, wireless, time service, ticker service are thoroughly described, and, taken all in all, it is remarkable how much information has been given in the 464 pages of the book.

With these two books at hand the student has every facility to increase his knowledge in telegraph matters and make his services more valuable to his company. Hundreds of operators are now enjoying the fruits of the study of these books in the form of responsible and lucrative positions.

These books are sold by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at the prices named, viz.: \$2.00 per copy.

Local Distribution of News by Printing Telegraph.

BY JOHN A. RANDOLPH, THE SOCIETY FOR ELECTRICAL DEVELOPMENT, INC., NEW YORK.

A method of distributing news simultaneously, quickly and accurately from a central point to an unlimited number of newspapers has recently been introduced in New York City. As delivered, the news is in standard printed form, the sheet, as it comes from the receiver, being similar in appearance to a page of typewriting, although in capital letters.

The system consists essentially of a transmitter, or monitor, located in a central bureau office and connected by wire to printing receivers in the respective newspaper offices.

The transmitter consists of a selective device controlled by a keyboard. The keys on the latter



TRANSMITTING NEWS.

are lettered and arranged in the form of two concentric circles. The letters are transmitted over the wires in the form of electrical impulses, every letter having a distinctive combination. The combinations are varied by changing the sequence and polarity of the impulses. The selective device forms and sends out the impulse combinations forming the letters of the various words. The transmitters are capable of sending eighteen to forty-five words per minute.

The impulses coming over the line are received by the printer magnets, which select the letters and actuate such parts of the mechanism as are necessary for the printing. The instrument is entirely automatic and prints the messages as fast as they come in on a paper roll.

One of these systems is exemplified on an extensive scale in New York. The sending station is located in the Hudson Terminal Building and is managed by the New York City News Association. It is from here that all the association's local news of Manhattan and the Bronx is distributed.

The problem of simultaneous delivery of news was solved by Mr. George S. Hiltz, engineer and

superintendent of the New York Stock Quotation Telegraph Company, who installed the plant.

There are three Burry page-printing machines in each newspaper office, making a total of over sixty.

The electric current is furnished by the Hudson and Manhattan Railroad Company from its powerhouse in Jersey City. To eliminate difficulties caused by variations in the electric pressure, Mr. Hiltz devised a semi-automatic voltage regulator which successfully surmounted the difficulty. There are three complete circuits, with twenty printing machines on each circuit, and twelve "monitors," or transmitters, in the central office.

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(12) Q.—Do the terms "difference of potential" and "electromotive force" mean the same thing?
T. D.

A.—No; these two terms are not synonymous, neither are they always interchangeable. Difference of potential is the work done in carrying a unit of electricity in the positive direction from one point to the other. Electromotive force is the name given to the cause of an electric flow.

(13) Q. Why are some permanent magnets made up of thin plates instead of one solid piece of metal? M.

A. Thin bars or plates of steel can be more powerfully magnetized than a solid bar, in proportion to their weight. They are called compound or laminated magnets, and some compound magnets have been made that will carry twenty-five times their own weight. The best cast steel, with an addition of three per cent of tungsten, makes the best magnet steel.

(14) Q. Is there any difference between a mil and a millimeter? A. D. B.

A. Yes. The two terms mean entirely different dimensions and care should be taken by students not to confound them. A mil is one one-thousandth of an inch and a millimeter is one-twenty-fifth of an inch—very nearly. A millimeter is equal to 39.37 mils.

(15) Q. What is the best insulation and protection to use for automobile primary and secondary ignition circuits, lighting, starting devices, etc.? A. W. A.

A. Experience has taught that rubber-insulated wires covered with varnished cambric tape and braid are the best for automobile work. The varnished cambric not only protects the rubber from the deleterious effects of hot oil and water, but also gives a flexible wire capable of withstanding high electrical stresses.

Mr. V. M. Summers, manager, Western Union Telegraph Company, Harrisonburg, Va., writes: "Many thanks for renewing my subscription to the AGE. It would be impossible to over-estimate its value."

**STATISTICAL INFORMATION REGARDING TELEPHONE TRAIN-DISPATCHING ON
RAILROADS IN THE UNITED STATES AND CANADA,
CORRECTED TO JUNE 1, 1915.**

NAME OF RAILROAD	Name of Superintendent of telegraph	Total mileage	Telephone Total mileage operated by telephone	TELEGRAPH Total mileage operated by telegraph	Telephone mileage increase during previous 12 months
Atchison, Topeka and Santa Fe.....	L. M. Jones	11,170	7,839	3,331	495
Atlantic Coast Line	W. P. Cline	4,816	1,192	3,399	0
Baltimore and Ohio	C. Selden	5,471	1,174	3,826	0
Bessemer and Lake Erie.....	F. W. Smith	206	206	0	0
Boston and Maine	S. A. D. Forristall	2,302	337	1,965	54
Canadian Pacific	J. McMillan, Mgr.				
	Telegraphs	14,184	6,121	7,710	0
Chicago and Northwestern	Wm. Bennett	7,899	2,180	5,608	0
Chicago, Burlington and Quincy.....	V. T. Kissinger	9,263	3,509	5,754	165
Chicago Great Western	G. O. Perkins	1,496	658	838	0
Central Vermont	M. Magiff	536	373	163	0
Central of Georgia	G. L. Candler	1,923	438	1,485	0
Chicago, St. Paul, Minneapolis and Omaha.....	Geo. Boyce	1,753	0	1,753	0
Chesapeake and Ohio	C. W. Bradley	2,367	1,614	359	139
Chicago, Rock Island and Pacific.....	C. H. Hubbell	8,316	2,218	5,534	0
Chicago and Eastern Illinois.....	Chas. McCormack	* 1,282	218	1,064	0
Central Railroad of New Jersey and New York and Long Branch Railroad	F. G. Sherman	676	181	501	106
Chicago, Milwaukee and St. Paul.....	E. A. Patterson	10,436	4,417	6,019	244
Chicago, Terre Haute and Southwestern.....	F. H. Van Etten	382	161	221	0
Cincinnati Northern	C. S. Rhoads	206	206	0	0
Cleveland, Cincinnati, Chicago and St. Louis.....	C. S. Rhoads	1,919	1,559	360	0
Colorado and Southern	J. L. Henritzy	1,871	0	1,239	0
Denver and Rio Grande.....	John M. Walker	2,598	376	2,221	0
Denver and Salt Lake.....	C. A. Parker	254	214	254	0
Delaware, Lackawanna and Western.....	L. B. Foley	985	985	0	0
Erie	E. P. Griffith	2,227	935	1,292	30
Grand Trunk Railway System.....	A. B. Smith	4,785	2,157	2,628	83
Grand Trunk Pacific Railway.....	A. B. Smith	3,170	2,881	252	0
Great Northern	E. J. Little	8,077	5,097	2,979	170
Illinois Central, North of Ohio River.....	F. T. Wilbur	3,010	1,513	1,497	219
Illinois Central, South of Ohio River.....	B. Weeks	2,830	1,565	1,216	230
Indiana Harbor Belt	W. L. Connelly	45	45	0	0
Kansas City Southern	R. L. Logan	824	0	824	0
Lake Erie and Western.....	F. F. Riefel	871	570	301	0
Long Island	L. S. Wells	388	370	18	0
Lehigh Valley	J. F. Caskey	1,444	1,281	163	0
Louisville and Nashville	R. R. Hobbs	4,940	2,260	2,232	428
Maine Central	I. B. Norcross	1,362	0	1,362	0
Michigan Central	J. J. Ross	1,701	1,452	132	34
Missouri Pacific	E. A. Chenery	7,284	1,131	6,016	0
Missouri, Kansas and Texas.....	W. H. Hall	3,649	1,686	1,901	0
Minne. St. Paul and Sault Ste. Marie.....	H. A. Tuttle	4,072	540	3,532	358
New York, New Haven and Hartford.....	N. E. Smith	2,000	162	1,840	0
Norfolk Southern	C. P. Dugan, Supt. of Transportation	907	751	146	0
Norfolk and Western	G. W. Jett	2,036	1,777	75	0
Northern Pacific	M. H. Clapp	6,354	2,820	3,168	305
New York Central and Hudson River and Boston and Albany	A. B. Taylor	3,328	2,661	667	115
New York Central Railroad, West.....	F. F. Riefel	2,094	2,094	0	36
New York, Chicago and St. Louis.....	W. L. Blair	523	511	0	0
Oregon Short Line	E. C. Monson	2,148	263	1,806	214
Oregon, Washington R.R. and Navigation Co.....	E. A. Klippel	2,019	730	1,231	207
Pennsylvania	J. C. Johnson	4,700	2,500	2,200	0
Pennsylvania Lines West of Pittsburgh.....	G. A. Cellar	4,970	364	4,486	234
Peoria and Eastern	C. S. Rhoads	337	337	0	0
Pittsburgh and Lake Erie.....	L. A. Lee	221	221	0	0
Pere Marquette	G. W. Trout	2,311	790	1,521	64
Pittsburgh, Shawmut and Northern.....	C. L. Lathrop	270	126	144	0
Philadelphia and Reading	C. M. Lewis	3,558	0	3,558	0
Queen and Crescent	W. S. Melton	654	654	0	360
Richmond, Fredericksburg and Potomac.....	T. R. Gooch	112	112	0	0
Southern Pacific and Arizona and Eastern.....	E. L. King	6,492	842	5,632	0
Seaboard Air Line	W. F. Williams	3,123	1,789	1,334	22
San Pedro, Los Angeles and Salt Lake.....	C. J. Steinel	1,040	0	1,040	0
Southern	W. H. Potter	6,933	281	6,652	0
St. Louis and San Francisco.....	H. D. Teed	5,062	1,723	3,339	0

* Last year's figures.

NAME OF RAILROAD	Name of Superintendent of telegraph	Total mileage	TELEPHONE	TELEGRAPH	Telephone mileage increase during previous 12 months
			Total mileage operated by telephone	Total mileage operated by telegraph	
Temiskaming and Northern Ontario	V. J. Kelly	328	286	42	0
Texas and Pacific	Frank Tremble	1,887	71	1,815	71
Terminal Railroad Assn. of St. Louis	E. Bentley	14	0	14	0
Toledo and Ohio Central	J. J. Schwendt	399	399	0	0
Union Pacific	F. Frenzer	3,610	721	2,866	0
Wabash	P. Church	2,135	848	1,287	0
Zanesville and Western	J. J. Schwendt	85	0	85	0
Totals		212,622	83,365	125,147	4,443
Totals for 1914		204,326	76,664	126,232	9,908

Statistics of Meetings of Association of Railway Telegraph Superintendents.

The following table shows the number, date and places of the annual conventions of the Association

of Railway Telegraph Superintendents from the first meeting up to the present time; also the names of the president, vice-president and secretary-treasurer for each year throughout the entire period.

No.	Date	Year	Place	President	Vice-President	Secretary-Treasurer
1	Nov. 20	1882	Chicago, Ill.	W. K. Morley	W. Kline	C. S. Jones
2	June 3	1883	Chicago, Ill.	W. K. Morley	C. Selden	P. W. Drew
3	Sept. 17	1884	Philadelphia, Pa.	C. Selden	E. C. Bradley	P. W. Drew
4	June 17	1885	Cleveland, Ohio.	C. W. Hammond	G. L. Lang	P. W. Drew
5	June 16	1886	St. Paul, Minn.	A. R. Swift	G. L. Lang	P. W. Drew
6	July 13	1887	Boston, Mass.	G. L. Lang	G. C. Kinsman	P. W. Drew
7	July 11	1888	New York.	G. C. Kinsman	C. A. Darlton	P. W. Drew
8	Oct. 16	1889	Washington, D. C.	C. A. Darlton	G. T. Williams	P. W. Drew
9	June 18	1890	Niagara Falls, N. Y.	G. T. Williams	G. M. Dugan	P. W. Drew
10	June 17	1891	Cincinnati, Ohio.	C. S. Jones	L. H. Korty	P. W. Drew
11	June 15	1892	Denver, Col.	L. H. Korty	U. J. Fry	P. W. Drew
12	June 20	1893	Milwaukee, Wis.	U. J. Fry	O. C. Greene	P. W. Drew
13	June 13	1894	Detroit, Mich.	O. C. Greene	E. R. Adams	P. W. Drew
14	June 12	1895	Montreal, Can.	M. B. Leonard	J. W. Fortune	P. W. Drew
15	June 17	1896	Old Point Comfort, Va.	G. M. Dugan	J. W. Lattig	P. W. Drew
16	June 16	1897	Niagara Falls, N. Y.	J. W. Lattig	W. W. Ryder	P. W. Drew
17	June 15	1898	Omaha, Neb.	W. W. Ryder	L. B. Foley	P. W. Drew
18	May 17	1899	Wilmington, N. C.	L. B. Foley	W. F. Williams	P. W. Drew
19	June 20	1900	Detroit, Mich.	W. F. Williams	C. F. Annett	P. W. Drew
20	June 19	1901	Buffalo, N. Y.	C. F. Annett	F. P. Valentine	P. W. Drew
21	June 18	1902	Chicago, Ill.	J. H. Jacoby	W. J. Walton	P. W. Drew
22	May 13	1903	New Orleans, La.	C. S. Rhoads	C. P. Adams	P. W. Drew
23	June 15	1904	Indianapolis, Ind.	H. C. Hope	E. E. Torrey	P. W. Drew
24	May 17	1905	Chattanooga, Tenn.	E. E. Torrey	E. A. Chenery	P. W. Drew
25	June 20	1906	Denver, Col.	E. A. Chenery	E. P. Griffith	P. W. Drew
26	June 19	1907	Atlantic City, N. J.	E. P. Griffith	W. J. Camp	P. W. Drew
27	June 24	1908	Montreal, Can.	W. J. Camp	G. W. Dailey	P. W. Drew
28	June 23	1909	Detroit, Mich.	J. L. Davis	I. T. Dyer	P. W. Drew
29	June 20	1910	Los Angeles, Cal.	I. T. Dyer	J. B. Sheldon	P. W. Drew
30	June 26	1911	Boston, Mass.	G. A. Cellar	W. Bennett	P. W. Drew
31	June 4	1912	New York.	J. B. Sheldon	W. Bennett	P. W. Drew
32	May 20	1913	St. Louis, Mo.	W. Bennett	A. B. Taylor	P. W. Drew
33	May 19	1914	New Orleans, La.	W. C. Walstrum	E. C. Keenan	P. W. Drew

The following classification shows the places, alphabetically arranged, where the conventions have been held and the years:

Atlantic City, N. J., 1907.

Boston, Mass., 1887, 1911.

Buffalo, N. Y., 1901.

Chattanooga, Tenn., 1905.

Chicago, Ill., 1882, 1883, 1902.

Cincinnati, Ohio, 1891.

Cleveland, Ohio, 1885.

Denver, Col., 1892, 1906.

Detroit, Mich., 1894, 1900, 1909.

Indianapolis, Ind., 1904.
 Los Angeles, Cal., 1910.
 Milwaukee, Wis., 1893.
 Montreal, Que., 1895, 1908.
 New Orleans, La., 1903, 1914.
 New York, 1888, 1912.
 Niagara Falls, N. Y., 1890, 1897.
 Old Point Comfort, Va., 1896.
 Omaha, Neb., 1898.
 Philadelphia, Pa., 1884.
 St. Louis, Mo., 1913.
 St. Paul, Minn., 1886.
 Washington, D. C., 1889.
 Wilmington, N. C., 1899.

MR. S. A. D. FORRISTALL, superintendent of telegraph of the Boston and Maine System, Boston, Mass., who has been absent from his office on account of illness for some time past, has returned from a trip to North Carolina, much improved in health.

HALL SWITCH AND SIGNAL EXHIBIT.—The Hall Switch and Signal Company, New York, will have a display of its selectors, telephone and associated apparatus at the convention of the Association of Railway Telegraph Superintendents at Rochester, June 22 to 25. Mr. J. A. Ritter and Mr. C. S. Rhoads, jr., will be in attendance.

MUNICIPAL ELECTRICIANS.

THE CINCINNATI CONVENTION of the International Association of Municipal Electricians, which is to be held at the Gibson Hotel, August 24, 25, 26 and 27, promises to be an unusually interesting one. Valuable papers on the subject of fire alarms, etc., will be presented and discussed. Mr. Clarence R. George, city electrician, Houston, Tex., is secretary of the association.

POTTSVILLE, PA., FIRE-ALARM SYSTEM.—The fire-alarm system at Pottsville, Pa., is under the supervision of Mr. John L. Kanady, city electrician. He is assisted by the chief of the fire department, who does most of the testing. Linemen from the telephone or electric light companies are employed on trouble work and on new construction. The apparatus at headquarters is of the automatic type and Gamewell make. There are thirty-four Gamewell boxes of the non-interfering Excelsior type, with lightning arresters and Morse key.

OBITUARY.

CLARENCE W. SEAMANS, chairman of the Board of the Remington Typewriter Company, died on May 30 of a complication of diseases, at his summer home in Pigeon Cove, Mass. Interment was in Brooklyn. Mr. Seamans was born in Ilion, N. Y., in 1854. It was in Ilion that the typewriter was also born. Early in the eighties Mr. Seamans became identified with those interests and did more than any other man to develop this world-wide industry into its present magnitude. Mr. Seamans was well known to telegraph and press association people. He developed suggestions made by these interests which enabled the typewriter company to furnish machines capable of withstanding the severe strain put upon them by manifold and other

telegraphic work. He was a member of the firm of Wyckoff, Seamans and Benedict, which produced and developed the Remington typewriter. He was afterwards president of the Union Typewriter Company, which was, in 1912, consolidated with the Remington Typewriter Company, and Mr. Seamans became its president, but later, on account of failing health, he relinquished the duties, assuming the chairmanship of the board. Mr. Seamans was identified with many other interests.

MR. W. H. WOLVERTON, who recently died in New York, left a fortune of a million and a half dollars, according to his will, which was probated a few days ago. Mr. Wolverton, who was a telegrapher, came to New York from western Pennsylvania in the late sixties to try his fortune in the metropolis. He always made it a point to save a portion of his salary no matter how small his income. He invested his savings in stocks in different enterprises, buying one, two or five shares at a time. The magnitude of his fortune is the best evidence of the soundness of his business judgment.

M. J. SULLIVAN, aged fifty-three years, a former and well-known Associated Press operator, died in Brooklyn, June 11. He was latterly correspondent for various newspapers at different times. He was connected with the New York Sun's cable department at the time of his death.

Death of C. E. Chinnoek.

Charles E. Chinnoek, aged seventy years, a manufacturer of telegraph instruments, and one of the pioneers of the electric light and telephone industries, died in Brooklyn, N. Y., June 11. Mr. Chinnoek was born in London, and on coming to this country he began his active life as a telegrapher. The telephone and electric light were still in their infancy when he became associated with Thomas A. Edison and later became the superintendent of the first central station of the New York Edison Company. As the vice-president of the Edison United Manufacturing Company, the parent Edison company, Mr. Chinnoek was largely responsible for the founding of the Edison Electric Illuminating Company of Brooklyn. The Edison United Manufacturing Company was later merged with the Thomson-Houston Company and became known as the General Electric Company.

Mr. Chinnoek was also chief electrician of the Metropolitan Telephone Company, now the New York Telephone Company, and had patented many useful electrical inventions, among them an automatic transmitter that was adopted by the United States Government. Another of his inventions which is used by all the telephone and telegraph companies is a method of suspending aerial cables. Mr. Chinnoek is survived by his widow, a son and a daughter.

Mr. H. E. Marquardt, of Wausau, Wis., in renewing his subscription for another year, writes: "It is ten years since I left the telegraph service, but the AGE is still one of my best friends, as I love to keep in touch with happenings in the telegraph world."

A Perfect Manual Typewriter Printing Telegraph

The National Electric Distributer Corporation is now constructing Dr. Cardwell's latest improvement in printing telegraph, which may be installed at all intermediate stations. Minimum voltage for local stations. Non-synchronous. Operated selectively or otherwise. Either Morse Telegraph, or telephone simultaneously with the printing system. Demonstrations of this system made daily at our office.

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39-41 Cortlandt Street

New York City

P. S. — Any form of typewriter may be adopted.

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.

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Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



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maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

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NEW YORK CHICAGO



THE RAILROAD.

Mr. W. H. HALL, superintendent of telegraph of the Missouri, Kansas and Texas Railroad, Denison, Tex., has been appointed general superintendent of telegraph of the system, with headquarters at the same point. Mr. Hall has appointed Mr. J. H. Hickman superintendent of telegraph, with headquarters at Parsons, Kan.

NEW YORK VISITORS.—Among recent New York visitors were Messrs. E. C. Keenan, general superintendent of telegraph, New York Central Lines West, Chicago; C. S. Rhoads, superintendent of telegraph, Cleveland, Cincinnati, Chicago and St. Louis Railway, Indianapolis, Ind.

RAILWAY WIRELESS IN ENGLAND.—Experiments are being made with wireless signaling apparatus on five locomotives of the London and South Western Railway, England.

Programme of Rochester Convention, Association of Railway Telegraph Superintendents.

Following is the complete business and entertainment programme of the thirty-fourth annual convention of the Association of Railway Telegraph Superintendents, which will be held at the Powers Hotel, Rochester, N. Y., June 21-25.

The hotel rates are as follows (European plan):

Ten rooms, shower bath, for one, \$2.00 per day; ten rooms, with bath for one, \$2.50; for two, \$3.50 per day; forty rooms, with bath for one, \$2.50; for two, \$4.00 per day; thirty rooms, with bath (large) for one, \$3.00; for two, \$4.50 per day; sixty double rooms, for two people, \$5.00 per day; twin beds, fifty cents per bed extra. Excellent cuisine.

BUSINESS PROGRAMME.

Tuesday, June 22:

10:00 a. m. to 12:00 m.—Registration, minutes, announcements, addresses, etc.

1:30 p. m. to 2:30 p. m.—Paper No. 1, "Interference from Single-phase High Tension Power Lines," by Mr. N. E. Smith. Discussion by G. A. Cellar, S. L. Van Akin, jr., and J. C. Johnson.

2:30 p. m. to 3:30 p. m.—Paper No. 2, "Primary vs. Dry Battery," by G. W. Nelson and E. E. Hudson. To be discussed by W. E. Harkness and C. S. Pfisterer.

3:30 p. m. to 4:30 p. m.—Executive session.

Wednesday, June 23:

9:30 a. m. to 11:00 a. m.—Paper No. 3, "Telephone Development," by Mr. J. J. Carty, chief engineer, American Telephone and Telegraph Company, New York. To be discussed by Mr. M. H. Clapp.

11:00 a. m. to 12:30 p. m.—Paper No. 4, "Screened Cable Conductors and Their Application in Telegraph Service," by Mr. R. E. Chetwood, plant engineer, Western Union Telegraph Company, New York. To be dis-

cussed by Messrs. W. J. Camp and C. S. Rhoads.

Thursday, June 24:

10:00 a. m. to 11:30 a. m.—Paper No. 5, "Censorship of Telegrams," by W. H. Hall. To be discussed by Messrs. H. D. Teed and J. F. Caskey.

11:30 a. m. to 1:00 p. m.—Executive session.

2:00 p. m. to 4:00 p. m.—Election and installation of officers.

ENTERTAINMENT PROGRAMME.

Monday, June 21:

8:00 p. m.—Informal gathering, banquet hall, Powers Hotel.

Tuesday, June 22:

1:30 p. m.—Luncheon for the ladies at Sibley, Lindsley and Curr's.

3:00 p. m.—The ladies will take special trolley cars to Glen Haven and boat from Glen Haven to Newport, Sea Breeze and Charlotte, arriving at Charlotte at 6:00 p. m. It is expected that the business meeting will adjourn at this time and a special car will be waiting for the transportation of the members of the association to Charlotte, where they will meet the ladies at Ontario Beach. A fish supper will be served at 7:30 p. m. at the Ontario Beach Hotel. A special car will await the return of the entire party.

Wednesday, June 23:

The entire party will attend the memorial services during the afternoon of the unveiling of the James D. Reid monument at Mount Hope Cemetery, and this trip will be made either by automobiles or trolleys. Sight-seeing tour of the city.

6:45 to 7:15 p. m.—In the parlors of the Powers Hotel long-distance telephone service will be established with San Francisco.

7:30 p. m.—A banquet will be given by the New York Telephone Company at the Powers Hotel. (Informal.)

Thursday, June 24:

1:00 p. m.—Luncheon for the ladies at Seneca Hotel.

2:30 p. m.—Special cars for the ladies for a trip through the Kodak works and camera plant, returning to the hotel about 5:30. No special entertainment has been provided for Thursday evening.

Friday, June 25:

9:00 a. m.—Special train leaves Rochester for Charlotte, where the entire party will go aboard a boat for a trip across Lake Ontario to Coburg. Returning, will reach Rochester at 8:00 p. m.

Owing to the death of president W. C. Walstrum, Mr. E. C. Keenan, first vice-president, will act as president, and will direct the meetings until the election of a new president.

Testimonial to Mr. W. S. Daniel, St. Louis, Mo.

Mr. W. S. Daniel, formerly manager of the St. Louis office of the Postal Telegraph-Cable Company, and who is now on sick leave in that city, was visited on May 20 by a committee consisting of C. F. Bartlett, sr., J. H. Hancock and Victor E. Blume, representing the St. Louis Postal employees, who presented him with a handsome solid gold Masonic emblem watch charm with diamond setting, representing the Consistory of thirty-second degree Masons, the Royal Arch Chapter and Knights Templar Commandery, with all of which bodies he is affiliated, as well as being a member of Moolah Temple of St. Louis of the Ancient Arabic Order Nobles of the Mystic Shrine. His blue lodge affiliation is with Tuscan Lodge No. 360 A. F. & A. M.

Mr. Daniel was also presented with a beautiful testimonial of friendship containing the autographs of ninety of his former employees and associates, including clerks of the business office, chiefs and operators of the operating department, branch managers and linemen. The testimonial is as follows: "To our friend, Mr. Wm. S. Daniel:



W. S. DANIEL.

"Sympathetic association with one another, and the appreciation and understanding of those qualities which unite us all in the bonds of friendship is, after all, the one thing that makes life worth living and which is the characteristic that has endeared you to us.

"We have all profited by our association with you in the short years you were our manager, and if we, perhaps, at times, failed to understand fully the goal of high efficiency you would have had us reach in our different and respective positions, which would have relieved you of many burdens, we shall always cherish the remembrance of your patience with us, and endeavor to attain the high ideals you so eminently portrayed.

"With this assurance of our loyal friendship, Mr. Daniel, we wish you future good health and prosperity."

(Signed) John H. Hancock, James Brown, Harry T. Ford, M. McGrath, C. A. Thomas, A. K. Minor,

Florence McGeary, B. L. Teachnor, Inez Cook, Gertrude A. Schuetze, Frank Meyer, F. J. Merke, M. A. Baird, A. G. Schaefer, J. F. Donley, W. J. Guthridge, W. A. Brueggeman, Albert Seewald, Robert Jones, C. F. Bartlett, sr., H. J. Nieman, S. B. Campbell, L. Dalton, C. A. Bauer, F. J. Slocum, J. Henry Blaser, Chas. F. Bartlett, jr., S. H. L. Recht, J. Steinhauser, T. G. Shea, Elsie H. Suren, Matthew McCourt, A. Thilking, E. Sieber, Wm. H. Lindeman, J. Peltier, B. L. M. Schlueter, E. V. Welch, E. A. Kohnle, May H. Schuette, Mabel R. Benn, J. P. Wilson, R. T. Baker, T. P. Wheeler, John Klautner, John P. McCarthy, Charles H. Hagergorst, D. J. Bishop, G. C. Goodwin, C. H. Ward, M. L. Sullivan, T. J. Irwin, Susen V. Marsteller, Orin Davis, E. B. Garlock, L. R. Fromm, W. Thrasher, F. O. Bauer, A. Kohnle, F. O. Kramer, W. E. Learmont, Vera Fromm, Victor E. Blume, Arnold Seifert, F. W. Hogue, Morris Feldman, Arthur Bartold, W. C. Volk, Ruth R. Forrest, M. G. Grady, Lillian M. Binnette, Elva Miller, A. C. Stockman, K. A. Ganey, C. Reiter, A. Brice, H. R. Sifverson, M. Stojanovic, C. Hill, M. S. Hausladen, H. P. Hirsckorn, Clara Smith, Ervin E. Wacker, L. S. Copple, Thos. Scully, M. K. Willman, W. Krueger, Leo Kraus, Geo. Stephan, B. Schloemer.

Mr. Daniel sent an acknowledgment with his autograph to each of them.

"It is with the most profound sense of appreciation," he said, "that I acknowledge the beautiful testimonial of your friendship. The Masonic emblem is peculiarly appropriate as vying with those sentiments so dear to my heart, while your profession of friendship so exceedingly proper and so eloquently expressed, has touched me deeply.

"You have proved, yea doubly so, by your loyal services and co-operation during the past years that genuine staunch friendship which you now so hospitably and lovingly express, and I shall ever cherish these friendly tokens as my most choice possessions in remembrance of the pleasant associations I have formed with you."

New Book.

THE BARCLAY PRINTING TELEGRAPH SYSTEM. By William Finn. This well-known work, the only authorized edition, has been reprinted in order to meet the great demand for it. It describes the system of printing telegraph most completely, the text being illustrated by sixty-three clear and large engravings. The accuracy of the descriptive matter may be appreciated from the fact that not one word in the original edition has been changed for the new edition. The Barclay system is one of the standard systems and every wide-awake operator should understand its arrangement and operation.

The former price remains unchanged—fifty cents per copy.

Address TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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New York and Chicago Office: Bryant Zinc Co.

New Western Union Boston Office.

The new office of the Western Union Telegraph Company in Boston, Mass., was opened early Sunday morning, June 13, without a hitch. The actual work of cutting over was in charge of wire chief Wm. Rogers, of New York, assisted by wire chief Geo. Dee, assistant wire chief J. J. Mullen being in charge at the old office. All business was handled at the new office Sunday without delay.

The German Atlantic Cables.

The severed cable communication between the United States and Germany, via the Azores, has not been restored because of the opposition of Great Britain and her allies. The German Government submitted to the United States a proposal to repair and reopen the cable if the consent of the British Government could be obtained. This proposal was communicated through ambassador James W. Gerard at Berlin to secretary Bryan under date of February 27, 1915, but no response was ever made by the British Government. Without the consent of the British Government it would be worse than useless to repair and reopen the cable, for the reason that Great Britain, if opposed to its use during the war, could cut the cable just as easily after its restoration as in the early days of the war. Three months and ten days have elapsed since the German cable proposal was submitted to the British ambassador in Washington, and during that time the British Government has ignored the matter.

Appreciative Subscribers.

Mr. Sidney Smith, manager of Western Union Telegraph Company at Mulberry, Fla., in remitting to cover his subscription for another year, writes: "TELEGRAPH AND TELEPHONE AGE is getting better all the time, and is a necessity to all live telegraphers."

Mr. M. H. H. Duvall, of Augusta, Ga., writes: "I take pleasure in inclosing check to cover my subscription to the AGE for another year. Notwithstanding the fact that I have been out of the telegraph business for the past five or six years, I am still deeply interested in all that pertains to the service and I look forward to the receipt of the AGE with much pleasure, as it keeps me in touch with my very dear friends of former days."

Mr. E. W. Collins, general superintendent, Postal Telegraph-Cable Company, Chicago, Ill., in remitting to cover his subscription for another year, writes: "About the only investment I ever made that has paid dividends from the start is the \$2.00 per year invested in subscriptions to the TELEGRAPH AND TELEPHONE AGE. These dividends come in the form of telegraph education of a technical nature, so helpful in the struggle with every-day problems so characteristic of the telegraph business. I am glad you renewed my subscription, because I should feel badly to skip a number after having received each successive issue for more than thirty years." Mr. Collins first subscribed for our paper in June, 1883, and his name is therefore on the original list of subscribers.

Classified and Want Advertising Section.

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:

S 4.

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253 Broadway, New York, N. Y.

MORRUM COMPANY
TELEGRAPH PRINTERS
717 Railway Exchange, Chicago

Our Subscription Department

This publication is prepared to handle subscriptions for any paper or magazine published. Our friends can hereafter look upon TELEGRAPH AND TELEPHONE AGE as a clearing-house for all journals no matter where printed. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Among the publications devoted to electricity which we make a specialty of are the following:

THE WIRELESS AGE, monthly, New York, price \$1.50 per year in U. S., \$2.00 to all other countries.

TELEPHONY, weekly, Chicago, price \$3.00 per year in U. S., Canada \$4.00, and all other countries \$5.00.

ELECTRICAL WORLD, weekly, New York, price \$3.00 per year in U. S., Canada \$4.50, all other countries \$6.00.

THE TELEGRAPH AND TELEPHONE JOURNAL, monthly, London, \$1.25 per year.

ELECTRICAL REVIEW, weekly, London, \$7.50 per year.

ELECTRICAL REVIEW, weekly, New York and Chicago, price \$3.00 per year in U. S., Canada \$4.50, all other countries \$6.00.

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Telegraph and Telephone Age
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X-RAY, EXPERIMENTAL AND WIRELESS SYSTEMS.

Sending Condensers for Wireless made to stand any voltage required. Standard Condensers a specialty. These Condensers are used in all Telegraph offices in America where Standard and ordinary Condensers are required. CONDENSERS AND ARTIFICIAL LINES for Submarine Cables and Land Lines. Send for Catalogue.

Reference: O. STRUBEL, Esq., Engineer Mex. Tel. Co., N. Y.
J. G. MURRAY, Esq., Electrician C. & S. A. Tel. Co., N. Y.

Address: WM. MARSHALL, 709 Lexington Ave., near 57th St., New York.

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 employees 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.

PHILLIPS' CODE THOROUGHLY REVISED AND BROUGHT UP TO DATE. PRICE \$1.00

Mr. Eugene B. 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 make 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*, *Inexist*, *Perseist*, *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.

The price of Phillips' Code is \$1.00.

Remit by post-office or express money order to

TELEGRAPH AND TELEPHONE AGE

J. B. TALTAVAL, Publisher

253 Broadway, New York

The San Francisco Telegraph Tournament.

Reports from San Francisco regarding the telegraph tournament, which is to be held at the Panama-Pacific Exposition in that city, August 26 and 27, indicate that interest in the event is growing.

At this time it will be of interest to summarize the records made at previous telegraph tournaments.

In the New York tournament of 1898, William M. Gibson sent 248 words in five minutes. In 1893 the same record was made by Frank L. Catlin and Frank J. Kilm. In Atlanta this record was beaten by both F. M. McClintic and E. E. Bruckner, the former sending 252 and the latter 251½ words of the same matter. Of course all of the contestants sent perfect Morse, including punctuation, etc.

The matter sent on these occasions is known as "The Command of Gideon," and is printed herewith.

In the championship class for the Carnegie Diamond-Gold Medal, at Atlanta in 1902, which was won by Mr. F. M. McClintic, who sent 517 words in ten minutes, new matter was used. This is also printed for the purpose of comparison.

THE COMMAND OF GIDEON.

"The command of Gideon and the assurance that Jehovah had sent him was distinctively a mission. He, among many other great men, felt that he had a mission in life, and faithfully filled it. And finding the secret of his success, we unfold it as the secret of all success. Herein is the secret in profane and sacred history of every well-wrought work—of every successful life. Fixed in men's memory, and written in the Book of Life, are the names of those men and women who, using the talent God has given them, have allied themselves to omnipotence and so become strong and great.

"There is no problem greater and that stares us so continually in the face as this, viz.: What is the real purpose of life? Just as you give an answer to that do you make life great or small. Men have thought and worked at many an answer to this problem. The stoic, the epicurean, the philosopher, the miser, the man who seeks for pleasure, the deeply religious soul, have each given his answer.

"They are all aiming at this, viz.: 'How to be happy.' And the answer at first seems very easy and natural. Get what you want and you will be happy. But experience teaches us that when we have gotten what we wanted we discover that it is not what we thought it to be. And no sooner is one want satisfied than another comes clamorous to the front.

"We want to make life longer, broader, deeper. We want to see it in a mission of some kind. Life is a gift, but with that gift comes a charge, the sacred charge of duty, and duty is this: 'Go in this thy might; have I not sent thee?'"

MATTER SENT BY MCCLINTIC.

"General Joseph E. Johnston, commanding the Army of Northern Virginia on the 15th of October, 1861, fell back to Centreville, a small village with about five or six houses and three or four miles from Manassas Junction. General Toombs' brigade

was all night going three miles. Sleepy, I would have given the world to drop down by the roadside and go to sleep. About sunrise we passed through Centreville and crossed Rocky Run, pitching our camps to the right of the road. We drew new tents known as the Sybley or Bell crown tent. They were round and about 15 feet in diameter at the base, and 12 inches at the top, supported by a center pole placed on an iron tripod. Fifteen men could occupy one tent by lying in a circle, with their feet to the center. They were warm and comfortable when we built fires in the center, the smoke going out at the opening above. While on post one day I saw every tent in camp blown down except Colonel Magill's. The wind was on a rampage and cold enough to chill to the bone. Skirmish, company, and battalion drill was the order of the day. We had some splendid drill officers and the regulars were as proficient in the maneuvers and the manual of arms as soldiers get to be. Dress parade when correctly performed is one of the most interesting maneuvers in military tactics. When on parade we would be in full uniform with white gloves, bright buttons, polished shoes and accoutrements. It was nothing unusual for 2,000 or 3,000 soldiers to turn out to witness one of our parades at sunset. Discipline was rigidly enforced and a great many of the boys caught it hot and heavy. On the coast of Georgia the boys had no opportunity to be had but after going to Virginia where they had room and temptations combined, they tried to see how mean they could be. There was various modes of punishment in the army. The highest being extra or double duty. Bucking and gagging was often resorted to. To buck a soldier he would have to sit down with his knees drawn up to his breast, his wrists would be crossed, tied and pulled down over his knees with a stick placed between his legs and arms. If he had too much to say a bayonet was placed between his teeth with strings on either side to tie behind his head. Digging stumps was a very popular mode of punishment, and sometimes the soldier would be chained to the stumps while digging. Sometimes a soldier would have to play ball, not nine on a side, but all by himself. He would be given five balls, four of them placed about ten feet apart forming a square. He then had one to spare which he would put down and pick up another carrying it to the next one and so on, around the corners for two hours. The balls were 32 pound cannon balls and you can imagine how his back felt when released. The barrel shirt, or the Jeff Davis uniform, as the boys called it, was another mode of punishment. One end of the barrel would be knocked out and a hole made in the other, so a man's head would pass through, which would"

This matter is given to enable operators desiring to enter the contest to ascertain beforehand how their work compares with the records. If they can equal or surpass these records they will surely be qualified to take part in the tournament, and every effort should be made by candidates to make a new record, not losing sight of the fact, however, that perfect Morse is as important as speed.

ITALY AND HUNGARY.—All telegraphic relations between Hungary and Italy have been suspended.

AT THE BIENNIAL CONVENTION of the Order of Railroad Telegraphers, Despatchers, Agents and Signal Men, held in New York, May 17 to 20, J. R. T. Auston was elected president; E. T. N. Howe, A. C. Masson and John Kerl, first, second and third vice-presidents, respectively. The office of grand secretary-treasurer will be filled later.

Phillips' Code.

Every telegrapher who understands and uses Phillips' Code is qualified for other lines of work requiring the making of notes, reports, etc. It is a system of telegraphic short-hand that can be used everywhere, on the wire or off, and many reporters use it in place of the usual shorthand. Every business man should familiarize himself with it and use it. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price, \$1.00 per copy.

Mr. S. A. Duncan, a former old-time telegraph official, and a past-president of the Old Time Telegraphers' and Historical Association, now in the real estate business at Atlanta, Ga., writes: "If you had failed to renew my subscription I would have been sure the war had gotten on to your nerves."

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

James Purcell, formerly an operator with this company and a brother of P. O. Purcell, of this office, died in Brooklyn at the home of his mother, on May 22d, interment taking place at Scranton, Pa. Mr. Purcell left the telegraph service several years ago to enter other business, but is still well remembered by members of the profession.

NEW YORK POSTAL.

Mr. G. W. McLaughlin has been appointed manager of the 346 Broadway office.

Miss Grace Bond Coney, twenty-three-year-old daughter of Mr. E. A. Coney, night manager of this office, a graduate of the Northwestern University, and a settlement worker in Chicago, drowned herself in Lake Michigan about May 9 after writing

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.

a note to her sister in New York, saying she was despondent. Mr. Coney has the sincere sympathy of all his friends in and out of the office.

PHILADELPHIA WESTERN UNION.

MISS MARIE BURT, of Philadelphia, was married on Easter Monday to Mr. Raymond English. After a short stop at St. Louis, Mr. and Mrs. English continued on their honeymoon to Denver, Col., and the Pacific Coast. Miss Burt was a well-known operator in the Quaker City and her numerous friends extend congratulations.

PHILADELPHIA POSTAL.

Mr. A. J. Eaves, of the electrical engineer's office, New York, is now with us, assisting in arranging our new main office quarters in the Finance Building.

The entry list for the Postal outing, on Saturday, June 20, has closed with a very large number of names. There is keen rivalry between the night, day force, plant and messenger departments. The baseball team will cross bats with the Western Union team.

The sympathy of the Postal and friends was extended to manager J. F. Logan, of Coatesville, Pa., who recently lost his mother by death.

This company moved into its new main office in this city on Sunday, June 12. A description of this up-to-date telegraph plant will appear in these columns later.

SIOUX CITY, IOWA, WESTERN UNION.

Mr. H. C. Comstock and Miss Dorothy Ray were united in marriage May 3. The entire force wishes the couple a happy and prosperous life.

SERIAL BUILDING LOAN and SAVINGS INSTITUTION

President, ASHTON G. SAYLOR
Secretary, EDWIN F. HOWELL

Resources \$845,000
Surplus - 35,000

The Serial is the telegraphers' financial institution. It was established by them in 1885 and has handled several millions of their savings, without the loss of a dollar.

Every telegrapher should have a Savings Account.

Saving accounts opened daily at the main office 195 Broadway (10 a. m. to 3 p. m.), or the Secretary's office Room 301, 16 Dey Street, (9 a. m. to 5 p. m.), New York.

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 62c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 13.

NEW YORK, JULY 1, 1915.

Thirty-third Year.

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The Audion Amplifier.

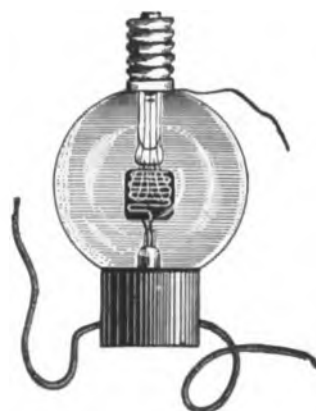
Much has been printed and spoken in the past year or two about the vacuum valve detector, but another instrument of even greater importance has been designed acting upon the principles of discharges through heated gases. This instrument is known as the Audion Amplifier. It amplifies not only wireless signals, but also telephone conversation over wires. Some years ago, Dr. J. A. Fleming, the eminent English scientist, used an exhausted bulb as a detector for wireless signals. The theory is that a heated gas is sensitive to these waves. The Audion Amplifier, however, includes an additional local battery whose current is permitted to flow through the amplifier bulb, giving a relay action.

Dr. Lee De Forest has modified and improved the valve and applied it to long-distance telephone work, as Fleming did to wireless telegraphy. In De Forest's experiments on actual circuits he found that the ions of the heated gas responded to telephonic inflections in the currents, as well as to those high-frequency oscillations used in wireless, and that when the instrument is properly connected in the line between a transmitter and a receiver it actually amplified the voice currents, giving a reproduction with perfect fidelity and without a trace of lag or distortion, yet with an increase in volume or intensity.

In the specific form of this valve called the audion amplifier, used for telephone relay work, there is a small bulb exhausted of air, containing, in addition to the usual filament, two thin plates of nickel

about one-eighth of an inch from the filament, on either side. Between the filament and plates are two pieces of nickel wire bent grid-shaped.

The incoming current, to be repeated and amplified, is conducted to the "grid" wire. The outgoing line is connected, one terminal to the plates, the other to the filament. In this circuit a battery is inserted. A separate battery heats the filament to incandescence. The heated gas, according to one theory, becomes then a conductor of the local current from the battery, which can pass from the cold plates to the hot filament. In other words, negatively charged "carriers," "ions," or "thermions," as they may be termed, speed in invisible streams, of almost infinite tenuity, from filament to



AUDION AMPLIFIER.

plates, passing, in their migration, through the spaces between the wires of the grids. Now, the slightest electrical potential, or charge of electricity, impressed upon these grids from the incoming telephonic currents, deflect or retard some of these tiny carriers of negative electricity. This effect is always proportional to the cause, so that the current changes produced in the outgoing, or "plate" circuit, are exactly similar to those current changes, or electrical charges, upon the grid wires which produced them. But the changes in current thus produced are many times in volume or intensity the changes in current which caused them. In other words, a unit electrical charge delivered upon the grid produces a deflection, or stoppage, of six to ten unit electrical charges passing from the filament to the plates. This action is the basis of the amplifying properties of the audion.

Mr. A. Simon, manager of the Western Union Telegraph office in the Stock Exchange Building, 16 Broad St., New York, writes: "Enclosed herewith find \$2.00, which it is a pleasure for me to remit for a renewal of my subscription to TELEGRAPH AND TELEPHONE AGE."

Telegraph and Telephone Patents.

ISSUED JUNE 1.

- 1,141,107. Telephone Transmitter. To W. W. Dean, Chicago, Ill.
 1,141,279. Telephone Apparatus. To T. Smith, Chicago, Ill.
 1,141,352. Semi-automatic Telephone Exchange System. To F. R. McBERTY, New Rochelle, N. Y.
 1,141,367. Telephone Call-Registering Device. To V. Thompson, Vancouver, B. C., Can.
 1,141,717. Transmitting Intelligence by Radiant Energy. To J. W. Lee, Brooklyn, and J. L. Hogan, jr., West Rockaway, N. Y.
 1,141,751. Printing-Telegraph System and Alphabet. To C. G. Ashley, Chicago, Ill.
 1,141,823. Telephone Signal. To E. H. Osborn, Sauk Center, Minn.
 1,141,866. Telephone Pay Station. To G. Christian, Detroit, Mich.
 1,141,868. Automatic Telegraphy. To P. B. Delany, South Orange, N. J.

ISSUED JUNE 8.

- 1,141,937. Telephony. To E. R. Corwin, Chicago, Ill.
 1,141,982. Relay. To C. A. Simpson, Chicago, Ill.
 1,142,062. Signal Device. To M. F. Sitts, Chicago, Ill.
 1,142,080. Telephone Attachment. To J. H. Clemons, Ilion, N. Y.
 1,142,173. Telephone. To G. A. Janicke, Louisville, Ky.
 1,142,228. Impulse Transmitter for Automatic Telephone Plants. To G. A. Betulander, Södertörns Villastad, Sweden.
 1,142,600. Shield or Guard for Telephones. To R. H. Maxwell, Trenton, N. J.
 1,142,678. Telephone Exchange System. To G. Dekin, Berkeley, Cal.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stock on June 26.

American Telephone and Telegraph Co.....	124
Mackay Companies	79
Mackay Company, preferred	64
Marconi Wireless Tel. Co. of Am. (Par value \$5.00)	3
Western Union Telegraph Co.....	66 1/4

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than

pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 1/2 cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

DR. WILLIAM MARCONI has been nominated a lieutenant of the aeroplane corps of the Italian army.

MR. ELMER A. SPERRY, a well-known electrical engineer and inventor, has been elected president of the New York Electrical Society.

MR. RALPH W. POPE, formerly secretary of the American Institute of Electrical Engineers and an old-time telegrapher, will spend July and August at Ocean Grove, N. J.

DR. CHARLES P. STEINMETZ, the well-known consulting electrical engineer, author and educationalist, of Schenectady, N. Y., has been elected president of the Illuminating Engineering Society, New York.

MR. H. B. PERHAM was re-elected president of the Order of Railroad Telegraphers at the St. Louis convention. The next biennial meeting of the Order will be held at Seattle, on the second Monday in May, 1917.

HONORS FOR MESSRS. EDISON AND VAIL.—The degree of Doctor of Science was conferred upon Mr. Thomas A. Edison and the degree of Doctor of Laws upon Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, by Princeton University at the commencement exercises on June 14.

MR. H. E. CROOKSTON, soliciting freight agent of the Chicago, Rock Island and Pacific Railroad, at Dallas, Tex., started his business career as a messenger and afterwards became an operator. He delivered the first press despatch to the *Dallas Morning News* in September, 1885, a recent issue of which paper contains a reference to the event.

TELEGRAPH OFFICIALS ON PACIFIC COAST.—Messrs. Newcomb Carlton, president of the Western Union Telegraph Company; Edward Reynolds, vice-president and general manager of the Postal Telegraph-Cable Company; G. G. Ward, vice-president and general manager of the Commercial Cable Company, and E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, are all on the Pacific Coast.

MR. P. J. FEENEY, an old-time telegrapher of Bangor, Me., who has been in outside business for the past sixteen years, but for the past four years located in Chicago, has returned to Bangor, where he has established himself in the fish business. "P. J.," as he is familiarly called, will no doubt make a success of his latest enterprise, as he has made successes of every previous undertaking with which he has had to do. He began his business

career as a messenger for the Western Union Telegraph Company in Portland, and rapidly rose to be operator, then manager. For some years he was manager of the Postal Telegraph-Cable Company's office in Bangor, and then, for twelve years, was manager for the Vacuum Oil Company for eastern Maine. In the spring of 1911 he accepted a position with the Griffin Wheel Company at its central offices in Chicago, as member and secretary of the executive board and director, and succeeded admirably there. Upon the death of Thomas A. Griffin, head of the company, a few months ago, Mr. Feeney terminated his contract and returned to Bangor.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, New York, who is on a Western trip, will visit the following cities before returning: Chicago, Danville, Decatur, Springfield, Peoria, Rockford, Moline, Rock Island, Ill.; Davenport, Muscatine, Cedar Rapids, Des Moines, Sioux City, Ia.; Omaha, Neb.; Denver, Colo.; Salt Lake City, Utah; Los Angeles, San Francisco, Cal.; Portland, Ore., and Seattle, Wash.

MR. C. C. ADAMS, vice-president of this company, has been elected president of the village of Lawrence, L. I., where he resides. This is Mr. Adams' third term.

MR. CHARLES M. BAKER, general superintendent of plant, Chicago, who has been in California on business connected with the service, has returned to Chicago.

MR. R. J. LITTLE, manager of the Rochester, N. Y., office of this company, is entitled to a great deal of credit for the important part he has played in the erection and dedication of the James D. Reid Memorial in Mt. Hope Cemetery in that city. Mr. Little all along rendered valuable help by attending to many details in connection with the arrangements for the erection of the monument and its dedication, and his aid has been highly appreciated by the trustees.

MR. D. C. DELANY, of the Postal Telegraph-Cable Company, Atlanta, Ga., leaves on July 5 for a trip to the Pacific Coast. He will be a party in the Shrine Patrol which is to go to Seattle, returning via Los Angeles.

MR. H. R. WATERBURY, formerly chief clerk to superintendent G. W. Ribble, Atlanta, Ga., has been appointed to an important position in the Tax Department in the executive offices, New York.

MANAGERS APPOINTED.—O. O. Worley, Canilla, Ga.; C. S. Theofan, Greenfield, Mass.; F. G. Lyons, Peabody, Kans.; H. L. Marsh, Huntingdon, Pa.; Miss M. M. Mash, Granite City, Ill.; C. R. Henderson, Hazelton, Ind. (new office).

Outing of Postal Branch Managers.

The eighth annual outing of the branch managers of the first district, Eastern Division, Postal Telegraph-Cable Company, was held at Witzel's Point View Island, College Point, L. I., N. Y., on the

afternoon and evening of June 26. There was an attendance of 470, the party being conveyed to the ground on the steamer "Montauk."

In the afternoon several races and games were held and well contested. The baseball game between main and branch office men was won by the former, score 6 to 3. Handsome prizes were awarded to the winners of the various events.

An excellent dinner was served after the games, and this was followed by a vaudeville entertainment.

Superintendent C. F. Leonard was the guest of honor and he made an interesting address on "Training Understudies."

The managers and heads of departments presented Mr. Leonard with a handsome statue of Castilian marble and genuine bronze, representing "Love's Message." The statue consists of a marble pedestal, on which is a bronze lamp-post bearing a letter-box. Winged cupid is in the act of dropping "Love's Message" in the box. It is six feet high and massive. The presentation speech was made by Mr. P. A. Hickey, chairman of the association, who made an excellent presiding officer.

Messages were read from Messrs. E. Reynolds, vice-president and general manager, and J. J. Whalen, manager of the main operating department at 253 Broadway, New York.

The affair was well arranged and carried out, and everyone present had a highly enjoyable time.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president of the company, together with his family, reached San Francisco June 29. He will remain in that city several days.

MR. V. M. SUMMERS, former manager at Harrisonburg, Va., has been promoted to the position of manager at Charlottesville, Va.

MR. C. J. HEATH, manager of the Western Union office at Corpus Christi, Tex., took an active part in the endeavor to bring the 1916 convention of the State Firemen's Association to Corpus Christi. Incidentally, his activity in this direction increased the business for his company.

THE OFFICE of Mr. A. R. Lingafelt, district commercial superintendent at Oklahoma City, has been abolished, and the district hereafter will be taken care of from Dallas. Mr. Lingafelt will remain in Oklahoma City in a travelling capacity. Mr. L. Epstein, chief clerk to Mr. Lingafelt, will go to Dallas as assistant manager.

MR. C. P. POLLAK, general superintendent, Eastern Division, American District Telegraph Company, New York, is on a Southern business trip in the interests of the service. He will not return to his office until the middle of July.

NEWSOM J. GIBSON, aged sixty-six years, a well-known telegrapher in the South and a former manager of a Western Union branch office in Nashville, Tenn., died in that city June 22. He retired in 1909.

MRS. S. M. CUSTER, wife of Mr. S. M. Custer, assistant commercial superintendent of this company at Philadelphia, died at her home in that city of cancer, on June 21.

THE MORSE ELECTRIC CLUB will hold its summer outing on July 17, at Donnelly's Grove, College Point, L. I., N. Y. The party will be conveyed to the grounds on one of the Western Union steamers, which will leave from Starin's Pier, foot of Cortlandt street, at 1.30 p. m., sharp. Special efforts are being made to make the outing an attractive and pleasant one in every respect. A game of baseball between two all-star teams representing various departments of the telegraph company will be one of the features. Other athletic games will also take place. An excellent dinner, music and a vaudeville entertainment will make up the evening's enjoyment. As a result of the recent campaign, over one hundred new members to the club have been secured.

THE CABLE.

CABLEGRAMS may now be sent to Italy, Libya, Erytrea and Italian Somaliland in Italian plain language.

CENTRAL AND SOUTH AMERICAN TELEGRAPH COMPANY.—At a meeting of the board of directors of the Central and South American Telegraph Company, held June 22, the following officers were elected for the ensuing year: James A. Scrymser, president; W. Emlen Roosevelt, first vice-president; John L. Merrill, second vice-president and auditor; Clarence Rapkin, treasurer; James R. Beard, secretary. On May 21, the company completed the installation, under the supervision of its general manager, Mr. Robert L. McCann, of a new eight-core Kerite cable laid in ducts across the Isthmus of Panama, between its Colon office and its office in Panama. This will provide ample facilities for the company's new duplicate New York-Colon cable, which, it is expected, will shortly be laid. Mr. Herbert Kingsford, the company's electrical engineer, and Mr. John K. Roosevelt, his assistant, recently arrived in New York from London, where they have been for some months supervising the construction of the new duplicate New York-Colon cable.

MEXICAN TELEGRAPH COMPANY'S ELECTION.—At a meeting of the board of directors of this company, held June 22, the following officers were elected for the ensuing year: James A. Scrymser, president; Edmund L. Baylies, first vice-president; John L. Merrill, second vice-president and auditor; Clarence Rapkin, treasurer; James R. Beard, secretary.

H. Dreisbach, Director, German-American Cable Company.

Mr. Heinrich Dreisbach, who succeeds Mr. Oscar Moll as director of the German Atlantic Cable Company at Cologne, Germany, was born in 1865, and first entered the German telegraph service in 1886. He has held positions as telegraph inspector at Emden and telegraph engineer of the Reichs-

postamt Berlin and councillor of posts and telegraphs at Oldenburg, and is, in consequence, well qualified to fill the duties of the position to which he has been appointed.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to June 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Oran and Tanger, June 24.

CANADIAN NOTES.

PLANT VALUATION.—The plant of the Maritime Telegraph and Telephone Company, according to papers filed at Halifax, N. S., is \$3,491,682.

MR. I. N. MILLER, JR., formerly assistant general superintendent of the Western Union Telegraph Company at San Francisco, Cal., who several years ago resigned his position on account of ill health, is now president and treasurer of the British Columbia District Telegraph and Delivery Company, Ltd., at Vancouver, B. C. Mr. Miller is taking an active part in the boosting of his adopted city, and is meeting with excellent success in many of his ventures to advertise Vancouver. One of his latest schemes was to send an automobile along the Pacific Coast to San Francisco, laden with pamphlets, maps and posters boosting Vancouver.

Telephones and Telegraphs in Canada.

In our issue of May 16 some Canadian telephone and telegraph financial statistics for 1914 were published. The following additional matter taken from the official report will be of interest: Number of miles of telephone wire in use in 1914, 1,323,090; compared with 1,092,587 in 1913; number of telephones in use, 521,144 in 1914; 463,671 in 1913; miles of telegraph wire in use 193,276 in 1914, compared with 176,124 in 1913.

The telephone figures show that gross earnings average \$33, and operating expenses \$25 per telephone in use; that the telephone mileage represents an average of one mile of wire for every six of the population of the Dominion; and that there was one telephone instrument in use for every fifteen of the population. On the basis of population it is stated that Canada is the largest user of telephones in the world, with the single exception of the United States.

Mr. C. E. Diehl, manager for the Postal Telegraph-Cable Company, and superintendent of fire and police telegraph at Harrisburg, Pa., writes: "Thanks for renewing my subscription. The next best thing to meeting old friends is to hear from them and know what they are doing. This, together with the record of all things telegraphically, as chronicled in your paper, makes it invaluable to the profession."

THE TELEPHONE.

MR. THEO. N. VAIL, president, American Telephone and Telegraph Company, was given the degree of doctor of laws by Harvard University, June 24.

MR. J. J. CARTY, president-elect of the American Institute of Electrical Engineers and chief engineer of the American Telephone and Telegraph Company, was given the honorary degree of doctor of engineering by Stevens Institute of Technology, Hoboken, N. J., June 8.

MR. W. S. GIFFORD, statistician of the American Telephone and Telegraph Company, New York, is the author of a paper entitled "Suggestions for Making a Business Library Practical," read before the annual meeting of the Special Libraries Association, at Berkeley, Cal., June 7 and 8.

MR. P. KERR HIGGINS has purchased an interest in the Clay County (Mo.) Telephone Company and will shortly assume active management of the property, with headquarters in Excelsior Springs, Mo. Mr. Higgins is a well known and experienced telephone man, and was, until recently, general manager of the Brazos Valley Telegraph and Telephone Company and its affiliated companies, located at Waco, Tex.

COST OF NEW YORK TELEPHONE INVESTIGATION.—The total expense to the state of the investigation of the New York Telephone Company's property and income was \$43,433.

TELEPHONES IN MINE RESCUE WORK.—Telephone communication between the advance or rescue party and the outside of the mine, in the case of mine accidents, is one of the features of the daily demonstration of the United States Bureau of Mines rescue crew conducted in connection with the exhibit of the Bureau at the Panama-Pacific Exposition at San Francisco.

EXTENSION TELEPHONES.—The New York Public Service Commission, second district, in the case of M. D. Whedon, of Granville, N. Y., against the New York and Vermont Home Telephone Company, has decided that the charge of fifty cents a month for extension telephones is not an unjust or unreasonable one. The New York Telephone Company was allowed to intervene as a party in interest.

Greetings from Prominent Electrical Men.

At the thirty-eighth annual convention of the National Electric Light Association, held in San Francisco, June 7-11, secretary T. C. Martin read messages of greeting and congratulations from several notable men of the electrical industry who were unable to be present, including Thomas A. Edison, Dr. Alexander Graham Bell, Prof. Elihu Thomson, Newcomb Carlton, president Western Union Telegraph Company; Clarence H. Mackay, president Postal Telegraph-Cable Company; Dr. Charles P. Steinmetz and John J. Carty, chief engineer of the American Telephone and Telegraph Company.

Mr. Carty's message was of special interest because it had been telegraphed over the transconti-

ental telephone line while the circuit was at the same time being used for telephone conversation, utilizing energy supplied by the central-station companies of New York, Pittsburgh, Chicago, Omaha, Denver, Salt Lake City and San Francisco.

Mr. Carty mentioned as evidence of the success of the association the fact that its member companies supply the energy required to operate 25,000,000 miles of telephone wire extending everywhere throughout the United States and serving as the means of transmitting 15,000,000,000 telephone messages annually.

Review of Principal Articles in Contemporary Telephone Publications.

WHO IS THE TELEPHONE COMPANY?—Under the title "Who is the Telephone Company in Public's Estimation?" Mr. Walter S. Allen writes an interesting article in the June 5 issue of *Telephony*. His answer is, "The president, office boy, operator, cashier, troubleman, complaint clerk—all share this distinction whenever they come into contact with any of the public." He points out the little things on which the company's reputation hinges.

TESTING OF LOADING COILS.—Mr. W. N. Furthmann in *Telephony* for June 5, publishes the first part of an article on the "Testing of Loading Coils and Cases Before Installation." He describes the various tests made on these coils during manufacture and assembly; the methods of connecting windings of the coils and results obtained, and the equipment used for testing. He also makes some references to cross-talk in testing circuits and means for reducing it. The article is concluded in the June 12 issue.

UNIT COSTS.—Mr. W. F. Sloan read a paper at the recent convention of the National Independent Telephone Association in Chicago, entitled, "Elements to be Considered in Preparing Unit Costs." The paper is published in the June 12 issue of *Telephony*. Mr. Sloan states that a knowledge of actual physical details is necessary in valuation and appraisal work. He gives methods of ascertaining actual investment, and enumerates the elements of unit costs.

THE KANSAS PUBLIC UTILITIES ACT is the title of a paper read by E. H. Hogueland at the recent annual meeting of the Kansas Telephone Association, and published in *Telephony* of June 12. Mr. Hogueland reviews the powers of early railroad commissions, and points out the factors leading to the establishment of public utilities commissions. The indeterminate franchise plan is recommended, also the broadening of the commission's jurisdiction.

Mr. T. C. Leckey, of Portsmouth, N. H., in renewing his subscription for another year, writes:—

"The year is through
My check is due,
Time flies fast
Looking over the past,
But glad I can renew."

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager of the Marconi Wireless Telegraph Company of America, sailed from Honolulu, June 30, on the steamer "Matsonia," for San Francisco.

MR. H. J. LAUER, general manager, Marconi Wireless Telegraph Company of Canada, Montreal, was a recent New York visitor.

MR. SIDNEY ST. J. STEADMAN, representing the English Marconi Company, has returned from the Pacific coast, and will sail for England on the steamer "Philadelphia," July 3.

MR. C. H. TAYLOR, engineer of the transoceanic division, Marconi Wireless Telegraph Company of America, New York, is en route to San Francisco, on business of the company.

THE MARCONI TELEGRAPH-CABLE COMPANY recently instituted proceedings before a justice of the supreme court of New Jersey to acquire by condemnation the right to construct and maintain fourteen poles, with the necessary wires, fixtures, etc., thereon, on the highway along the property of Morris Hess, in Monmouth county, N. J. Hess demanded \$2,000; the commission awarded him \$14.

INLAND DISTRIBUTION OF WEATHER FORECASTS by wireless is the latest experiment to be undertaken by the weather bureau. The plan contemplates the sending of the forecasts at a speed slow enough to accommodate amateur wireless operators.

WIRELESS OPERATOR FINED.—Mr. Stanley Russell, of Boston, Mass., wireless operator on the steamer "Satsuma," was recently fined \$125 at South Shields, England, for taking photographs of warships on the river Tyne without the consent of the naval authorities. He said he took the pictures to be used as souvenirs for friends in America.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

WIRELESS OPERATORS ON THE LUSITANIA AND GULFIGHT.—*The Wireless Age* for June contains an interesting story of the devotion to duty of wireless operators Robert Leith and David McCormick, his assistant, of the Cunard steamer "Lusitania," which was sunk by a German submarine off the Irish coast on May 7. Both operators remained on the ship, sending the S O S signal while she was sinking beneath them. No definite news regarding the fate of Mr. Leith has been received, but it is known that Mr. McCormick was rescued. The explosion of the torpedo put the main wireless set out of commission, but the distress signals were sent out by means of the emergency apparatus. Both operators were in the service of the English Marconi Company, the former acting as traveling inspector. In the same issue of *The Wireless Age* is a short account of the loss of the American steamer "Gulfight" off the Scilly Islands, May 1, as a result of a German submarine attack. Mr. Charles C. Short was the wireless operator on the "Gulfight." He lost his life with several of the crew. He was twenty-two years of age and came from Chicago.

PORTRAIT OF DR. MARCONI.—A full-figure portrait of Dr. Wm. Marconi on the deck of the steamer "Lusitania," on which he arrived in New York on his recent visit, is given in the June *Wireless Age*. It is the latest portrait of the noted inventor and is an excellent likeness of him.

MEMORIAL FOUNTAIN.—The dedication of the memorial fountain in Battery Park, New York, on May 12, in honor of nine wireless operators who lost their lives at sea in the performance of their duties, is fully described in *The Wireless Age* for June. The article is well illustrated. The unveiling ceremonies were described in TELEGRAPH AND TELEPHONE AGE of May 16.

"WIRELESS DEVELOPMENT IN THE WILDERNESS" is the title of an interesting article in the June number of *The Wireless World*, by J. R. Irwin. The "wilderness" is Alaska, and a short historical sketch of this interesting territory is given, together with an account of the wireless development in that region. He describes the various stations now being established there, and illustrates his text with several views of plants now in operation and in process of construction.

INTERNATIONAL WIRELESS COMMISSION.—The June issue of *The Wireless World* contains an article by W. Duddell, the well-known English scientist, on the proposed work to be undertaken by the international commission on wireless telegraphy. The author proposes that the commission should approve of the following course of action: The first point would be to see whether it is possible to standardize existing antennæ in such a way as to obtain comparable results, or whether, on the other hand, it is necessary to construct special antennæ for the purpose. We must also design and construct a closed or nearly closed radiating circuit, capable of radiating definite quantities of energy of different wave-lengths. We must also have a closed or nearly closed receiving circuit, which can be used in connection with the standard measuring apparatus, so as to determine the radiation of the circuit. Mr. Duddell's remarks on electrostatic detectors on ionized gas at a meter for the strength of signals, etc., possess great interest for those whose knowledge of the subject is sufficiently advanced for them to appreciate his points.

Wireless Pocket Book.

A practical book on wireless telegraphy is "The Wireless Operators' Pocket Book of Information and Diagrams," by Leon W. Bishop. It was written for the wireless operator and for those experimenters who already have some knowledge of wireless phenomena, and is devoid of mathematics. It covers the transmitting and receiving circuits; apparatus; aërials and grounds; operation of a station; codes; wireless telephony, and many other subjects of like nature. Every wireless operator would be advancing his own interests by studying this book carefully. The price is \$1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Dedication of the James D. Reid Monument at Rochester, N. Y.

The monument erected over the grave of James D. Reid in Mount Hope Cemetery, Rochester, N. Y., was dedicated in the presence of a large gathering of railway telegraph superintendents and other telegraph officials and their friends on the afternoon of June 23. The dedication ceremonies had been made a part of the programme of the convention of the Association of Railway Telegraph Superintendents.

The weather being rainy, the lawn about the monument was covered with matting, and a large tent was erected to shelter those present.

Mr. E. P. Griffith, of New York, one of the trustees of the Reid Memorial Fund, presided.

The invocation was made by the Hon. W. C. Hurton, of Brooklyn, N. Y., a well-known old-time telegrapher, and was followed by an address prepared by Mr. David Homer Bates, chairman of the executive committee of the Reid Memorial Trustees, and a close personal friend of Mr. Reid, which was read by Mr. Griffith, Mr. Bates having, at the last moment, been prevented from attending. Mr. Bates' address was as follows:

In the first half of the nineteenth century, James D. Reid and Andrew Carnegie were born in Scotland, not far from each other.

They both came to America, with their parents, when quite young.

Each was destined to exert a large influence upon the new and magic art of the telegraph in the land of their adoption.

Morse's first line from Washington to Baltimore was built in 1844, when Carnegie was nine years old and Reid was twenty-five.

The name of James D. Reid has a charm for every old-time telegrapher. He was one of Morse's early associates, and his life-long friend, and to him is accorded the honor of being the first commercial telegraph superintendent. Morse himself being the first government superintendent under Act of Congress.

Reid built the first telegraph line from Philadelphia over the Allegheny Mountains begun in 1845 and completed to Pittsburgh on Christmas day, 1846, just in time for the transmission of a message from the adjutant-general of Pennsylvania to president Polk, announcing the forwarding of two regiments of troops for Mexico. It was on this line that Andrew Carnegie, in 1849, then fourteen years old, learned to telegraph in the old Thaw building, corner of Third and Wood streets, Pittsburgh.

One day, last March, Albert B. Chandler, Charles P. Bruch and David Homer Bates, called on Mr. Carnegie to report the completion of the Reid monument, and at that interview Mr. Carnegie told once more of how he became a telegraph messenger and operator, and how that was the turning-point of his career. His warm friendship for Reid continued for over fifty years, and, in 1889, at Mr. Carnegie's request, president Harrison appointed Reid United States consul at Dunfermline, Scotland, where he spent the remaining years of his

life in comfort and peace after forty-four years of active service in the telegraph field.

At a meeting of the Magnetic Club, held in New York, November, 1911, Mr. Bruch, the president, called attention to the fact that Reid's grave was marked only by a simple stone slab; that he had been the employer of many boys who, in later years, had become prominent in the telegraph and other lines of business; that he was the first employer of women in the telegraph service; that he was the friend and contemporary of Morse; the first president of the Telegraphers' Mutual Benefit Association; one of the organizers of the Old Time Telegraphers' and Historical Association; the author of the only comprehensive history of the telegraph in America as yet published; the founder and editor of the first electrical paper in the world,



REID MONUMENT, ROCHESTER, N. Y.

and the originator of the telegraph signal "73," the "God be with you" of the telegraph.

It was suggested by Mr. Bruch that Reid's unique service to the telegraph, his friendship for telegraphers, and his gentle, lovable character, which endeared him to all who knew him, should entitle him to a suitable monument, and out of this suggestion this monument has been created.

Reid's personal telegraph friends, old-time telegraphers, and others of the fraternity who never knew Reid in the body, contributed various amounts, aggregating \$1,500, and Mr. Andrew Carnegie added a like amount, in memory of his dear friend. The fund thus created has been used to pay for this beautiful monument which was designed and completed by the celebrated sculptor, Charles Keck, who has modeled many pieces of sculpture now adorning the Educational Magnificent Hall at Albany, and many other public buildings. Mr. Keck has also produced two other fine monuments, in both of which members of the telegraph fraternity have a special interest. One of them, the Bronze Tablet, nine by four and a half feet, unveiled in 1911, in the Soldiers' and Sailors' Memorial Hall, in Pittsburgh, to commemorate

the United States Military Telegraph Corps, Mr. Carnegie and forty-two other volunteers from Allegheny County, Pa., having served the government in the corps during our Civil War. Mr. Keck's other monument was erected at Harriman Station, N. Y., in 1912, to the memory of Charles Minot, who sent the first telegraphic train order in America, in 1851.

The trustees of the James D. Reid Memorial Fund having concluded their pleasant task and having deposited a sum of money with the Mount Hope Cemetery authorities sufficient to cover the perpetual care of this monument, now take great pleasure in presenting it to the telegraph fraternity, although the memory of his lovely and helpful life will be, of itself, a lasting memorial and inspiration to those of us who were cotemporary with him and who were so fortunate as to have known him in the flesh.

Mr. Burton then delivered an eloquent address, in which he reviewed the life and work of Mr. Reid. He said:

Fourteen years ago, we assembled together to take farewell of the earthly form of our friend and co-laborer, James Douglas Reid. Surrounded by beautiful flowers, with solemn music and words of eulogy, we bore him to his last resting-place, with heavy hearts and many tears, because the eye that so often kindled with the love of men and the gentle voice that had so often been raised in behalf of the good in life, were closed and silenced forever. We realized that in the death of our associate, a helpful and unselfish friend of the race had entered into his long sleep.

But even as the cold and cruel winds of winter have surrendered once again to the glorious beauties of the springtime and the joyous outburst of nature bids every heart rejoice and take courage, even so has the lapse of time softened our grief and dried away our tears. The dull despair that marked our brother's burial has given place to calm and tender gratitude for the helpful and unselfish ministry of his friendship and the inspiring and compelling force of his memory.

Three years ago, at a meeting of the Magnetic Club, held in the City of New York, it was proposed that a monument be erected as a memorial to James Douglas Reid, to perpetuate, in enduring granite, his services to mankind in aiding and advancing the development of the electric telegraph and his life-long friendship for the great body of loyal men and women who labor in telegraphic fields. We are here to-day amid these quiet and sacred surroundings to complete the labor of love and gratitude which was then undertaken by the telegraph fraternity—to mark by this graceful and imperishable monument the love which we bore him in life and the honor and gratitude in which we hold his memory, and for the edification of future generations to show some recognition of the dignity and beauty of his character and of his unselfish devotion to the interests of his fellow-men and to the progress of the electric telegraph.

We, who were privileged to know him in his lifetime, need no monument to keep alive his

memory. We have the record of his good deeds and many virtues graven upon the tablets of our hearts—

"Dear son of memory—
What needst thou such weak witness of
thy name,
Thou, in our wonder and astonishment,
Has built thyself a life-long monument!"

James Douglas Reid was born in Edinburgh, Scotland, March 22, 1819. When fifteen years of age, he went to Canada with his family, and three years later became a resident of this beautiful city of Rochester, N. Y. His connection with the telegraph began in 1845—in its earliest days of practical utility. From that early time, until his death at the ripe age of eighty-two, his interest in the telegraph and those associated with its progress and development never flagged, and during almost this entire period he was actively related to it.

He was the friend and associate of Morse, the undoubted inventor of the electric telegraph; he was the first superintendent of telegraph; he was the founder and editor of the first telegraphic journal published in the United States; he was one of the organizers and the first president of the Telegraphers' Mutual Benefit Association, the first fraternal insurance organization formed in this country; he was one of the founders of the Old Time Telegraphers' and Historical Association; he was the author of the first history of the telegraph in America, which was published in 1877; he was United States consul at Dunfermline, Scotland, from 1889 to 1897; his appointment by president Harrison and his retention by president Cleveland was a fitting recognition of long and faithful service in his chosen field, and of unfailing loyalty to high and noble ideals of service to the land of his adoption, and to its people.

He was the originator of the telegraphic signal of fraternity, "73," which is known and used by telegraphers everywhere as the greeting of goodwill and friendship. Is it too much to hope that in these days, when all the world is crying "Peace! peace! when there is no peace," that the spirit of brotherhood and friendship represented by this mystic symbol may yet win its way, largely by means of the telegraph, into the hearts and minds of men, even unto the uttermost parts of the earth.

Achievement without character is rarely perpetuated in this manner, and it is not only because James Douglas Reid was a pioneer of the telegraph that we are dedicating this monument, but, rather, I think, because he had a rare capacity for friendship, because he had a very broad human sympathy, because, as the writing upon this monument so admirably expresses it, he was "A kindly gentleman, of beautiful character and stainless life."

And, now, as we turn from this imposing monument and resume our own life's journey, may the philosophy which guided the life of James Douglas Reid, and which was expressed by him in his seventy-third year in a quotation contained in a letter to a friend, stir our hearts and inspire us to like endeavor—

"Better than martial woe, and the pageant
of civic sorrow;
Better than praise of to-day, or the statue
we build to-morrow;
Better than honor and glory, and history's
iron pen,
Is the thought of duty done and the love of
his fellow-men."

The ceremonies were concluded with the singing of "America."

Mr. Andrew Carnegie sent the following telegram: "I shall be present with my friends of the 'Magic Key' in spirit at the ceremonies in honor of James D. Reid, my co-worker of the early days and a cherished friend for half a century. "73."

Mr. James D. Reid, of Milwaukee, Wis., a nephew of Mr. Reid, telegraphed his regrets at his inability to be in attendance.

Among those present were Mr. G. A. Redman, one of Mr. Reid's first messengers in Rochester, now a prominent business man of that city; Misses Alice, Elizabeth F., and Jane B. Reid, nieces of Mr. Reid, who live in Rochester, where their uncle resided for many years; Misses Marion and Margaret Clarkson, granddaughters of Mr. Reid, and Mr. Charles Keck, of New York, the designer of the monument.

The monument is of Barre granite, modeled after the Scottish market cross. It is twelve feet in height, and the top is decorated with a bronze medallion of Mr. Reid. On one side is a bronze plate, suitably inscribed, the lettering of the inscription being done in gilt. In explaining the design, Mr. Keck said that the Scottish market cross was chosen because Mr. Reid was a man of Christian character, whose birthplace was Scotland. The cross exemplified his character, and the Scottish market design was selected to commemorate his native birthplace.

Intellectual Power.

The following interesting observations on education have been sent to us by a friend:

THERE IS NO SHORT CUT TO INTELLECTUAL POWER.

It is as impossible to become a scholar in the twinkling of an eye as for Caliban to become a Chesterfield after half an hour of Delsarte.

You must get a little every day.

It is said that Benjamin Franklin, when a boy, became very much wearied at his father's long grace before each meal, and, one day, in his quaint, droll manner, rolled into the dining-room a whole barrel of pork, beseeching his father to invoke the Divine Blessing upon it all at once, and thus have done with the business. But his father rebuked him sharply, reminding him (and there was a whole lot of philosophy in the old man's remarks) that the blessing of Heaven was wanted not on the pork in the barrel, but on such portions of it as were consumed day by day.

Education is not to be secured in a single moment, but only in the course of a long and studious life.

A fortune may be made in a day by a masterful stroke of financiering or a lucky bet on the stock

market. A skillful operation may restore a man to health in half an hour. We are told by certain of the orthodox that the vilest sinner that ever stood before the throne of grace may become a saint in the regeneration of a moment; but there is one thing on earth that cannot be acquired by any short cut. The thing is intellectual power.

Young men and women are intellectually ruined by the thousands because they imagine that education is a thing to be limited by a schoolhouse and concluded upon the receipt of a diploma, while all around them are successful people, lacking early advantages, who, because they knew no diploma, because they knew no place to stop, did not stop but continued to pursue their studies long after their companions had ceased to grow.

Stations, diplomas and graduating days are bad things for men and women who want to get to the end of the line.

Appreciative Subscribers.

Mr. Edward Reynolds, vice-president and general manager, Postal Telegraph-Cable Company, New York, in remitting to cover his subscription for another year, writes: "The AGE has become a necessity and we would be lost without it."

Mr. Geo. M. Myers, of Kansas City, Mo., president of the Old Time Telegraphers and Historical Association for the years 1913-14, in renewing his subscription for another year, writes: "Delighted to send check renewing my subscription for another year."

Mr. A. F. Joyner, manager, Postal Telegraph-Cable Company, Ocala, Fla., writes: "I am glad you renewed my subscription without waiting to hear from me. It is very annoying to lose even one copy of your valuable journal."

Mr. M. M. Lott, of the *Daily Telegram*, Winnipeg, Man., in remitting to cover his subscription for another year, writes: "I note with interest what J. B. Dillon, of Dallas, recently said on page 216 of the May 1 issue. I often think of him when he would say about the Memphis-Dallas circuit. I know something is wrong or you would not kick. But he did not 'fix.' I left it with him and Biff Davis, and in their glory, if they are not crazy from the over-thinking capacity of that 'fix proposition,' that 'Onion Farm,' Brownsville, Texas, circuit will surely finish them. I can't count the gray hairs in my head that those officials and the hard-working circuits have caused. This will be a pleasant reminder to them that I am still the same old Seven and Six. It is the 'Maple Leaf for me forever,' but the AGE has got to keep coming to me or I would get awfully lonesome."

Mr. F. M. McClintic, in renewing his subscription to our publication, writes: "Enclosed find \$10 for a five-years' subscription." This is the best evidence of the worth of our paper to Mr. McClintic.

SIDNEY ALLEN, of Corpus Christi, Tex., who was advertised in the previous issue of this paper as missing, has been located and he returned to Corpus Christi on June 24.

New Western Union Office at Boston.

The Boston main office of the Western Union Telegraph Company has been moved from 109 State street to 175 Congress street, as was briefly announced in our June 16 issue.

The new location is a brick and stone, six-story building, lighted on three sides.

All departments are accommodated in the new quarters, with the exception of the main commercial office, which will remain at its present location in State street.

The operating department occupies the whole of the third floor, an area of approximately 10,000 square feet. There are 192 Morse positions provided, many of which are used in connection with new type concentration devices, permitting of the greatest efficiency in handling light load circuits. In addition to the Morse, there are three of the new multiplex printing telegraph sets, four Western Union printers and one Morkrum printer. These automatics will handle the bulk of the fast trunk traffic.

Messages will be picked up and distributed by means of belt-conveyors, automatic carriers and pneumatic tubes.

High-speed pneumatic tubes will connect the operating department directly to the State street business office.

The office is equipped with the Western Union new type switchboard and terminal frame, and the equipment throughout is modern.

Spacious quarters, with all conveniences for comfort and rest have been provided for the employes, including rest rooms, lunch rooms, hospital and smoking room.

District commercial superintendent C. F. Ames and plant superintendent W. S. Barker have been provided with commodious offices upon the second floor.

The Gold and Stock Department, which operates the tickers and Commercial News Department in Boston is upon the second floor. This department is entirely re-equipped.

The bookkeeping department is located upon the sixth floor.

A branch commercial office is to be opened upon the ground floor, and the headquarters for messengers will occupy part of the ground floor and basement. The messengers' quarters will be complete in every respect, comprising wardrobes and dressing rooms, reading and lunch rooms, and shower baths.

The lighting throughout the building is of the semi-indirect system.

The Boston operating force consists of 185 Morse operators, forty-five persons in the automatic department, forty clerks in the traffic department, twenty employes in the telephone department, thirty-seven supervisors, test-board attendants and repeater attendants.

Mr. J. B. Rex is chief operator; Mr. W. G. Wetmore, traffic supervisor of functional branch and district offices; Alan Stevenson, assistant chief operator; George T. Dee, wire chief; M. C. Harrington, repeater chief; Hughie Jones, automatic chief; W. E. Martin, night chief; J. B. Colson,

late night chief; J. J. Mullin, late night wire chief; H. E. Stickney, equipment chief, and E. C. Corrigan, night wire chief.

The old quarters at 109 State street were occupied by the company for forty years. It was in the fall of 1875 that the Western Union moved from 83 State street to 109, and the office has never once been closed since that time. It was remarked recently that no one knew where the door key was, if there was one.

Mr. George F. Milliken, the inventor of the repeater known by his name, was the first manager at 109 State street, with Edwin F. Leighton as night manager. Mr. Milliken was succeeded by Charles W. Henderson, who was followed by Mr. C. F. Ames, the present district commercial superintendent. Other managers were: James F. Nathan, now commercial superintendent at New York; William A. Rudd, who died in office; Allan Woodle, district commercial superintendent at Buffalo; Owen A. Connor and F. W. Barth, the present manager.

Some of the most noted of the old-time operators of the country grew up at 109 State street. They were famous operators and penmen in the old days. Among them were Thomas A. Edison, W. E. Kettles, Thomas C. Devine, Sid. Shirley, Joseph Wood, John Taylor, Thomas Roche, who later became superintendent; Charles F. Wood, who became general superintendent; Thomas A. Dowd, now a Boston lawyer; E. B. Pillsbury, now general superintendent transoceanic division, Marconi Wireless Telegraph Company of America, New York; W. C. Cox, S. Sullivan, Dr. Thomas, E. J. O'Connor, J. A. Elms, James F. Gormley, Joseph Walton, M. D. Machesault, Daniel McCarthy, James O'Leary, Charles Norton, John Miller, John Gatins, Dr. C. A. Clinch, John E. Flynn, Ralph A. Pillsbury, Charles D. Stanford, Walter E. Perkins, now a noted actor, Thomas Kelley, Thomas Callaghan, and many others.

Among the earlier chief operators were James Dougher, William M. Knowlton, James Colson, Charles G. Pond, Arthur Brewer, Thomas Finan, Frank Stevens, John S. Whitaker, John W. Duxbury and Heman J. Pettengill, who is now president of the Southwestern Telegraph and Telephone Company, at St. Louis, Mo.

All these men were famous operators and officials: Wm. Blanchard, in charge of the Phelps Printer; Ed. Fullam, E. A. Beardslee, Thos. A. Davin, P. J. McMahon, Jules Gutheridge, Jos. H. W. Hoogs, Daniel B. Grandy, Jos. H. Clarke, James C. Robinson, C. G. L. Pope, Harry Williamson, E. G. Read, E. E. Morrison, John H. Milliken, Chas. S. McCoy, Daniel D. Devereux, Harvey C. Wheeler, W. J. Parritt, G. S. Marcyes, F. T. Viles, J. W. Larish, S. W. Eldridge and James E. Griffith.

Of the present force only three were among those who transferred from 83 to 109 State street offices when the removal took place forty years ago. They are J. B. Colson, Samuel Eldredge and J. A. Elms. The three ladies who entered 109 State street in the early days and are still in the service are Mrs. A. M. Cullins, Mrs. H. F. McCoy and Miss E. T. Ellingwood.

Interference from Single-Phase High-Tension Power Lines of the New York, New Haven and Hartford Railroad Company.*

BY N. E. SMITH, SUPERINTENDENT OF TELEGRAPH, NEW YORK, NEW HAVEN & HARTFORD RAILROAD COMPANY, NEW HAVEN, CONN.

Mr. Smith gave a lengthy history of the difficulties encountered in the efforts to overcome the inductive effects of the high power currents used on the electrified zone of his road, between New York and New Haven, Conn.

In connection with experiments made with a view of some method that could be adopted, other than transformer neutralization, to clear the lines of induced currents, he said, it was found that the use of condensers was a very effective method of draining off the induced charges. Whereas, the insertion of condensers was found to be of material help, the capacity sufficient to silence the line made the line so heavy as to prohibit their use.

One thing that assisted very greatly in overcoming induction on our circuits, he continued, was found to be the application of more telegraph battery power and the voltages were raised on practically all of the electric zone wires.

We experienced considerable trouble from electrostatic interference, which was sufficiently severe to ground many of the carbon-blocks in office protectors. We found it necessary to remove for a time practically all of such blocks which, of course, was very undesirable, but necessary to permit of wire operation. Just what the electrostatic voltage amounted to we were not then able to ascertain although we approximated it at something like 500 to 800 volts, on our telephone wires.

Observations that were made justify the statement that the presence of a large number of working telegraph wires on a pole-line subjected to electrostatic induction offers a variety of paths for the dissipation of the induced charges. Consequently, a heavy pole line is more nearly immune from that class of disturbance than a line carrying but a few circuits. In some of the tests it was rather difficult to determine whether some of the disturbances noted were the result of electrostatic or electromagnetic influence. We experienced considerable trouble from electrostatic induction upon our telephone circuits, but with the exception of the grounding effects at office protection the telegraph circuits, so far as I am aware, have never been effected to any great extent. It is possible, however, that we were misled in our belief that "static" was the principal cause of the grounding of carbon-blocks. "Surges" causing high electromagnetic voltages may have played their little part in it also.

On account of the magnitude of our approaching electric system and the physical hazard from the 11,000 volt wires, which were in many places in close proximity to telegraph wires the telegraph company finally decided that it could not consistently take chances with such a disturbing and danger-

ous element and decided to entirely vacate the railroad company's right-of-way wherever the 11,000 volt single-phase system existed or was extended, and took definite steps to that end. After the Harlem River Branch and New York, Westchester and Boston road had been added to the electric system we got along fairly well until some of the large freight yards on the Branch, such as Westchester, Van Nest and Harlem River, were equipped with switching motors and freight trains had been added to the electric schedule. We then commenced to experience very serious interruptions caused by the heavy currents necessary to handle the increasing load. The ten neutralizing transformers on the main line were working "overtime" so to speak, but, of course, could not perform impossibilities.

Telegraph conditions continued to grow worse and worse. One of the train dispatcher's circuits was especially affected which eventually made it necessary for us to install a special type of motor-generator at New Haven to be used in connection with a metallic circuit arranged for the dispatcher who was seriously handicapped. This arrangement was a perfect success, no traces of induction when the wire was clear being noticeable. At times it was necessary to connect up other metallic circuits using the same motor generator for battery power, artificial resistance being inserted to balance circuit resistances. At one time we had as many as four metallic circuits in operation.

We found it necessary in order to work our New York-Boston lines, that extended practically two hundred miles east of Stamford, to cut and battery them, both east and west at New Haven and insert repeaters at the latter point. We were forced to use voltages sometimes as high as 400, 200 at New York and 200 at New Haven, on the seventy-five mile sections passing through the electric zone, applying artificial resistance to cut the working currents down to normal amount. This had a great tendency to quiet the line although at times induction would break through the barriers we had interposed.

The present electrification comprises practically 100 route miles, a total of 375 miles of main and branch track. In addition, there are 163 miles of yard and siding tracks making a grand total of 538 miles electrified.

The operation of freight trains creates the greatest disturbance; the tonnages of such trains vary anywhere from 1,500 to 3,000. Such trains call for a tremendous output of current especially when getting under way and, at times, induction is so severe as to preclude wire operation for a few moments. Until the present time we have been quite suspicious that some of our troubles have been the result of imperfectly insulated telegraph wires. We have recently renewed cables that were in a very bad condition on the Harlem River Branch and improved insulation in other ways very materially. We note, however, that induction is just as severe as it was before the improvements were made. The resistances of the circuits have been greatly reduced as a result of reconstructing and other improvements which has raised the telegraph working currents and, no doubt, has had a tendency to increase

* Abstract of paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, Rochester, N. Y., June 22.

inductive currents. We have been obliged at times to again resort to increased voltages and artificial resistance on some of the circuits to secure satisfactory service.

Relays of thirty-five ohms resistance are in use on all our wires running through the electrified territory. Those of higher resistance are altogether too sensitive to induced currents. We have even tried relays of twenty-five ohms but results observed were not any more favorable apparently than those obtained from the use of thirty-five ohm instruments.

Negotiations with the telegraph company have now progressed to the point where the entire telegraph plant between New Haven, Harlem River and Woodlawn, is to be purchased by the railroad company and turned over to us for maintenance, etc. It is our intention once the responsibility becomes ours to take steps towards the installation of neutralizing transformers on the Harlem River Branch and between Stamford and New Haven which, no doubt, will reduce induction to the degree that satisfactory working circuits will be obtained with normal battery power.

I feel justified, in view of our varied experiences, Mr. Smith continued, in expressing the opinion that the only panacea for single-phase inductive troubles where it is impossible to vacate the field of disturbance is that which may be obtained from neutralizing or perhaps, what are more properly called, compensating transformers. The separation between the power and telegraph lines, the physical condition of the latter, the particular type of electric system adopted, the location of power and sub-stations, with relation to the effect upon paralleling wires must be taken into consideration. Different cases will require different treatment. The number of transformers necessary to produce satisfactory results will depend entirely upon the severity of the disturbing influence. Whereas, such corrective devices may prove satisfactory in the operation of simplex circuits our experience has not been such as to warrant the prediction that quadruplex, duplex, composite and automatic systems would be entirely immune from serious difficulty.

The telephone circuits through the entire electric territory gave us quite serious concern regarding one particular feature. Unlike the telegraph situation, no neutralizing transformers were contemplated on account of excessive cost to equip a single circuit.

Considerable time has been spent by us in experimenting with different devices in an attempt to find something that will, in case of actual contact, operate successfully without serious arcing effects. A potential of 11,000 volts, with 30,000 kilowatts back of it, is a power that cannot be ignored and is entitled to the most profound respect. Were there but two or three telegraph and telephone circuits involved, the problem would be a comparatively simple one to solve, but a line carrying from twenty to thirty wires presents a condition a little more difficult to meet.

Mr. Smith's paper was illustrated by several diagrammatic maps showing the various circuits, distances between points, etc.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What causes attraction and repulsion between two parallel wires?

Explain how the convolutions of an electromagnet coil cause induction?

When a circuit having induction is charged, is the full strength of the charging current immediately available at the instruments?

Does the induced electromotive force (usually called counter-electromotive force) increase or oppose the generator electromotive force, and what is its effect when the original current is broken? In other words, what is the effect of counter-electromotive force when a telegraph circuit is closed and when it is opened?

What are the means employed to reduce self-induction in magnets?

Study the description on pages 38 and 39.

What is non-inductive resistance?

What benefit is derived by the insertion in the circuit on non-inductive resistance?

Why did the earlier four-ohm duplex and quadruplex sounders respond more quickly and distinctly than the 100-ohm pattern when arranged in multiple on single-wire circuits?

How were the circuits made non-inductive without interfering with the multiple arrangement?

What was the effect of connecting the two coils of the 100-ohm sounders in multiple?

How much was the total resistance of the coils reduced?

To what is the benefit of connecting the coils in multiple due?

What is gained by adding non-inductive resistance.

THE STEARNS' DUPLEX.

In single circuits, does it make any difference whether the line current is positive or negative? In other words, is the operation of the instruments dependent upon the direction of the current?

If a way wire has battery at one end only, should the copper or zinc poles be connected to the line?

If the direction of the line current through the relay coils is reversed, for instance, by changing the main-line wires on the relay binding-posts, will it have any effect on the operation of the instrument?

Explain why reversing the direction of the current does not affect the operation of a single-line instrument.

In a single-line circuit, is the continuity of the operating current ever broken?

(To be Continued.)

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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 1, 1915.

The Convention of Railway Telegraph Superintendents.

The thirty-fourth annual convention of the Association of Railway Telegraph Superintendents, which was held in Rochester, N. Y., June 22 to 25, was a very interesting and profitable one to the members. The papers presented were of high order, practical and timely, and the discussions which followed them brought out a great deal of additional information of value, which might never have been revealed under ordinary circumstances.

All work and no play applies as well to railway telegraph superintendents as it does to the proverbial "Jack" of the story. They were provided with sufficient entertainment to maintain a normal balance; they worked hard for a while, then indulged in a little recreation which fitted them to attack the next batch of work with renewed vigor. And so it was all through the convention—work and play—always fresh for both, in turn. The entertainment feature was planned and carried out in an excellent manner.

Apart from the meeting itself, there were two things related to the occasion that stand out prominently, viz.: the fact that Rochester was the cradle of the Western Union Telegraph Company, and

the further fact that the party assisted in the unveiling of the monument on the grave of James D. Reid, who was the first telegraph superintendent and did much to benefit the telegraph fraternity.

Another noteworthy feature of the meeting was the prominence given to the consideration of wireless telegraphy and wireless telephony. It is noticeable to the regular attendants at these conventions that wireless is looming up in discussions of railway telegraph subjects. A year or two ago considerable skepticism existed in the minds of many of the members as to the applicability and utility of wireless telegraphy in railway operation, but it has disappeared and they are now asking questions and looking into the merits of the system. It is simply another instance of the repetition of history in the case of invention. The telephone went through the same experience and so did the telegraph in its early days. It can safely be claimed that the 1915 convention of this association was one of the most important and helpful ever held by the organization. Many new ideas were expressed and exchanged, and, in due time, what is good and serviceable in them will bear fruit in practice.

Auroral Disturbances on Telegraph Wires.

Aurora Borealis has been particularly active recently and the operation of telegraph lines was slightly interfered with. The disturbances, however, caused no marked delay to business, although the effects were more pronounced in some parts of the country than in others. Telephone lines were not affected by these manifestations. It is well known that telephone metallic circuits are immune from such disturbances and the aurora has no terrors for the telephone as it has for the telegraph. Telegraph circuits being of the grounded type, earth currents manifest themselves by increasing or decreasing the battery currents, the instruments seeming at one moment to be clogged with current and the next to be robbed of all traces of it.

The cause of the auroral phenomena is yet a mystery to the scientist, but it is generally agreed that they are connected in some way with sun spots. Disturbances in the sun almost invariably cause disturbances in the earth's currents. It seems likely that sun spots cause a static difference of potential which exerts its influence through space to our own earth.

DR. STEINMETZ'S NAMESAKES.—A story is told that once when the General Electric Company offered to increase the salary of Dr. Charles P. Steinmetz, consulting engineer of that company, he objected, urging that the money be divided among the men in the shops. This was done, and it is stated that he has more namesakes than anyone else in Schenectady.

Mr. W. H. Baker, secretary of the Western Union Telegraph Company, New York, writes: "Every ambitious employe of the telegraph or telephone companies should subscribe for and read TELEGRAPH AND TELEPHONE AGE. Herewith find check to pay for renewal of my subscription."

Convention of the Association of Railway Telegraph Superintendents.

The thirty-fourth annual convention of the Association of Railway Telegraph Superintendents was held at the Powers Hotel, Rochester, N. Y., June 22 to 25, with an attendance of about 200, including many ladies—wives, daughters and friends of members.

Mayor Hiram H. Edgerton, of Rochester, welcomed the association to the city, and hoped the members and their friends would enjoy their stay. The address was responded to by Mr. G. A. Cellar, on behalf of the association.

Mr. Belvidere Brooks, vice-president of the Western Union Telegraph Company, made a few interesting remarks. He stated that his company takes much interest in these conventions and the great good they accomplish in advancing the telegraph on the railroads. They promote the adjustment of relations between the telegraph company and the railroads. He also stated that Rochester was the birthplace of the Western Union Company.

Mr. G. D. Perry, general manager of the Great North Western Telegraph Company of Canada, Toronto, thanked the association for the invitation to be present, and expressed his appreciation of the compliment.

Mr. G. M. Yorke, general superintendent of plant, Western Union Telegraph Company, New York, commended the spirit of co-operation between the railway telegraph superintendents and the telegraph company. The plant conditions, he said, had been much improved. He stated that the Western Union was very proud of the multiplex system of telegraphy.

Mr. W. W. Ryder, general manager, Western Division, Western Union Telegraph Company, Chicago, made a few remarks.

Letters of regret at their inability to be present were read from Messrs. Thomas A. Edison, Andrew Carnegie, Theo. N. Vail, L. McKisick, C. H. Gaunt, Newcomb Carlton, W. J. Lloyd, Charles Selden, and others. Mr. Selden regretted that he could not be present at the unveiling of the James D. Reid monument in Mount Hope Cemetery in Rochester.

Acting-president E. C. Keenan referred to the illness of Mrs. W. Bennett, wife of past-president Bennett, which, he said, was the reason for their absence. Mr. G. A. Cellar was authorized to send a telegram for the association conveying the hope of the members for Mrs. Bennett's speedy recovery.

New members were elected as follows: Active—P. F. Frenzer, superintendent of telegraph, Union Pacific, Omaha, Neb.; G. W. Jett, superintendent of telegraph, Norfolk and Western, Roanoke, Va.; H. C. Hewes, assistant general foreman, Illinois Central, Chicago; E. W. Kolb, signal engineer, Buffalo, Rochester and Pittsburgh, Rochester, N. Y.; R. W. Potts, assistant superintendent, Chicago, Rock Island and Pacific, Chicago.

Associate—B. H. Richards, sales engineer, Hall Switch and Signal Company, Montreal, Que.; John P. Kobrock, Missouri and Kansas Telephone Company, St. Joseph Mo.; E. A. Woodward, railway sales engineer, Kellogg Switchboard and Supply

Company, Chicago; J. C. Binning, sales engineer, Western Electric Company, Chicago; G. A. Nelson, Gordon Primary Battery Company, New York; W. M. Heim, eastern district manager, W. N. Matthews and Brother, New York; John B. Harlow, engineering department, Western Electric Company, New York; Godfrey Gort, L. S. Brach Company, Chicago; E. W. Pierce, New England Telephone and Telegraph Company, Boston, Mass.; A. C. Terry, district commercial superintendent, Western Union Telegraph Company, Pittsburgh, Pa.; A. D. Cardwell, chief engineer, American Telegraph Typewriter Company, Brooklyn, N. Y.; J. A. Ritter, sales engineer, Hall Switch and Signal Company, New York.

Honorary—Theo. N. Vail, president, American Telephone and Telegraph Company, New York; Newcomb Carlton, president, Western Union Telegraph Company, New York; Edward J. Nally, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York; Clarence H. Mackay, president, Postal Telegraph-Cable



E. C. KEENAN, CHICAGO, PRESIDENT ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.

Company, New York; J. J. Carty, chief engineer, American Telephone and Telegraph Company, New York.

The reports of the officers were presented. Acting-president Keenan stated that the past year had been a prosperous one for the association. Secretary-treasurer P. W. Drew reported a substantial cash balance after meeting all expenses. Messrs. W. H. Potter and M. H. Clapp, chairmen of the Eastern and Western Divisions of the association, respectively, reported on the meetings of the two divisions during the year. The chairmen of the various committees also made their reports.

Mr. T. D. Lockwood, general patent attorney, American Telephone and Telegraph Company, Boston, made a few felicitous remarks. He stated that he was an honorary member of many associations, but his membership in this association was nearest to his heart. He referred to his early telegraph association in Rochester with Mr. E. M. Barton, and told of many experiences with the late Henry A. Bogardus, better known as "Bogy," also of Roch-

ester. He expressed his great pleasure at being present and meeting many of his old friends.

Mr. A. G. Saylor, general manager, Eastern Division, Western Union Telegraph Company, New York, spoke of his early telegraph experiences. He complimented the railway telegraph superintendents for their fairness in their dealings with the telegraph company, and referred to the great improvements in railway telephone dispatching and the important part the superintendents of telegraph have performed in connection with such development.

"Interference from Single-Phase High-Tension Power Lines of the New York, New Haven and Hartford Railroad Company" was the title of the paper read by Mr. N. E. Smith, of New Haven, Conn., at the afternoon session.

Mr. Smith gave a history of the work of electrifying that road and the difficulties experienced with induction on telegraph and telephone lines. The various methods experimented with to overcome these troubles were also gone into in considerable detail.

In the discussion of Mr. Smith's paper, Mr. J. C. Johnson, of the Pennsylvania Railroad, Philadelphia, in a communication read by Mr. I. C. Forshee, described the work of electrifying the section of his road between Philadelphia and Paoli, a distance of twenty miles, and all the sixteen tracks at the Broad street terminal, and explained the existing conditions and the problems to be met to maintain and protect the telegraph and telephone lines from interference. All circuits throughout the section are being placed underground. The telephone and telegraph conductors are in two cables, one of which is called the trunk cable, carrying the through circuits, and the other, the local cable, containing the local circuits. The long-distance telephone circuits are operated as phantom circuits, and these are composited and duplexed. The Philadelphia-Pittsburgh phantom, 350 miles long, has four telegraph circuits which are operated duplex. He believed that high insulation of the telephone and telegraph circuits and perfect balance both for resistance and capacity are necessary to insure satisfactory operation in the electrified district. The lead sheath of the cables, he said, has taken care of electrostatic induction, but it has no appreciable effect upon the electromagnetic induction.

Mr. G. A. Cellar, of the Pennsylvania Railroad, Pittsburgh, Pa., stated that he was in doubt as to whether the cost of the New Haven system has not been greater through the loss of continuity in communication service than would have been the cost of metallic circuits sufficient in number to have overcome the difficulties. He did not criticize the methods employed, because they naturally suggested themselves, one after another, through a sequence of events cumulatively great as compared with initial plans. Yet, notwithstanding all the efforts, the restoration of the telegraphic system has fallen short.

Mr. S. L. Van Akin, jr., of the New York Central, Syracuse, N. Y., believed that the superintendents should seek the co-operation of all the large electrical manufacturing concerns and that the de-

signing engineers should develop equipment that will eliminate sharp peak reversals, so that there will be less tendency to produce inductive interference.

Mr. J. B. Taylor, of Schenectady, made a few remarks of a general character. He briefly referred to the increasing troubles from inductance and the various methods employed for the overcoming and elimination of the disturbances.

Messrs. P. J. Howe, of the Western Union Telegraph, New York; I. C. Forshee, of the Pennsylvania Railroad, and H. S. Warren, of the American Telephone and Telegraph Company, New York, also made remarks on the general subject.

The next paper read was one entitled, "Primary Battery for Transmission on Train Dispatching and Other Telephone Lines," by Messrs. G. W. Nelson and E. E. Hudson.

This paper dealt principally with the use of low internal resistance, closed-circuit primary cells as a reliable and efficient source of energy for telephone train dispatching and referred particularly to the reliability insured by this source of current, rather than the low cost of operation effected, notwithstanding that a substantial saving in maintenance may also be obtained by their use. A fuller abstract of this paper will appear in this publication.

In the discussion, Mr. W. E. Harkness pointed out the advantages and disadvantages of the caustic type of cell. While the caustic soda cell is superior to the dry cell for dispatchers' transmitters, it is a question if it can show any advantage over storage cells in this service. For way-station transmitters the caustic soda battery, when properly maintained, has given satisfactory service. It would not, however, furnish a uniform or high grade of service when subjected to heavy or long periods of discharge. Under ordinary conditions, storage cells cannot compete with either the caustic soda cell or the dry cell in way-station service. He favored the use of the caustic soda cell for booth and other outdoor telephones. The soda cell is superior to the dry cell, he said, as a common source of current. He thought caustic soda cells could be used with advantage for the operation of telegraph sounders.

Mr. C. S. Pfisterer brought out the merits of the dry battery.

Mr. R. F. Finley, engineer of the New York Central, read a report giving results of tests of wet and dry batteries on that company's lines, with comparative costs.

Mr. R. E. Chetwood, plant engineer, Western Union, New York, stated that the Western Union Telegraph Company had been experimenting to find a substitute for the gravity battery, but, as yet, had not found anything satisfactory.

Messrs. G. K. Hever, Western Electric Company, New York; F. T. Wilbur, Illinois Central, Chicago, and others, made brief remarks.

The discussion was closed by Mr. E. E. Hudson, who spoke in favor of the Edison cell.

After an executive session the meeting adjourned.

At Wednesday's session, acting-president Keenan announced that Mr. J. J. Cartv, chief engineer of the American Telephone and Telegraph Company, New York, who was down on the programme to read a paper on "Telephone Development," would

not be present, on account of a sudden call to Washington. Mr. Carty telegraphed his regrets and expressed good wishes for the success of the convention.

Mr. C. H. Wilson, general superintendent, American Telephone and Telegraph Company, New York, made a few remarks of a general character, and thanked the association for the invitation to be present. Mr. Wilson is an old-time telegrapher, and he gave a few reminiscences of his early experiences as an operator. He believed that the title "superintendent of telegraph" should be changed to "superintendent of telephone." It had been his pleasure for a number of years to co-operate with railway telegraph superintendents. They had a strenuous task to keep up to date.

Mr. M. H. Clapp, of the Northern Pacific Railway, St. Paul, Minn., reviewed the development and the growth of the use of the telephone. Referring to the transposition of wires, he stated that all wires along his road would be ultimately transposed for telephone use. He believed there was a greater field for telephone repeaters on railroad wires than for loading coils. He also predicted the use of telephone switchboards at places where there is a group of wires, such as in yards, etc. He believed the auto-manual board would solve the twenty-four-hour service problem on railroads. Another subject for future consideration is the matter of adequate lightning protection. The problem of loud-speaking telephone transmitters and receivers, he thought, would be solved in the near future.

Mr. T. D. Lockwood referred to the development of the telephone switchboard. The central, or common-battery system, he said, was the most wonderful. He also touched upon transpositions. The idea, he said, was due to Mr. J. A. Barrett. The importance of the development in cables was also referred to. Time, patient study and brains, he said, will master every problem of the telephone and the telegraph. Speaking of telephone repeaters, he said there was no trouble to make a telephone repeater, but there is trouble to make a repeater that will amplify. The telephone company, he said, is now conducting experiments with a repeater from which it expects great things.

Remarks on the general subject of telephone service and its advantages and disadvantages were made by Messrs. V. T. Kissinger, I. C. Forshee and L. M. Jones. Mr. Keenan stated that on the New York Central Lines telephones for dispatching and other railroad business was eminently and entirely satisfactory.

Mr. R. E. Chetwood, plant engineer, Western Union Telegraph Company, New York, then read a paper on "Screened Cable Conductors and their Application in Telegraph Service." (An abstract of this paper will be published in a later issue.)

Dr. F. B. Jewett, assistant chief electrical engineer, Western Electric Company, New York, submitted comments on Mr. Chetwood's paper, which were read by Mr. G. K. Heyer. He gave an account of the development of cables, and the difficulties of construction. Mr. Heyer supplemented Dr. Jewett's discussion with a few remarks of his own.

Mr. C. S. Rhoads, of the Cleveland, Cincinnati, Chicago and St. Louis, Indianapolis, Ind., also submitted some comments in writing, which were read by Mr. M. B. Overly, of the same road.

Messrs. J. B. Taylor, I. C. Forshee and T. D. Lockwood also discussed the paper. Mr. Lockwood gave a brief history of telephone cable development and described the early forms of cables.

In closing the discussion, Mr. Chetwood stated, in answer to questions, that the screened cable only reduced interference from high-speed circuits; that the cable is used largely for automatic circuits, and that other metals than copper had been considered for the screen, naming one cable with a brass screen. He stated that very little was gained by loading screened cables.

Mr. J. B. Taylor brought up the question of the effect of aurora borealis on telephone and telegraph working. He suggested the advisability of collecting data on the subject.

Mr. C. H. Wilson related some of his experiences with the recent manifestations of the aurora.

Professor C. A. Culver, of Beloit College, Beloit, Wis., made some interesting remarks on wireless telegraphy and wireless telephony.

After adjournment the entire party proceeded in automobiles to Mount Hope Cemetery, where the monument over the grave of James D. Reid was unveiled. A more detailed account of the ceremonies is given elsewhere in this issue. At the conclusion of the exercises the party was taken on a sight-seeing tour of the city.

In the early evening a demonstration of the transcontinental telephone line was given in the hotel parlors. It was managed by Mr. B. A. Kaiser, and the conversations were very distinct. This was followed by a banquet given at the Powers Hotel by the New York Telephone Company, which proved to be a very enjoyable affair. Brief remarks were made by Messrs. E. C. Keenan, E. A. Chenery, mayor H. H. Edgerton, of Rochester; W. J. O'Hea, of the New York Telephone Company, Rochester, and G. A. Cellar. The banquet was closed with the singing of "America," after which dancing was indulged in.

At Thursday's session, Mr. W. H. Hall, of Denison, Tex., read a paper on the "Censorship of Railway Messages." He described the methods used on his road for the purpose of shortening telegraphic correspondence and the employment of the mail for matters requiring special attention, but which should not be put upon the wires. He read the code used on his road in telegraphic correspondence and described the symbol letter and file number method of identifying telegrams.

In the discussion, Mr. J. F. Caskey, of Bethlehem, Pa., said the subject of Mr. Hall's paper is one phase of conservation about which we hear so much these days. On his own road a censor was employed for seven months. All parties sending Western Union telegrams under frank were instructed to send copies of each telegram to the superintendent of telegraph for censor. Every message so sent was carefully edited, and, in many cases, recast and unnecessary words cut out, so that, by the present appearance of things, the company ex-

pects to save approximately \$2,000 per annum in excess of the salary of the censor. The railroad telegrams of the larger offices were censored, with the result that in one department alone a wastage of approximately \$31 per day was reduced to less than \$5.00 per day.

In a communication submitted by Mr. W. J. Camp, assistant manager, Canadian Pacific Railway Company's Telegraph, Montreal, and read by Mr. F. F. Riefel, the methods employed in shortening service telegrams on that road were described.

Mr. E. A. Chenery, of the Missouri Pacific, St. Louis, Mo., exhibited a blue print of curves, showing the number of messages sent during the years 1913, 1914, and up to May, this year, and their cost.

Mr. E. C. Keenan questioned the economy of coding railroad telegrams. It costs money and time, he said, to code and decode messages. He advocated simplicity in all operations.

Others who took part in the discussion were Messrs. M. H. Clapp, G. A. Cellar, C. H. Hubbell, J. J. Ross, L. M. Jones, M. B. Wyrick and W. H. Potter.

A telegram was read from Mr. Charles P. Bruch, chairman of the James D. Reid Memorial, New York, thanking the association for its assistance at the unveiling of the Reid Monument in Mount Hope Cemetery, on the afternoon of June 23.

At the executive session in the afternoon amendments were made to Articles II and III of the by-laws concerning the duties of officers and committees.

Mr. David Sarnoff, contract manager of the Marconi Wireless Telegraph Company of America, New York, gave an interesting talk on wireless, which, he pointed out, was closely affiliated with the subjects discussed at the meetings. Among other things, he said that there was no trouble from inductance on wireless. He referred to the use of wireless amplifiers as repeaters on the transcontinental telephone line. Wireless relays were also referred to. The two great difficulties encountered in the development of the wireless telephone, he said, were, first, to get a transmitter that will handle the current, and, second, the proper regulation of voice currents. He predicted that wireless telephony over 100 miles would be practicable within two years or less. Automatic machines, he stated, can be used in radio transmission and reception, too, if needed.

A telegram was read from Mr. E. J. Nally, vice-president and general manager of the Marconi Company, expressing his thanks for his election as an honorary member of the association.

A resolution of thanks was then passed to mayor Hiram H. Edgerton, of Rochester, the Powers Hotel, the Western Union Telegraph Company, the American Telephone and Telegraph Company, the Railway Telegraph and Telephone Appliance Association and the Buffalo, Rochester and Pittsburgh Railroad for favors extended, and to Messrs. A. D. Walters and B. A. Kaiser, of the entertainment committee, for their assistance in making the convention a success.

St. Paul, Minn., June 20, 21 and 22, were the place and dates chosen for the 1916 convention.

The following officers were then elected: President, E. C. Keenan; first vice-president, L. S. Wells; second vice-president, M. H. Clapp; secretary and treasurer, P. W. Drew. Messrs. W. H. Potter and F. T. Wilbur were elected chairmen of the Eastern and Western Divisions, respectively.

The convention then adjourned.

ENTERTAINMENT.

After luncheon, on June 22, the ladies were conducted to Charlotte by special trolley cars, and were joined there in the evening by the members and friends. A dinner was served by the courtesy of the General Railway Signal Company of Rochester.

On June 23 the entire party attended the unveiling of the James D. Reid monument at Mount Hope Cemetery, after which it was taken on a sightseeing trip around the city in automobiles. In the evening a demonstration was given in the hotel parlors of the transcontinental telephone line, after which a banquet was given through the courtesy of the New York Telephone Company.

On Thursday, June 24, a luncheon was given for the ladies at the Seneca Hotel and they afterwards visited the Eastman Kodak Works, where a photograph was taken of the group.

On Friday, June 24, the party made a trip to Coburg, Ont., through the courtesy of the Buffalo, Rochester and Pittsburgh Railway Company. It was conveyed by rail to Charlotte, where the steamer was taken for Coburg. The sail across Lake Ontario was a delightful one, the weather being perfect. Luncheon and dinner were served on the boat, and a band brought along for the occasion rendered excellent music. An hour was spent in Coburg sightseeing. The party reached Rochester on their return shortly after 8 p. m. The luncheon and dinner were provided through the courtesy of the Railway Telegraph and Telephone Appliance Association, and were all that could be desired.

A special resolution of thanks was tendered while on the boat to Messrs. A. D. Walters and B. A. Kaiser for the excellent entertainment provided all through the convention and for the able manner in which it was carried out. Everyone complimented these gentlemen on the results of their close attention to their duties and their unfailing courtesy.

EXHIBITS AND NOTES.

The J. H. Bunnell and Company, New York, was represented by Mr. J. J. Ghegan, president, and senator C. E. Graham, of New Haven, Conn., vice-president. Mr. Ghegan showed samples of an improved telegraph key brought out by his firm. The contact points are of tungsten instead of platinum. There is no corroding of the points by the sparking and they are practically indestructible. This key is now being tried out by the Western Union and Postal Telegraph-Cable Companies and various railroad companies. Mr. Ghegan also distributed leaflets on the Jove fire-alarm box.

The Hall Switch and Signal Company, New York, had a display of its standard apparatus, including Gill telephone selectors and box outfits with the adjustable speed silent calling keys; dispatchers' office equipment; jack and signal boxes; Sandwich cordless jack boxes for telegraph and telephone, and the new visible self-restoring signal attachment for box outfits, which indicates for about three minutes after a call is registered. The latest improved Sandwich 4 G type selector was also shown. Messrs. J. A. Ritter and C. S. Rhoads, jr., were in attendance.

The American Telegraph-Typewriter Company, Brooklyn, N. Y., had on exhibition two printers operating over what would correspond to a simple Morse circuit. The company was represented by A. D. Cardwell and R. F. Spamer.

The Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., represented by Mr. A. H. Fargo, president, exhibited samples of its electrical devices, including steel straight connection, all-steel cable grip; guy grip; cable lugs; ground point; ground connection; terminal connection, and various other Fargo appliances. The straight and other connecting devices have a low resistance, and the gripping part has three times the cross-section of the wire or cable. No solder is used, and there is no possibility of separation or breakage at the joint. The grounding devices insure a reliable ground, and are easily installed.

The Morkrum Company, Chicago, was represented by Mr. J. O. Carr.

The Automatic Electric Company, Chicago, was represented by Mr. J. H. Finley, who distributed a combination key-ring and identification check as souvenirs.

Following is a list of those in attendance:

Angelica, N. Y.—Mr. and Mrs. C. L. Lathrop and Misses Lucile and Frances Lathrop.

Baltimore, Md.—B. F. Thompson.

Battle Creek, Mich.—Mr. and Mrs. E. D. Hubbard and Miss Isabel and Master Henry Hubbard.

Beloit, Wis.—Professor C. C. Culver.

Brooklyn, N. Y.—W. C. Burton, A. D. Cardwell.

Bloomfield, N. J.—E. W. Brown, E. E. Hudson, P. B. Hyde.

Boston, Mass.—F. P. Brennan, T. D. Lockwood, E. W. Pierce.

Buffalo, N. Y.—E. S. Grauel, W. T. Pickard, A. Woodle.

Chicago, Ill.—J. C. Benning, Mr. and Mrs. E. A. Burkitt, J. O. Carr, W. L. Cook, Mr. and Mrs. P. W. Drew, Mr. and Mrs. J. H. Finley, R. F. Finley, Mr. and Mrs. A. G. Francis, G. Gort, H. C. Hewes, C. H. Hubbell, Mr. and Mrs. E. C. Keenan, Mr. and Mrs. V. T. Kissinger, Mr. and Mrs. W. C. Lindsay, and Miss Edna Lindsay, Mr. and Mrs. R. W. Potts, W. W. Ryder, G. E. Sharp, E. O. Sternberg, Mr. and Mrs. G. R. Stewart, Mr. and Mrs. F. H. Van Etten, Mr. and Mrs. F. T. Wilbur, E. C. Wilson, E. A. Woodward, Mr. and Mrs. C. A. Worst, Mr. and Mrs. M. B. Wyrick.

Cleveland, Ohio.—C. S. Pfisterer, F. F. Riefel.

Columbus, Ohio.—B. J. Schwendt.

Decatur, Ill.—Mr. and Mrs. J. P. Church.

Denison, Tex.—Mr. and Mrs. W. H. Hall.

Detroit, Mich.—Mr. and Mrs. J. J. Ross.

Fremont, Ohio.—E. L. Marshall.

Galveston, Tex.—Mr. and Mrs. J. Matthews.

Gibson, Ind.—W. L. Connelly.

Indianapolis, Ind.—M. B. Overly.

Jersey City, N. J.—R. H. Corson.

Kansas City, Mo.—C. E. Marsh.

Lincoln, Neb.—Mr. and Mrs. H. A. Vaughn and son.

Memphis, Tenn.—D. J. Kavanaugh, B. Weeks, S. Weeks.

Minneapolis, Minn.—L. H. Merrill, A. Young.

Montreal, Que.—Mr. and Mrs. T. Rodgers and Miss Laura Rodgers, A. D. Smith.

New Haven, Conn.—C. E. Graham, N. E. Smith.

New York—B. B. Adams, M. C. Allen, Mrs. G. H. Bailey, C. G. Baird, Mrs. John Brant, Belvidere Brooks, R. E. Chetwood, J. C. Enders, W. N. Fashbaugh, H. B. Fenn, Mr. and Mrs. L. B. Foley, J. J. Ghegan, S. B. Haig, W. E. Harkness, J. B. Harlow, Mr. and Mrs. G. K. Heyer, W. J. Higgins, P. J. Howe, J. C. Hubbard, Mr. and Mrs. B. A. Kaiser, Charles Keck, Mr. and Mrs. D. C. Keefe, W. T. Kyle, H. C. Law, A. Lockwood, R. J. Meigs, P. W. Miller, G. A. Nelson, C. S. Rhoads, jr., J. A. Ritter, D. Sarnoff, R. F. Spamer, T. R. Taltavall, A. B. Taylor and daughter, Blanche, J. B. Taylor, Mr. and Mrs. A. D. Walters, H. S. Warren, Mr. and Mrs. L. S. Wells, R. W. Whitehead, G. M. Yorke.

Norfolk, Va.—Mr. and Mrs. W. F. Williams.

North Bay, Ont.—W. J. Kelley.

Omaha, Neb.—Mr. and Mrs. P. F. Frenzer and son.

Orange, N. J.—F. V. McGinness.

Passaic, N. J.—Mr. and Mrs. E. P. Griffith and Miss Gertrude and Master Francis Griffith.

Philadelphia, Pa.—I. C. Forshee.

Pittsburgh, Pa.—Mr. and Mrs. G. A. Cellar, Mr. and Mrs. L. A. Lee and Miss Dorothy Lee, R. W. Phillips.

Poughkeepsie, N. Y.—A. H. Fargo.

Portland, Ore.—Jeff W. Hayes.

Roanoke, Va.—G. W. Jett.

Rochester, N. Y.—H. W. Benedict, P. N. Boylan, E. M. Bruce, G. D. Butler, E. J. Devans, F. L. Dodson, M. F. Geer, H. E. Huntington, E. Kolb, Mrs. R. C. Leake, Mr. and Mrs. H. W. Lucia, M. G. McInerney, F. W. Moffett, E. Mould, W. J. O'Hea, Mrs. F. W. Rizer, A. Thompson, jr.

St. Albans, Vt.—Mr. and Mrs. M. Magiff.

St. Louis, Mo.—W. G. Barry, Mr. and Mrs. E. A. Chenery.

St. Paul, Minn.—Mr. and Mrs. M. H. Clapp.

South Bethlehem, Pa.—J. F. Caskey.

Syracuse, N. Y.—S. L. Van Akin, jr.

Tacoma, Wash.—E. E. Dildine.

Topeka, Kan.—Mr. and Mrs. L. M. Jones and Miss Mabel Jones.

Toronto, Ont.—C. E. Davies, W. J. Duckworth, G. D. Perry.

Washington, D. C.—W. H. Potter.

Wilmington, N. C.—W. P. Cline.

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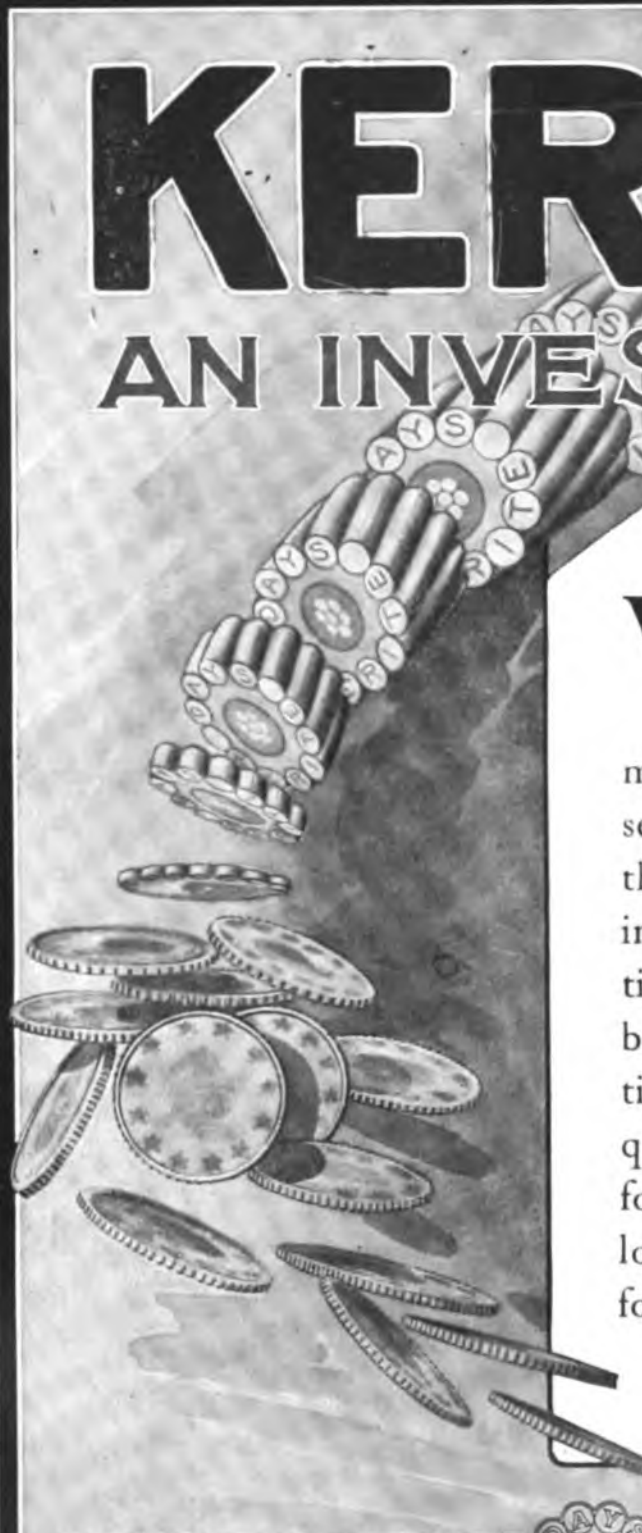
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THE RAILROAD.

Mr. J. R. IVEY, electrician of the Atlantic Coast Line, with headquarters at Savannah, Ga., was a recent New York visitor. He was accompanied by his wife.

Mr. J. C. TUCKER, recently appointed assistant to the vice-president of the Erie Railroad, was formerly a telegraph operator on the Buffalo and Southwestern Railroad and afterwards became train dispatcher. He has occupied several prominent positions in the Erie service.

Mr. J. J. BYRNE, general eastern freight agent of the Delaware, Lackawanna and Western Railroad, with headquarters in New York, began his career as a telegraph operator at Indianapolis, Ind., in 1887. He has been identified with the Lackawanna service since that time.

Mr. W. H. HALL, who was recently appointed general superintendent of telegraph of the Missouri, Kansas and Texas Lines, with headquarters at Denison, Tex., has charge of both the telegraph and signal departments. Mr. John Hickman, who was appointed superintendent of telegraph of the Missouri, Kansas and Texas Railway Company, at Parsons, Kan., has charge of the telegraph and signal work on the lines north of the Red River.

Convention of Train Dispatchers.

Among the proceedings of the annual convention of The Train Dispatchers' Association of America, held at Minneapolis, Minn., June 15, 16 and 17, three papers of general interest to railroad men were read, as follows:

"Checking Train Orders," by C. C. Barnard, chief dispatcher, St. Joseph and Grand Island Railway, St. Joseph, Mo.; "Team Work Between Dispatchers, the Yard, the Engine-House, the Train Crews and the Operators in Reducing Overtime," by J. P. Finan, train dispatcher, Atchison, Topeka and Santa Fe Railway, Needles, Cal., and "The Curve Line of Horse Sense," by F. A. Parker, chief dispatcher, Chicago, Rock Island and Pacific Railway, Des Moines, Iowa.

"I believe that accuracy in every detail of an order," said Mr. Barnard, "makes for accuracy in the order as a whole, and, therefore, believe that all train orders should be checked and the book of rules followed to the letter in all transactions concerning train orders, and that a uniform manner of putting them in form for delivery should be followed."

Mr. Finan said in his paper that the chief dispatcher cannot fulfil his duties properly without being somewhat familiar with the duties and responsibilities of the yardmaster and roundhouse foreman, and emphasized the importance of preserving at all times amicable relations with everyone to insure co-operation. He also pointed out how operators could co-operate in the general plan of team work.

In his paper on "The Curve Line of Horse Sense," Mr. Parker stated that the position of train dispatcher is really that of a master railroader, and to be a master railroader the candidate must

learn something beside what he learned around the telegraph office before he was promoted, and assumed was sufficient to carry him through to the general manager's chair.

The officers elected for the ensuing year were: E. W. Weston, chief dispatcher of the Northern Pacific at Livingston, Montana, president; F. I. Felter, chief dispatcher of the Electric Division of the New York Central, New York City, vice-president; Mr. John Colclough, dispatcher of the Intercolonial at Riviere du Loup, Quebec, was elected a member of the executive committee for four years, and the next place of meeting selected for the convention was Toronto, Ont., on June 20, 1916. Mr. John F. Mackie, Chicago, is secretary of the association.

Railway Telegraph and Telephone Appliance Association.

At a meeting of the Railway Telegraph and Telephone Appliance Association, held in Rochester, N. Y., June 24, the following officers were elected: H. G. Thompson, Edison Storage Battery Co., Orange, N. J., chairman; A. D. Walters, New York Telephone Company, New York, vice-chairman; G. A. Nelson, Gordon Primary Battery Company, New York, secretary and treasurer.

Executive committee: B. A. Kaiser, American Telephone and Telegraph Company, New York (re-elected); A. D. Smith, Northern Electric Company, Montreal, Que.; W. T. Kyle, Okonite Company, New York; E. E. Hudson, Thos. A. Edison, Inc., Bloomfield, N. J.; J. H. Finley, Automatic Electric Company, Chicago; G. A. Graber, Kerite Insulated Wire and Cable Company, Chicago.

MUNICIPAL ELECTRICIANS.

Cincinnati Convention of Municipal Electricians.

The twentieth annual convention of the International Association of Municipal Electricians will be held at Cincinnati, Ohio, August 24 to 27, inclusive, headquarters being at the Gibson Hotel.

In a recent circular letter to the members, secretary Clarence R. George states that an excellent programme is being prepared for the consideration of the members, and pleasing and entertaining features are promised.

Papers will be read, interesting discussions had, together with demonstrations, etc., that not only will hold the close attention of the membership, but will be specially adapted to city electricians, fire and police-alarm superintendents, electrical inspectors, and, in fact, anyone interested in the science of electricity and the tremendous advances that are continually being made pertaining to municipalities.

Every effort is being made by the officers of the association, as well by the several committees having the programme in charge, to make it one of the most notable conventions ever held by the organization, and every member is urged to attend and bring along a new member.

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So clear are the explanations of the great motive forces of the modern world offered in this little book, that no reader can fail to gain from it a thorough oversight of the nature and workings of electricity. The author explains the various ways by which electricity is obtained, and how it is applied to produce the useful results that we see around us.

There is a decided need of text-books such as this which shall explain, in simple language, to young people of, say, fourteen years and upward, a general outline of the science, as well as the ground-work of those electrical inventions which are to-day of such vast commercial importance.

There is also a need for such a book among a large part of the adult population, for the reason that there have been great and radical changes in this science since the time they completed their studies, and they have not the time to follow up the subject in the advanced books.

The book contains chapters on

DEFINITIONS	THE TELEPHONE
MAGNETISM	ELECTRIC LIGHT
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A-B-C OF ELECTRICITY

Yours truly,

Name

Address

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 San Francisco Telegraph Tournament.

The telegraph championship tournament, which is to be held as a feature of the Panama-Pacific International Exposition, at San Francisco, August 27 and 28, will comprise nine events. The contest is open to the telegraphers of the world—railroad, commercial, press and brokers. Each event carries a valuable cash prize.

Following is an official list of the events:

First event—Railroad operators:

Class A. Sending forty ordinary railroad messages;

Class B. Receiving forty ordinary railroad messages.

Second event—Ladies' contest:

Class A. Sending twenty ordinary commercial messages;

Class B. Receiving twenty ordinary commercial messages.

Third event—Press contest:

Class A. Sending 1,500 words press, using Phillips' code;

Class B. Receiving 1,500 words press under same conditions as class A.

Fourth event—Brokers contest:

Class A. Sending for thirty minutes of general brokerage matter;

Class B. Receiving for thirty minutes of general brokerage matter.

Fifth event—Wireless contest:

Class A. Sending twenty ordinary wireless messages;

Class B. Receiving twenty ordinary wireless messages. A regulation pair of head telephones will be used and receiving will be done from a high-frequency buzzer.

Sixth event—Commercial men's contest:

Class A. Sending sixty ordinary commercial messages;

Class B. Receiving sixty ordinary commercial messages.

Seventh event—Championship event:

Class A. Sending 500 words press, twenty ordinary commercial messages, ten ordinary railroad messages and a certain amount of general brokerage matter. All copy to be followed;

Class B. Receiving 1,000 words press, twenty ordinary commercial messages, ten ordinary railroad messages and a certain amount of general brokerage matter. Use of Phillips' code will be permitted. The sender for this event will be chosen.

Eighth event—Commercial men's machine and hand contest (sending only). A sufficient number of commercial messages, brokerage and press matter will be supplied to fill the hour's work.

Ninth event—Railroad men's machine and hand contest (sending only). Sufficient number of railroad messages will be supplied to fill out the hour's work.

These two latter events should be second in importance to the championship event only.

The committee in charge already has sufficient funds on hand to insure the success of the tournament and contributions are constantly coming in. From the present outlook, this tournament will carry larger cash prizes than any tournament ever held.

The championship carries the Carnegie diamond medal.

Entry fees: Championship event, \$5.00; all other events, \$2.00.

Send entry fee and all communications to E. Cox, secretary, 1002 Postal Telegraph Building, San Francisco, Cal.

Mr. E. E. Bruckner, of Chicago, writes as follows in regard to our article in the May 16 issue: "I am thoroughly in accord with your San Francisco tournament article in the May 16 issue of TELEGRAPH AND TELEPHONE AGE. But if it is insisted that the championship prize should be for all-around work, why not be consistent and require the press matter in that event to be handled in code instead of straight Morse as heretofore? This would give the press operators an even break with the commercial men; for the former would most likely make the more creditable showing in handling the press work, while the latter would show to better advantage in handling messages. Again, how can it be contended that a man is an all-around operator unless his ability to handle code be tested? I think nowhere to-day is an operator thought first class unless he knows the code.

"Anybody can send and receive straight Morse; so where messages are added to the test the addition merely results in handicapping all press operators and in entirely eliminating the great majority of them. Therefore if code is not included in the next championship test, the officials should, in fairness to everyone, go back to the Atlanta tournament standard, i. e., sending and receiving straight Morse."

Mr. F. M. McClintic writes:

For the good of future telegraph tournaments, rather than to enter into personalities, I deem it a duty to answer the article in your issue of June 1, in which Mr. A. S. Weir, chairman of the Philadelphia tournament committee, is quoted as suggesting that the Philadelphia tournament would be well worth patterning after.

As a participant in five contests—to each of which I devoted considerable time and earnestly strove to win, I trust that the appended suggestions may carry weight:

(1) I suggest that the judges be placed in a private room with no knowledge as to the order of competition, and so situated that no view of contestants or communication of any sort is possible from beginning to end of each class contest.

At Philadelphia the judges were placed in a room with an open door, giving plain view of each contestant. For various reasons this is manifestly open to unfairness, whether or not it was so at Philadelphia.

(2) After the judges are secluded, contestants

should draw lots for positions and contest according to the number drawn.

This has not been done at any contest within my knowledge.

(3) The resistance in the line used by contestants should be fixed before the first contestant starts, and remain unchanged until the last one has finished.

In Philadelphia frequent changes occurred during the process of sending contests for the championship, and certain, at least, of the contestants were heard in New York City. I advocate the adoption of long circuits in these contests (with resistance in a line entirely within the tournament hall), with a view to measuring the worth of an operator's carrying ability. The possibility of plugging in resistance on an outside line has decided disadvantages which must be apparent.

(4) Separate and solidly constructed stands should be provided for contestants in every event, and while contestants are proceeding, absolutely no person should be allowed within close range.

At Philadelphia, if Mr. Weir will permit me to refresh his memory, a New York telegrapher walked, apparently aimlessly, across the stage and back, bumping his weight, both going and coming, against the frail table on which I was sending in the championship class. After I had finished the contest, I complained to Mr. Weir, personally, and attempted, unsuccessfully, to lay the case before the judges. The man who had been permitted this liberty in plain view of the judges, officials and audience, afterwards met me on the floor of the exhibition hall and remarked solicitously: "Hope I didn't knock you out, did I, Mac?"

If my suggestion is adopted, no such act will be possible in future, either by accident or design.

(5) At the conclusion of contests, when decisions have been rendered, all copy and markings of the judges should be open for inspection and contestants thereby able to learn their abilities and shortcomings.

In Philadelphia, immediately after the receiving message portion of the championship contest, I asked to inspect my copy, but was informed that it had been destroyed. I made application to the tournament officials on the day following, with the same result.

It is quite true, as Mr. Weir says, that I was not forced to defend my championship at short notice in Philadelphia. The fact remains, however, that a condition of message receiving and sending was added at Philadelphia, not a part of the Atlanta contest, in which I won the Carnegie medal, or of any recently previous tournament. I had served my term at message sending and receiving in years past, just as I had at railroad work, which latter, although of equal importance, was not embodied in the championship contest at Philadelphia.

In order to properly fit myself to compete with men who benefited by making the receiving and sending of messages a part of the championship contest in Philadelphia, it would have been necessary for me to have given up the advancement that I had gained in years, and take regular employment as a bonus telegrapher. The same would have ap-

plied to the bonus men, in a measure, had technical railroad work been made a part of the requirements of all-around ability. No amount of ordinary practice that could be done within the time I was allotted could have fitted me as an equally able contestant along that line, with men daily occupied with bonus work, while straight sending and receiving of Morse—the conditions under which the medal was awarded me in Atlanta—was no handicap to them.

The Atlanta committee, which originally secured the Carnegie medal, presented it for competition under the following conditions: Five minutes receiving of straight Morse to qualify; those who survived this test to be eligible for the final contest of sending straight Morse, from new matter, selected by the judges.

I do not question that a special contest comprising straight Morse sending and receiving; sending and receiving of commercial messages and also brokerage and railroad matter, would prove a better test of all-around ability. But the conditions imposed by the Atlanta committee, who secured the Carnegie medal and made the original conditions, were for straight Morse receiving and sending.

My protest is against establishing new conditions for the championship at each tournament.

Very truly yours,

F. M. McCLINTIC.

An Appreciated Compliment.

A manager of a large office recently addressed a communication to his employees as follows:

"I wish to take advantage of this opportunity to recommend to you that you subscribe for TELEGRAPH AND TELEPHONE AGE, which is issued on the first and sixteenth of each month, and that you read and study every page of it. I feel I can do the employees no greater favor than to urge that advantage be taken of the educational opportunities and the electrical books which are advertised therein.

"As is very aptly pointed out by a most excellent article on 'Promotions,' in the issue of June 1 of that paper, it is safe to say that every employe in the telegraph service hopes to receive promotion some day, and the companies want men with useful knowledge.

"The more one knows about the details of his line of work, then surely the more likely is he to be selected when vacancies are to be filled, because ability is what counts in determining the fitness of a candidate for a position.

"Those who have achieved the greatest success in the profession and who are now the highest officials, are loudest in their praises of the AGE."

Mr. Judge H. Oswald, operator and postmaster, Pasacao, A. C., P. I., in remitting to cover his subscription, writes: "I wish to say that TELEGRAPH AND TELEPHONE AGE is the best all-around telegraph and telephone magazine I have ever had the pleasure of reading, and it should be in the hands of every telegraph and telephone man in the world. It is worth twice the price paid for it."

OBITUARY.

JOSEPH L. WETZEL, aged thirty-seven years, and operator at Portsmouth, N. H., died in that place June 7.

WILLIAM O. TREMAINE, aged sixty years, an old-time telegrapher and press operator, died of apoplexy in New York on June 14. For several years past he had been press operator for the *Journal* at Elizabeth, N. J. Mr. Tremaine was a native of Indianapolis, Ind.

SHEPHERD M. DUNLAP, for many years manager of the Columbus, Ohio, office of the Western Union Telegraph Company, but who retired from active service a year ago, died of pneumonia on June 18. He had been identified with the Western Union service for forty years. He was a veteran of the Civil War. He entered the telegraph service in 1867. Interment was at Greenfield, Ohio, where he was born sixty-seven years ago.

JOHN A. SUTHERLAND, aged eighty-two years, a forty-niner of the telegraph, died in Englewood, N. J., June 22, after an illness of three days. He was born in Palmyra, N. Y. He was a member of the Old Time Telegraphers' and Historical Association, and a frequent attendant at the annual gatherings. He was an operator in Buffalo, with Mr. Nat Hucker, in 1847. Mr. Hucker has remained actively engaged in the telegraph at that point since then.

Mechanical Transmission Litigation Ended.

The patent litigation between James E. Albright and Thos. J. Dunn and Company has been settled on the following basis. Mr. Albright sued Dunn and Company in the United States District Court, Southern District of New York, on one of the patents owned by him controlling telegraphic sending machines, alleging that the "Dunduplex" machines were infringements. When the case was about ready for hearing, Dunn and Company concluded not to contest Albright's contentions, and a decree was accordingly entered by consent, holding the "Dunduplex" machines to be infringements. Mr. Albright has agreed to manufacture the Dunn machines, and allow Dunn and Company to sell the same on commission, and all those furnished in future must bear the stamp of Albright, or of the Vibroplex Company, which will assure users that they have been supplied through Mr. Albright. All Dunn machines in use without such stamp will still be infringements of the Albright patents.

The foregoing legal notice means that an amicable understanding between the Albright and Dunn interests has been reached and the two interests hereafter will pull together. Mr. Dunn will continue to sell his own product, as well as the Vibroplex product manufactured by Mr. Albright, and the Albright interests will sell the Dunn product. These two interests now control the mechanical transmission field. These interests have been the originators of mechanical devices, and while it has taken a number of years to thrash the various contentions out in court the legal decisions have at last placed the interests of the transmitting devices in the original hands. This puts a stop to all litigation and users of transmitting devices can now feel

sure that they will be protected if they purchase from either of these two interests.

Old Timers' Reunion Postponed.

At a meeting of the officers, executive committee and local members of the Old Time Telegraphers' and Historical Association, held in New York City on June 17, it was unanimously decided that on account of the continuance of the war in Europe and the unsettled condition of things generally, not to hold a reunion in New York City this year.

Two meetings of the officers and executive committee had previously been held, at which opinions were expressed unfavorable towards holding a reunion this year, but they did not feel at liberty to act definitely upon the matter, and, therefore, resident members of New York City were invited to meet with the officers and executive committee to decide the question.

Mr. Andrew Carnegie, president of the Association, had an attack of grippe last winter, from which he has not entirely recovered, and his physician is advising him to transact as little business as possible.

Mr. D. H. Bates, first vice-president of the Old Time Telegraphers' and Historical Association, and secretary of The Society of the United States Military Telegraph Corps, stated that the military telegraphers would meet in New York in annual convention sometime in October, the date to be announced later. He added, however that the meeting would be a very modest one, but that it would be necessary to hold it on account of pending national legislation, and also because of the advanced ages and rapidly declining membership of the society.

Philadelphia Postal Athletic Association.

The second annual outing of the Postal Telegraph Employees' Athletic Association was held June 19, at the Point Breeze Track, before a very large assemblage.

50-Yard Dash—Won by F. Hoban; second, J. Sullivan, Jr.; third, H. Mills. Time, 6 1-5 seconds.

50-Yard Sack Race—Open—Won by V. J. Feola; second, E. Ownes; third, M. A. Auerbach. Time, 22 seconds.

100-Yard Dash—Open—Won by L. Gatti; second, L. Hessley; third, F. Hoban. Time, 13 2-5 seconds.

One-Mile Relay, Inter-Departmental—Won by executive department: Stratton, Lit, McNicoll and Vigatalone; second, receiving department; third, service department. Time, 4 minutes, 30 seconds.

One-Mile Bicycle Race, for Messengers—Won by R. Spickler; second, W. Mullen; third, G. Gentner. Time, 2 minutes, 36 seconds.

100-Yard Dash, Messengers—Won by Sorokin; second, Vigatalone; third, E. Hogan. Time, 12 1-5 seconds.

Two-Mile Motorcycle Exhibition—Won by Henry St. Ives, of France, from Vanderberry, of Philadelphia. Time, 1 minute 59 seconds.

50-Yard Dash, Ladies—Won by Katherine McLaughlin; second, Olga Falcon; third, Amelia Kemmler. Time, 11 seconds.

The final event of the outing was the baseball game between the Postal first team and the Western Union, in which the Postal came out the victors, score 7 to 6. This carried the trophy, which now hangs in our main office.

The committees having charge of these most successful athletic games were: General committee—E. M. Price, chairman; David Logan, secretary; E. W. Miller, treasurer; C. F. Meyers, J. A. Jeffries, P. J. Reilly, jr., W. G. Kurtz, J. J. Hardy, J. Blank, W. Miley, H. Riskie, R. L. Massey. Reception committee—C. E. Bagley, E. W. Miller, C. F. Meyers, R. C. McCreedy, J. H. Wilson, J. A. McNichol, E. H. Locke, C. E. Stump, M. N. Redding. Baseball committee—J. J. Hardy, chairman; W. G. Kurtz, E. W. Miller, D. Logan, E. M. Price. Track officials—Chairman, E. M. Price; referee, E. W. Miller. Judges—J. H. Wilson, R. C. McCreedy, C. E. Bagley. Timers—J. H. Lieberman. C. F. Meyers, R. L. Massey. Director of runners—W. Miley. Starter—D. Logan. Linesmen—H. Riskie, J. A. Jeffries. Announcer—E. M. Barnes. Starter motorcycle race—J. A. Roden. Official physician—Dr. J. P. Lenahan.

Recent visitors to the new office and spectators at the outing, Saturday, June 19, were: C. E. Diehl, manager, Harrisburg; J. E. Zecher, manager, Atlantic City, N. J.; Thos. Reilly, manager, Shenandoah, Pa.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. S. R. Crowder, division plant inspector, and Walter Morrissey, assistant chief operator of the New York office, were recent visitors at Savannah, Ga.

Mr. David Fuchs, manager of the 547 West Thirty-fourth street office, has returned to his desk after a vacation spent at his old home in the mountains of Sullivan County.

OKLAHOMA CITY, OKLA., WESTERN UNION.

Business is on the increase and extra men are making full time, the baseball season having occasioned an extra force at the "Daily Oklahoman" office, which is in charge of Mr. L. J. Tucker, as manager, with J. D. Miller and W. J. Archer.

Operator C. A. Wallace has returned from a leave of absence, spent in Kansas.

We are now working four premium circuits out of Oklahoma City, which are manned as follows:

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.

Dallas, W. T. Germany; Kansas City, H. D. Bell; St. Louis, C. A. Wallace; Chicago, Otto Blevins.

Mr. George Moeser is traffic supervisor, with direct supervision over all trunks, which, with the above premium circuits, includes Wichita and Tulsa locals. Mr. J. B. Putty is assistant to Mr. Moeser, with direct supervision over the way room. Mr. W. S. Wills is day wire chief in charge of the plant, and Mr. J. F. Slack, formerly chief operator at Fort Smith, Ark., is night wire chief. Mr. C. A. Mercer is the late night chief operator.

Mr. E. E. Lash is the chief operator, with Mr. R. N. Long as night chief.

The commercial department is in charge of Mr. Harry G. Robinson, as manager.

Some minor improvements are contemplated for this office in the near future, among which is a semi-indirect lighting system, together with oscillating wall fans for ventilation. The way room has already been equipped with an eight-circuit selective unit, which is intended to facilitate the handling of business.

Mr. Zack Purdy has accepted a position with Associated Press, and will leave about July 1 for Muskogee, Okla., where he will be located.

The office of district commercial superintendent having been abolished, Mr. B. D. Barnett returns to Lawton, Okla., his former home, as manager; Mr. L. L. Butts will assume a position under manager Robinson.

Operator Henry Johnson is on a three months' leave of absence, and is looking after his Ozark farm in Arkansas.

Operator A. J. Spaulding has returned to work after an absence of thirty days, looking after his oil interests at Wewoka, Okla.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

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Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

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Western Union Building, 16 Dey Street, 9 a.m. to 5 p.m.
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Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 63c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 14.

NEW YORK, JULY 16, 1915.

Thirty-third Year.

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Platinum—Where it is Found and How it is Used in the Electrical Arts.

Platinum is one of the most important and indispensable metals used in the construction of telegraph and telephone apparatus and although it is very expensive no satisfactory substitute has yet been found for it.

An interesting account of the metal, where it is obtained and how it is used, is given by Mr. F. G. Austin in the *Western Electric News*.

Platinum was first discovered in a Spanish mine of South America early in the sixteenth century, from which source it received its name, "Platina del Pinto" (little silver from the River Pinto). The ore is now found in various parts of the world, but the richest deposits are those of the Ural Mountains, which have been worked under the supervision of the Russian government since 1828.

The platinum of commerce is obtained entirely from alluvial deposits, at depths varying from six to forty feet, the sand and gravel of former river beds being subjected to a series of screenings and washings to effect the separation of the ore. The yield of the ore per ton of gravel seldom exceeds six grams (less than 3-16 of an ounce), and deposits yielding less than three grams per ton are rarely worked with profit.

Between eighty and ninety per cent of the present world's supply is derived from the alluvial deposits of the Ural Mountains, although many of the gold-bearing gravel beds of the world yield traces of platinum, and a few, most notably those in Colombia, S. A., have given promise of attaining commercial importance. The physical and chemical properties of the ore make its detection and extrac-

tion far more difficult than the more easily recognized and separable gold, so it is possible that much of the ore has been lost in the black sand washings of gold placer deposits. This is especially true of the alluvial deposits of the Pacific coast in California and Oregon, where the platinum occurs in a finely divided form.

Platinum ore is usually found in the form of rounded or flattened grains, or "sand," occasionally in irregular lumps the size of peas; large nuggets are very rare—the largest as yet found weighing twenty-one pounds. The ore has a metallic lustre and is distinguished by its steel gray color; shining light gray streak when rubbed on a hard white surface; high specific gravity (sixteen to nineteen times as heavy as its own volume of water); infusibility in the hottest blast furnaces, and insolubility in any single acid.

Platinum occupies a unique position among metals. When pure, and in compact form, it is tin white in color. It combines the highest specific gravity and highest fusing (melting) point of any single metal in commercial use. Its specific gravity is 21.5; it is therefore twice as heavy as silver and nearly three times as heavy as cast iron. A temperature of 1755° Centigrade or 3191° Fahrenheit is necessary to fuse the metal, hence it is unaffected by temperatures attained in the hottest of blast furnaces. This valued property has led to the extensive use of the metal in the construction of electric resistance furnaces and in pyrometers for measuring high temperatures.

Platinum is a good conductor of both heat and electricity—it expands and contracts under variations of temperature less than any other metal. Because of these properties, together with its high fusing point and non-oxidability (non-"rusting" properties), it is the best metal available for conducting electric current into glass vacuum apparatus, such as incandescent lamps, etc.

Platinum is almost as soft as copper and ductile as gold. It can be easily rolled into sheets so thin that a thousand of them piled on top of each other would not exceed an inch in height. It is frequently drawn in the form of wire to sizes less than one one-thousandth part of an inch in diameter.

For use as "spider lines" in optical instruments, platinum is drawn by a special process to diameters as small as 6/100,000 of an inch. Such wire is nearly invisible to the unaided eye, and a strand of it of sufficient length to encircle the earth at the equator would, in volume, be equal to a bar one inch in diameter by six inches in length.

The telephone, telegraph and, in fact, almost all electrical instruments, are yearly making heavier demands upon the limited supply of platinum. In these industries, it is chiefly used for contact points in electric circuits, and this service means a large actual loss of the metal, as it is slowly dissipated

in the miniature arcs formed between the contact points at each opening of the electric circuit.

Platinum is used extensively in the manufacture of telephone apparatus, in the form of contact points for desk stands, drops, signals, relays, spring jacks, ringing and listening keys, etc. It is also used for the leading-in wires in Sunbeam Mazda lamps. For telegraph apparatus it is used for contacts, principally on relays and keys.

The history of platinum and its by-metals during the past twenty years has been a varied, and, at intervals, a stormy one. About eighteen years ago its price was as low as \$6 a troy ounce. So greatly has the demand for it increased in recent years that the price to-day is between \$43 and \$44 a troy ounce.

There has been an endless endeavor on the part of chemists and research laboratories to replace platinum, but the fact remains that there is as yet no substitute that embodies all the qualities of this metal. It is preëminent among the precious metals having all the noble qualities of gold, and excelling it in many respects.

Telegraph and Telephone Patents.

ISSUED JUNE 15.

- 1,142,804. Telephone-Receiver Support. To A. H. Drake, Waterloo, Ia.
 1,142,857. Automatic Telephone Signaling System. To M. Suwa, Tokyo, Japan.
 1,142,875. Electro-Megaphone Receiver. To C. K. Cregier, Chicago, Ill.
 1,143,140. Telephone-Call Register. To J. A. Robinson, Denver, Col.
 1,143,487. Microphone and Like Instrument. To E. Belin, Paris, France.

ISSUED JUNE 22.

- 1,143,680. Telephone System. To W. Aitken, Liverpool, England.
 1,143,799. Receiver for Wireless Telegraphy. To R. B. Avery, South Bend, Ind.
 1,143,820. Telephone Trunking System. To E. D. Fales, La Grange, Ill.
 1,144,290. Telegraphy. To B. L. Bobroff, Milwaukee, Wis.
 1,144,330. Telephone Busy-Signal Apparatus. To G. E. Kimball, Chicago, Ill.

ISSUED JUNE 29.

- 1,144,391. Transmitter for Telephone and Other Sound-Transmitting Instruments. To W. P. Stunz, Lansdowne, Md.
 1,144,399. Rectifying Detector for Wireless Systems. To E. T. Turney, New York.
 1,144,407. Telephone Systems. To A. H. Dyson, Chicago, Ill.
 1,144,969. Radio Telegraphy and Telephony Receiver. To G. W. Pickard, Amesbury, Mass.

FORGER OF MONEY ORDERS.—Roy Miles was sentenced in San Francisco, June 15, to four years' imprisonment for forging money orders on both the Western Union and Postal Telegraph-Cable Companies.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stock on July 14:

American Telephone and Telegraph Co.	120 1/4
Mackay Companies	77 1/2
Mackay Company, preferred	64
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	2 3/4
Western Union Telegraph Co.	67

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charge on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 1/2 cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. H. B. PERHAM, president of the Order of Railroad Telegraphers, St. Louis, Mo., was a New York visitor this week.

MR. JEFF W. HAYES, editor and publisher of the *American Telegrapher*, of Portland, Ore., is in New York, on business connected with his journal. He is accompanied by David Ginsburg, of Denver.

MRS. MARY SCHERRER, mother of Mr. F. J. Scherrer, secretary of the Old Time Telegraphers' and Historical Association, New York, died in Chicago, on July 6. Interment was at her old home in Auxplain, Ill.

MR. THOMAS A. EDISON has accepted the invitation of secretary of the navy Daniels to head an advisory board of civilian inventors and engineers for a Bureau of Invention and Development which the secretary intends to create.

MR. SIDNEY H. FLAGLER, manager of the telegraph office of the Standard Oil Company at 26 Broadway, New York, and assistant grand lecturer of the Grand Lodge of Masons of New York, was, on June 25, presented with a handsome chest of silver by brother masons.

MR. CHARLES KECK, the well-known New York sculptor, who designed the United States Military Telegraph bronze tablet in the Soldiers' Memorial Hall at Pittsburgh, Pa.; the Charles Minot tablet at Harriman, N. Y., and the James D. Reid monument in Mount Hope Cemetery, Rochester, N. Y., was the designer of the gold dollar which has been issued by the government in commemoration of the Panama-Pacific Exposition.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. EDWARD REYNOLDS, vice-president and general manager, has reached the Pacific Coast after visiting all the principal offices en route from New York.

MR. C. F. LEONARD, superintendent, New York, made an inspection trip among the New Jersey offices in his district this week.

MR. J. F. SKIRROW, associate electrical engineer, New York, will leave July 17 on his vacation, which he will spend in touring the New England states in his automobile.

MR. DONALD McNICOL, of the electrical engineer's office of the Postal Telegraph-Cable Company, New York, who is the author of "American Telegraph Practice," has disposed of the French translation rights to Ch. Beranger Publishing Company of Paris. The book will now be published in French.

MANAGERS APPOINTED.—O. F. Webster, Belding, Mich.; John T. Meyer, East Liverpool, Ohio; F. M. Potter, Adrian, Mich.; F. C. Wilsford, Greenville, Miss.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

MR. NEWCOMB CARLTON, president, spent a few days this week in the Yosemite Valley, while on his way East. He will return to New York about August 1.

MR. A. G. SAYLOR, general manager, New York, has returned from a trip through the New England states on company business.

MR. C. W. MITCHELL, former manager at Cleveland, Ohio, has been appointed manager at St. Louis, Mo., vice W. H. Spain, resigned.

MR. B. J. ROSS, district commercial manager at Cleveland, Ohio, has been advanced to the position of manager at that point, to succeed Mr. C. W. Mitchell, transferred to St. Louis as manager. The position of district commercial manager at Cleveland has been abolished.

MR. E. C. SCHLEIGHT, former manager at Jackson, Mich., has been appointed district commercial manager at Chicago, succeeding F. C. Siddall, appointed district cable manager of the Chicago district.

MR. F. H. NICHOLLS, formerly manager of the cable billing bureau, New York, has been appointed manager of the 8 Broad street office, vice C. W. Kay, transferred to the Produce Exchange as cable agent.

MR. J. P. EDWARDS, division traffic superintendent, New York City Division, recently gave a talk before the Western Union Educational Society, New York, on the benefits of team work and co-operation.

MR. F. E. HOWELL, formerly manager at Utica, N. Y., has been appointed special agent at that point. He is succeeded as manager by Mr. M. J. McCarthy, formerly manager at the Gloversville, N. Y., office. C. O. Getman, operator at Gloversville, succeeds Mr. McCarthy as manager.

MR. E. A. HOLCOMB, of the Albany, N. Y., office, has been transferred to Binghamton, N. Y., as chief operator.

SUMMER OFFICES have been opened at Marlboro, N. J., Mrs. G. H. Grimm, manager; Buck Hill Falls, Pa., C. N. Thompson, manager; Riverhead, N. Y., W. Lennox, manager; Richfield Springs, N. Y., Thomas Leahy, manager.

TICKERS IN MASSACHUSETTS.—The Massachusetts Public Service Commission gave a hearing recently on a petition to compel the Western Union Telegraph Company to install stock-ticker service. The petitioner claimed that as the Western Union Company resells quotations to its subscribers, who have no connection with the New York Stock Exchange, the business is intrastate and subject to the jurisdiction of the board. Counsel for the Western Union Company contended that the origin of the quotations in New York and their destination in local brokers' offices at Boston renders the business interstate and that the contract between the company and the exchange prohibits the former from supplying ticker service to any person or firm not approved by the latter. The board took the case under advisement.

C. W. Mitchell, Manager, St. Louis, Mo.

MR. CHARLES W. MITCHELL, the newly appointed manager for the Western Union Telegraph Company at St. Louis, Mo., has made a record for himself that is rarely equaled. His entire experience in the telegraph before going to St. Louis has been confined to two offices, viz.: Mansfield and Cleveland, Ohio, and his advancement has been one of steady progress.

MR. MITCHELL was born in Mansfield, Ohio, December 25, 1874, and entered the telegraph service as messenger at that place in June, 1890. He became an operator and finally reached the position of manager of the office. In August, 1912, he was appointed manager at Cleveland and held that position until June 1 of this year, when he was chosen to take the managership of the St. Louis office.

THE CABLE.**J. L. Merrill, Second Vice-president and Auditor, Central and South American Telegraph Company and the Mexican Telegraph Company.**

MR. JOHN L. MERRILL, who was recently elected second vice-president and auditor of the Mexican Telegraph Company and the Central and South American Telegraph Company, New York, as announced in our July 1 issue, is a native of Orange, N. J., where he was born on September 17, 1866. He entered the service of these companies in New York, February 24, 1884, and has been associated with them ever since, having served as auditor for over fourteen years.

MR. MERRILL is one of the leading citizens of the Oranges. He was a member of the East Orange City Council for two terms. In January last, he retired as president of the New Jersey Society of

the Sons of the American Revolution. Fond of American history, he has held many other positions of importance in historical and patriotic societies. At the present time he is president of the Revolutionary Memorial Association, which maintains Washington's Headquarters at Somerville, N. J., and is also secretary-general of the National Society of Colonial Wars.

THE COMMERCIAL CABLE COMPANY has issued a sheet of additions and corrections to its 1915 book of cable rates.

THE HALIFAX AND BERMUDA CABLE, which has been interrupted for several weeks, has been repaired and business is now being transacted on a normal basis.

SEEK USE OF CODE ON CABLES.—The Merchants' Association of New York will ask the State Department at Washington to obtain Great Britain's consent to the use of the general telegraph code in commercial cablegrams.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to July 12, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Oran and Tanger, June 24.

Cable Testing.

The fifth edition of "Students' Guide to Submarine Cable Testing," by H. K. C. Fisher and J. C. H. Darby, London, has just been issued. Books of this kind are not numerous. This one is very complete and will be very useful to those engaged in submarine telegraphy. The contents cover simple testing, the constant of the galvanometer, measurement of copper resistance, capacity and its measurement, tests for total breaks, the earth overlap, the measurement of the resistance of an earth, multiplying power of shunts for swings, and many other subjects relating to the practice of submarine cable telegraphy. A list of practical questions and answers is given, also diagrams of connections of instruments. Copies of this book may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price, per copy, \$3.50.

CANADIAN NOTES.

THE GREAT NORTH WESTERN TELEGRAPH COMPANY is distributing its new rate book. Mr. S. B. McMichael, general manager, Dominion Messenger and Signal Company, Toronto, Ont., is entitled to much credit for the excellent manner in which the book has been prepared.

THE TELEPHONE.

MR. U. N. BETHELL, president, New York Telephone Company, is spending his vacation in the Adirondacks.

MR. F. H. BETHELL, president of the Bell Telephone Company of Pennsylvania, the Central District Telephone Company and of the Chesapeake and Potomac Telephone Company, New York, has been elected the first president of the village of Scarsdale, N. Y., of which place he is a resident.

MR. ALONZO BURT, first vice-president and treasurer, Chicago Telephone Company, Chicago, was an executive office visitor this week. He is visiting his daughter in Philadelphia.

MR. C. H. WILSON.—The former title of Mr. C. H. Wilson has been changed from general superintendent, Long Distances Lines, New York, to general manager, Long Distance Lines Department.

HULL MUNICIPAL TELEPHONE.—The Hull, England, municipal telephones are the only ones in Great Britain now outside the control of the British post-office.

COSTLY RED TAPE.—There are two telephone companies in a certain town in Pennsylvania. One of them, through a change in its lines, found it had no use for a pole standing on a certain street corner. The other company wanted a pole on this corner, so the first company decided to sell the pole to the other for \$10. To close this transaction, however, representatives had to be sent to Harrisburg, the state capital, and the case, in all its details, laid before the public service commission of the state, which finally agreed to the sale. The expenses of the negotiations to the telephone company were \$150.

Telephone Pioneers' Convention.

The transportation committee of the Telephone Pioneers of America has issued a neat pamphlet, giving the itinerary of the trip to San Francisco on the occasion of the fifth annual convention of the body, which will be held in that city September 21-23. It gives a brief description and illustration of several points of interest which will be visited during the trip. It also contains a map of the United States, showing the route of the special train. All employees of the Bell System, whether Pioneers or not, are invited to take advantage of this trip. Secretary R. H. Starrett, 15 Dey street, New York, will be glad to give further information.

Review of Principal Articles in Contemporary Telephone Publications.

LONDON TELEPHONE SERVICE.—The June issue of *The Telegraph and Telephone Journal*, of London, is devoted almost entirely to the London telephone service in its various branches. "The Past and Present" is reviewed by Mr. A. Berlyn, assistant controller; "Accounts" are discussed by Mr. J. Stirling; "The Telephone in Government Offices," by J. Livingstone, and "Automatic Telephony in the London District," by M. C. Pink. Other articles are given on the London trunk exchange; the operating school; candidates; telephone societies; telephones and railways, and other subjects.

INCREASED REVENUE THROUGH IMPROVED TRANSMISSION is the title of a paper presented by O. F.

Cassaday before the Tri-State Independent Telephone Association and printed in *Telephony* for June 19. The author shows how a company can increase its toll revenue by improving its service and transmission and by placing high-efficiency instruments at heavy toll users' stations.

INCREASING RATES IN ST. LOUIS.—*Telephony* for June 26 prints an outline of the decision of the Missouri public service commission, upholding the proposed increase of rates in St. Louis by the Southwestern Telegraph and Telephone Company. The commission states that the present return on the valuation of the company's property is 5¼ per cent and holds that a schedule of rates reasonable to both the public and the company should yield a net return of 6½ per cent. The new schedule of rates will go into effect August 1.

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. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at \$1.50 per copy.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York, has returned from an inspection trip covering the Marconi stations in the Hawaiian Islands and on the Pacific Coast.

WIRELESS TO JAPAN.—Wireless communication has been established between Honolulu and Japan, a distance of 3,400 miles.

MARCONI OPERATORS IN BRITISH WAR SERVICE.—Over 4,000 Marconi operators are in the service of the British army and navy, according to a statement made by Mr. Godfrey Isaacs at the annual meeting of the Marconi International Marine Communication Company in London, July 7. The Admiralty had, on more than one occasion, said Mr. Isaacs, expressed appreciation of the resource and courage displayed by the men.

INJUNCTION IN WIRELESS SUIT.—In the suit brought in the United States district court of the eastern district of Louisiana, by Samuel M. Kintner and Halsey M. Barrett, receivers for the National Electric Signaling Company, against Vaccaro Brothers and Company, Vaccaro Steamship Company, Ltd., M. E. Hart Enterprise Electrical Company and the Gulf Radio Company, judge R. E. Foster recently granted a preliminary injunction enjoining the defendants from selling, leasing, installing or otherwise disposing of wire-

less apparatus in infringement of certain patents issued to Reginald A. Fessenden for improvements in wireless apparatus and method of signaling.

Sayville Station Taken Over by Government.

On July 8, the United States Government took possession of the Sayville, L. I., radio station of the Atlantic Communication Company in the interest of American neutrality and to avoid contravention of the Hague convention forbidding the establishment of a wireless station on neutral soil during a war. The plant is now in charge of captain William H. G. Bullard, superintendent of the United States naval station at Arlington, Va.

The Atlantic Communication Company had applied for a license to operate the station, but the request was refused on several grounds, among which are that the company is virtually under the control of the German Government; that the station was, in part at least, operated by officers of the German military forces, and that the station, in its present remodelled form, cannot be licensed without contravening the spirit, if not the letter, of the Hague convention.

It was reported recently that the Sayville station was being used by the German officials to send secret information from the United States by means of a code invented by Dr. I. Kitsee, of Philadelphia, but the officials of the Atlantic Communication Company deny that this had been done.

Coincidentally with the taking over of the station by the government, it was announced that the rate of \$1.00 per word to Germany would be reduced one-half and \$1.08 rate to Austria-Hungary to fifty-eight cents a word, plus the land rate in both instances. The Postal Telegraph-Cable Company has been handling the work at the Sayville station.

In order to maintain its legal rights, the Atlantic Communication Company will file formal protest against the action of the government. Dr. K. G. Frank, of New York, well known in electrical circles, is secretary and treasurer of the company.

Marconi International Marine Communication Company, Ltd.

The report of the directors of this company for 1914, presented at the annual meeting in London, July 7, states that during the last five months of the year the company's business suffered considerable disorganization and some loss, due to the war, entailing a great increase of work and strain upon those responsible for the conduct of the business, but, notwithstanding the adverse circumstances, the business had continued to show substantial progress. The revenue from ships' telegrams, subsidies, etc., show a substantial increase over the amount for 1913.

The number of telegraph stations owned and worked by the company as public telegraph stations on the high seas increased from 788 at the end of 1913 to 905 at the end of 1914. During the current year further progress is being made, the number of steamers fitted to June 19 having increased to 970.

There are now over 2,000 ships, exclusive of ships of war, fitted with Marconi telegraph stations, and, for the most part, worked under the direction of the company and its associated companies. The directors recommended a final dividend for 1914 of five per cent, which, with the interim dividend, makes 10 per cent for the year.

The company has sustained some loss in consequence of the attacks upon its mercantile fleet by enemy submarines, for which it is contemplated compensation will be received.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

THE WIRELESS TRANSMISSION OF PHOTOGRAPHS is the subject of an illustrated article in the June number of *The Wireless World* (London), written by Marcus J. Martin. The article is illustrated by diagrams and describes various experimental methods. The same author contributes some notes to the same journal relating to the status of "Tele-vision."

OWNERSHIP OF WIRELESS EQUIPMENT.—*The Wireless Age* (New York) for July contains an article on "The Ownership of Wireless Equipment," which supplements the comments made on the subject in previous issues of that magazine. The article is a vindication of the principle advocated by that publication that wireless service is best rendered by a responsible private company.

MR. E. E. BUCHER continues, in the July number of *The Wireless Age*, his serial article, entitled "How to Conduct a Radio Club." Mr. Bucher discusses the use of kites for the support of aërials, and describes the construction of these devices.

Mr. Charles J. Ross, auditor of the Marconi Wireless Telegraph Company of America, is the subject of a biographical sketch in the July issue of *The Wireless Age*. Mr. Ross was a former telegraph and telephone man, and is an accountant of high standing.

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(16) Q. Will you please inform me which is the longest submarine cable system out of New York? R. D.

A. The Central and South American Telegraph Company, whose office is located at 64 Broad street, New York. This office works direct with Panama, a distance of 2,259 nautical miles. This cable has an automatic repeater in Cuba. The next section, from Panama to Valparaiso, Chile, is 3,431 nautical miles long. It has three repeaters: one in Ecuador, one in Peru and one in Chile. The next section, from Valparaiso to Buenos Aires, is 891 miles in length, making the total distance from New York to Buenos Aires, 6,581 miles. All of the lines are in duplicate and some of them in triplicate.

(17) Q. What is the cause of a noisy telephone line? J. P. D.

A. A noisy telephone may be the result of one or more of several causes, which would require much space to enumerate. Among these causes may be mentioned induction, loose connections, disturbed balance of a transposed line, leakage, etc.

A correspondent writes: "I would like to relate an experience I had while on duty in a local railroad telegraph office. While I was practicing on a 'bug' some one broke me and said I sent 'like a ham.' To get even with him I started to tell him to 'put his brakes on,' but before I had said the first word he broke me and repeated the same words to me. Then I started to tell him that he sent like 'an ice wagon' when he broke me again and sent me exactly the same sentence that I was about to express. What I would like to know is how he knew what I was going to tell him—whether he was possessed with mental telepathy or some other form of mentality. I would also like to state that I was not asleep or 'hearing things.' The chief dispatcher and another operator were standing near the desk at the time. They also said that they had never heard of such an experience.

[As we have no mind-readers on our editorial staff, nor anyone else who can offer an explanation of this phenomenon we confess our inability to enlighten our correspondent. It is a case of stealing words right out of the mouth.—Editor.]

Correspondence School Lessons in Telegraphy.

There is a steadily increasing demand for "Correspondence School Lessons in Elementary Telegraphy," by J. H. Penman, which is a book that should be in the possession of every telegrapher who wishes to increase his knowledge of the technical side of his business. It is elementary in character, and, therefore, easy to study. It begins with arithmetic, which is followed by simple algebra, a knowledge of which is easy to acquire and enables the student to understand the mathematics of telegraphy.

There are chapters on the telegraph circuit, batteries, instruments, testing, switchboards, repeaters, the duplex, the quadruplex and many other subjects of direct bearing on the telegraph and its operation.

Each chapter is followed by test questions on the subject of the chapter.

The whole book is written in plain English and forms an interesting subject of study. Every telegrapher should know the whys and wherefores of his business, in addition to his ability to send and receive.

The price of this excellent book is only \$2.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Mr. John R. White, western agent of the French Cable Company at Chicago, in remitting for his paper for another year, writes: "I hope to have the pleasure of renewing my subscription for many years to come."

New Postal Main Office at Philadelphia, Pa.

The Philadelphia main office of the Postal Telegraph-Cable Company was moved to its new quarters in the Finance Building, 1420-1430 South Penn square, on Sunday, June 13. The building is a modern one, just completed. Its location opposite the City Hall and near the Pennsylvania Railroad station, being in the heart of the business and traffic center of the city, is unexcelled as regards convenience both for the requirements of the company and the public. The handsome signs and window lettering make the office very conspicuous, and the completeness of its interior equipment and arrangement make it the best telegraph office of its size in the United States, if not in the world.

Modern equipment has been installed in all departments for the efficient handling of the company's business. The business office, located on

fire proof switchboard equipped for one hundred and sixty circuits, including burglar-alarm and watchmen's service. The relays used in connection with this service are of special design, with small slate bases. All of the instruments are mounted on asbestos board, set in angle-iron frames. Several new circuit arrangements have been developed in connection with the burglar-alarm and watchmen's service.

The tailor and messengers' uniform room are located on the mezzanine floor.

The entire fourteenth floor is occupied by the superintendent's office, bookkeeping department and general operating department. The rest room for the women employes, lockers, waiting room and lavatory for the men are also located on this floor. All of the departments are equipped with semi-indirect lighting fixtures and fourteen electrically



FIG. 1—GENERAL VIEW OF OPERATING DEPARTMENT.

the ground floor, is beautifully fitted up with mahogany furniture throughout and illuminated by three specially designed lighting fixtures. In the customers' lobby the floor is laid in mosaic with a panel of ceramic tile in the center, and the words "Postal Telegraph" outlined therein.

Directly in the rear of the business office are located the delivery and call-circuit departments, with a rear entrance for the messenger boys. One of the features of the call-circuit department is the

operated clocks, controlled by a Howard master clock, furnish the time service.

Eight hundred and fifty wires enter the building through underground ducts and run through a fire-proof wire shaft to the ceiling of the fourteenth floor, thence on racks hung from the ceiling, to the terminal frames, where they terminate on fuse-blocks equipped with two-thousand-volt fuses and arresters with ten-mil mica separators. Fire-proof equipment is used wherever practicable in the oper-

ating department. The switchboards, terminal frames, repeater tables, operators' sittings, type-writer lockers and concentration cabinet are all built of metal and finished in olive green.

The main switchboard frame is built of iron in six sections. Four of these are assigned to main-line wires, and each section is equipped with a fifty-wire slate terminal board, with two rows of spring jacks, fifty jacks in each row, and a pin jack panel of four rows of fifty jacks each. The legboard section has two panels of fifty spring jacks and one hundred pin jacks each and one panel of five rows of fifty pin jacks each. The remaining section has eighty new type city board units and one panel of four rows of fifty pin jacks. All of the switchboard and jack panels are of Monson slate, while the city board units are mounted on unglazed porcelain, finished in japan.

Directly in the rear of the switchboard are located the terminal frames and generator plant. There are three 110-385-volt, three 110-240-volt and three 110-100-volt motor-generators, and two Needham motor blowers. The machines are set on concrete benches, with control panels mounted above them. Ample space is provided for the stor-



FIG. 2—RECEIVING DEPARTMENT.

age of spare armatures, etc., underneath the work bench.

All of the local circuits are supplied direct from the electric light company's main leads through resistance coils. In the 150-ohm sounder circuits there are 2,000-ohm Ward Leonard snap coils, and in the multiplex local circuits, 1,500-ohm coils. The office cables and potential leads are lead covered and laid in two-inch iron conduit underneath the floor.

There are two separate steel wiring cabinets under each table: one for the potential leads and 110-volt local feeder, which also contains the fuses and resistance coils, and the other for the office cables. All of the office cable used throughout the plant is No. 18 B. & S. enamelled copper wire, with silk and cotton covering and encased in a lead sheath. All of the table wiring is done with standard flame-proof No. 16 B. & S. office wire.

The multiplex equipment consists of nineteen quadruplexes, eight duplexes and twenty-one single repeaters wired up on seventy-six sections of repeater tables. These sections are built of pressed steel, with wooden shelves.

In the center of the room is located the routing desk, upon which are the terminals of the pneumatic tubes and kickback carriers. Four pneumatic tubes operating on the pressure-suction system, with timing-device control, connect with the business office and delivery department. There is also a tube service between the front counter and the delivery department. Four pairs of kickback carriers radiate from the routing desk to the main



FIG. 3—PUBLIC ENTRANCE TO OFFICE.

switchboard, service department, Pennsylvania Railroad ways and through divisions. The incoming carriers deliver their traffic into a common hopper in the center of the routing tables.

Adjoining the routing table is the concentration cabinet, wired for 120 lines and ninety operators' positions, and so arranged that it can be handled by one or two monitors, as the traffic demands require.

The operators' positions, 113 in number, are located on the north side of the room, in front of the concentration unit. The tables are of special design, twenty-four inches wide, and built of angle iron, with sectional oak tops. Each operator has a working table space of thirty-five inches long by twenty-four inches wide. The use of this type width table permits the check to distribute and collect traffic without interfering with the working operators, thereby avoiding annoyance and possible errors.

Another feature that greatly adds to the comfort of the operators is the grouping of the typewriter lockers along the wall, instead of placing them under the operating tables between the sittings. Ninety steel lockers are provided for the force and they are arranged three tiers high.

All of the Pennsylvania Railroad way wires terminate in a thirty-wire selector cabinet, which provides a selector, signal lamp and cut-in jacks for each circuit.

Four Morkrum printers are also included in the equipment.

The telephone room is fitted up with both Bell and Keystone private-branch exchanges and tables for the use of the telephone clerks in transmitting and receiving telegrams. Twenty-six extension sets connect all departments with the exchanges.

The plans for the new office were prepared by division electrical engineer J. P. O'Donohue, and approved by electrical engineer M. M. Davis.

Mr. D. H. Gage, of the electrical engineer's department, New York, had direct charge of the installation of all of the equipment, and he was ably assisted by the local forces under manager J. H. Wilson, cable foreman Jos. Eder and mechanic F. D. Bourke. City foreman Wm. Fitzgerald handled the American District Telegraph installation.

Following is the Philadelphia personnel: C. E. Bagley, superintendent; J. H. Wilson, manager; Chas. Meyer, cashier; E. W. Miller, chief operator; M. A. Baker, wire chief; C. S. Almes, assistant wire chief; C. A. Currier, quad chief; M. N. Redding, traffic chief; W. P. Bowers, assistant traffic chief; R. L. Massey, assistant traffic chief; J. A. McNicol, night chief operator; F. K. Holtzinger, night wire chief; E. H. Locke, night traffic chief; F. P. McElroy, all-night chief; John Gorsuch, district foreman; Wm. Fitzgerald, manager American District Telegraph and city foreman; Wm. Miley, manager messenger department; A. F. Reed, night manager messenger and district department.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

Is the continuity of the current ever broken on a multiplex circuit—that is, a duplex, quadruplex, etc.?

What led to the invention of the Stearns duplex?

If the coils of an electromagnet are wound with two separate wires and equal currents are sent through the coils, but in opposite directions, what is the magnetic effect upon the cores of the instrument?

Why is german silver used for the resistance coils of a rheostat?

Is the entire resistance wire of a rheostat wound on one spool, or subdivided into several spools?

How are the resistance coils connected together?

Why is the resistance of a rheostat divided into sections?

How are the different sections cut in and out of circuit?

In the operation of a duplex, is the circuit actually broken when transmitting messages?

If the continuity of the circuit were actually broken, would the duplex work? If not, state the reason why.

How is the main line of a duplex kept constantly closed? Explain how an instrument can be made to work with the current on the line unbroken.

How is the home current prevented from magnetizing the home relay?

Study Fig. 17 (page 43), which is a theoretical diagram of the Stearns duplex.

How is the Stearns duplex balanced?

What is the object of balancing a duplex?

What is a polar duplex and in what respect does it differ from the Stearns duplex?

Does the Stearns duplex work satisfactorily in wet weather? If not, give the reasons why.

Is the polar duplex immune from the effects of line escapes in wet weather?

Study the principles of operation of the polar duplex, as presented in Fig. 18, on page 48.

If an outgoing current flows through the coils of an electromagnet from left to right, which end of the magnet will become the south pole?

If the current entered the magnet in the reverse direction, would it have any effect upon the sign of the poles?

What is the name of the instrument used to reverse the polarity of the sending current?

How often does this reversal of current take place?

Referring to Fig. 18, on page 48, how many main contact points has the instrument, and are they of the same polarity?

(To be Continued.)

The Barclay Printing Telegraph System.

A new edition of "The Barclay Printing Telegraph System," written by Mr. William Finn, the well-known telegraph engineer, has been published and is now obtainable. This book gives a very complete description of the Barclay system, and has been reproduced to meet the constant call for information on the subject. It is well illustrated and is printed in clear type on finely finished paper. Every telegrapher should be familiar with the system. The price of the book is only fifty cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

BAND-STAND ON INSULATORS.—A band-stand erected at Tent City, San Diego, Cal., is supported on 860 telegraph insulators, with the idea of doing away with vibrations. It is thought that the sound of the music will carry further.

Screened Cable Conductors and Their Application in Telegraph Service.*

BY R. E. CHETWOOD, PLANT ENGINEER, THE WESTERN UNION TELEGRAPH COMPANY, NEW YORK.

For a number of years it has been realized that the amount of cable which must be placed in important circuits of the railroad and telegraph companies would constantly increase regardless of all efforts to maintain these important circuits comparatively free of cable. City and municipal ordinances requiring the taking down of open wire construction and the replacement of it with underground conduit and cable construction is one reason for the increase in the amount of cable.

Another reason for an increase in the amount of cable in long haul circuits is that in the neighborhood of large cities such as New York, Buffalo, Cleveland, Chicago, St. Louis, Kansas City, etc., it is becoming increasingly difficult to carry pole lines into and through these cities on account of congested railroad conditions.

For these reasons it was decided by the Western Union Telegraph Company a few years ago to make a complete investigation of the effects of cable on telegraph transmission, especially in connection with high speed automatic systems of telegraphy, with a view to determining the most economical type of cable to be used in telegraph service.

At the outset of the investigation it was well known that the presence of cable in important high speed circuits seriously reduced their efficiency. It was known that the rubber insulated and paper insulated cable that had been placed in circuits between New York and Chicago had gradually lowered the speed on these circuits. Records showed that the speed in cycles per second on circuits used in Wheatstone service between New York and Chicago had decreased from approximately seventy-five cycles in the year 1893 to thirty-five to forty cycles in the year 1910. This reduction in speed in a general way was known to be due to the high resistance and capacity of wires in cable compared with open wire construction and to the induction between telegraph circuits in the same cable when such circuits were used in high speed automatic service. It was also known that where railroad telephone and train dispatching circuits were carried in the same cable with high speed automatic telegraph circuits, there were disturbances of considerable magnitude induced on the telephone circuits. The railroad companies were gradually increasing their telephone facilities by the stringing of additional physical circuits and by the phantoming of existing physical circuits and as, in general, it is economical to carry as many circuits as possible in one cable it was most desirable that investigations be made to determine the type and character of cable which could be best used in general service.

The author then described the tests made to determine the effect of cable on telegraph circuits and

to obtain data from which to design a type of toll cable that would most satisfactorily meet the requirements of the various telegraph and telephone services of the telegraph and railroad companies.

The results of these tests were thoroughly analyzed and studied and the following general conclusions drawn:

1—Increasing the operating voltage approximately 40 per cent only gives an increase in speed of approximately 10 per cent when operating plain differential and only 6 per cent increase in speed when inductance and capacity is inserted at the apex of the circuit. By the application of inductance and capacity at the apex of the differential duplex, a large percentage of the induction on adjacent telephone circuits in a cable can be eliminated when the telegraph voltage does not exceed 170 volts. The introduction of the capacity and inductance, however, decreases the speed at which the circuit can be operated telegraphically.

2—Operating under the best conditions of apparatus and instrument adjustment and transmitting under like conditions, a commutator transmitter somewhat similar to the distributor used in the new Western Union multiplex, will give a slightly higher average speed than that obtained with a Wheatstone transmitter.

3—The substitution of No. 13 gauge conductors for No. 16 gauge conductors or the substitution of No. 10 gauge conductors for No. 13 gauge conductors, does not greatly increase the speed or telegraphic efficiency of the circuit. Under best conditions, replacing a No. 16 gauge cable conductor with a No. 13 gauge cable conductor increases the speed roughly 10 per cent, while the actual value of the cable conductor was approximately doubled. With circuits as ordinarily made up of open wire and cable, doubling the size of cable conductors will give still less increase in speed.

4—The tests showed that most of the induction on the cable circuits due to telegraph operation is electrostatic and not electro-magnetic and the conclusion drawn from the tests was that approximately 90 per cent of the induction was electrostatic and approximately 10 per cent electromagnetic.

5—The speed at which automatic circuits can be operated in a cable is considerably reduced unless special precautions are taken to minimize the effects of induction. In the length of cable under consideration, namely twenty-eight miles, the maximum speed of transmission would be reduced from 25 per cent to 50 per cent, depending upon the number of other circuits operated and their relative location with respect to each other if special precautions were not taken to minimize the induction.

6—Grounding one wire of a pair in the cable when the other wire was being used in high speed service decreases the amount of interference to and from other circuits. In general, the amount of interference is decreased to the extent that a speed approximately 30 per cent higher is obtained than otherwise would be the case.

From the results of these tests, together with data obtained from the British Post Office, it was

* Abstract from paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, Rochester, N. Y., June 22.

decided that the proper type of cable for telegraph service, where high speed automatic circuits were involved, would be to place a metallic wrapping around each pair rather than around each single conductor, and to take care of the induction between wires of a pair by means of an anti-induction device described later. This method would provide freedom from induction between wires composing a pair and between screened and unscreened pairs and at the same time would decrease the cost of construction considerably. The screening of the pairs in this manner, of course, would also eliminate the induction on unscreened pairs in the cable which might be used for telephone service. Our calculations and tests showed that cable made in this manner could be used for phantom telephone circuits whether loaded or unloaded and for high speed automatic circuits without serious effects from induction. The decrease in telegraphic efficiency of the circuits from causes other than interference due to induction, namely due to the high resistance and capacity of cable conductors compared to open wires, would not, of course, be affected.

Tests made with the anti-induction device previously referred to showed that the two wires in a screened pair could be used in high speed automatic service without mutual interference. This anti-induction device briefly consists of a condenser in series with a resistance and connected between the heads of the artificial lines of the duplex sets connected to the circuits. Its action is to induce on the local side of the differential relay in the duplex set a current equal to that in the line side of the relay due to induction along the wire. Since the magnetism in this relay is proportional to the difference of currents in the two sides, it is evident that the device practically neutralizes the unbalance which would otherwise occur.

From the experience so far obtained with screened cable conductors in actual service, it appears that their use is the only practicable method of eliminating interference between wires in a cable when certain of the wires are used in high speed automatic service, and the length of the cable is considerable. Where the length of cable is not very great, screened pairs are unnecessary and cannot be justified from a service or cost basis.

While the use of screened cable pairs will reduce the trouble due to mutual interference between circuits, still the effect of the high resistance and high capacity of cable conductors compared with open wires on pole lines is most detrimental to service, and this serious effect cannot be overcome by any reasonable increase in the size or gauge of the cable conductors.

AN ELECTRICAL MOSQUITO EXTERMINATOR.—An electrical engineer has discovered that mosquitoes are attracted by a certain note in harmonic telegraphy. He covered the machine with fly-paper and the mosquitoes were lured to their death by the musical note. He has also found a way to electrocute the insects by using the same note.

The Audion Amplifier.

BY A SUBSCRIBER.

I have read, with much interest, the article in your journal of July 1, in reference to the "Audion Amplifier." As "amplifiers" seem to be in vogue just now, it may be of interest to your readers to learn that there is another in the field, termed by the inventor an "amplifying telephone receiving instrument," for which the following features and advantages are claimed, namely: That it has no electromagnetically operated parts; is non-adjustable; is of small size; of low cost; is operative interchangeably on circuits differing in length; is operated inductively and does not require an auxiliary or local battery in its operation, and, therefore, the first cost of battery is saved, and there is no cost for maintenance; is readily and easily installed in circuit in place of the usual magneto telephone receiver, and requires no attention thereafter.

That in its use the present telephone systems and the apparatus used therewith are not in any way interfered with;

That no changes are required in the circuits; in or at the switchboards; in or of the transmitting or signaling means, nor in the current-energy now used in telephoning;

That, with its use, the reliability and loudness of the receiving is greatly increased on any circuit where the usual main-line receiver operates more or less satisfactorily, and, that it reproduces the spoken messages clearly and with certainty on circuits where the receiver used in the main-line circuit is barely audible and uncommercial.

This is seemingly a scientific achievement in the right direction, and an improvement that should be of interest to anyone engaged in the telephone industry.

English vs. American Telegraph Service.

In the consideration of government ownership of the telegraph, some of the many conveniences and advantages enjoyed by the American public should not be lost sight of. In England, for instance, every word in the address and signature is charged for—an average of fourteen words per message—which the American companies send free. In England, telegrams must be sent to the telegraph office; in the United States, messengers may be called free of charge. In England, all messages must be paid for when handed in over the telegraph counter; in this country, accounts may be opened.

Some foreign governments even charge for telegraph blanks, and there are no telegraph offices in hotels. The courts refuse to recognize any legal liability whatsoever in regard to errors and delay in the transmission of a telegram. The telegraph and telephones abroad do not help to support the government, as they are free from taxation, and there is no redress whatever in case of error. It is a case of what are you going to do about it?

How would the American public relish such restrictions? They are totally foreign to the American spirit.

Lieut. Greely and His Patent Insulator.

A good story is told of the experiences of the late General A. W. Greely, at one time chief of the Signal Corps, U. S. A., with a patent telegraph insulator.

Lieutenant Greely—he was a plain lieutenant then—went to Texas in November, 1875, to build a telegraph line to San Antonio from Fort Brown. He had an insulator which he and other experts had gotten up in Washington especially for this line. It consisted of a well-lacquered sheet-iron cap over a dry wood screw and had the general appearance of a tomato can on the end of a broomstick, when in position.

The line was built 400 miles and for two weeks or a month it worked like a dream. Suddenly warm weather set in, and when warm weather strikes lower Rio Grande it takes hold for keeps. The thermometer crawled up to 100 and after several weeks of this spell the line began to get mysterious kinks in it. There was trouble somewhere and plenty of it. The line was not down, but it seemed to have its grip on all through messages. San Antonio had to do all its business with Fort Brown by relaying at Laredo. In a few days Laredo could only telegraph as far as Ringgold Barracks, south, or to Fort Clark, north, and through messages from San Antonio to Fort Brown had to stop off three times en route and take a rest. At the end of the week the trouble was worse, yet Lieut. Greely sent couriers galloping down the whole circuit. They could not find a place where the wire was down or in contact with trees or with anything else, but they reported something queer with the "insulators." Lieut. Greely was wild with indignant surprise. The idea of an insulator going wrong which had been concocted in Washington especially for Texas. Still the telegraph line was not working any better as a telegraph line than as a fish line or a clothes line, so he borrowed a mule from a quartermaster and started out to investigate. He came back in light marching order that evening with a sad secret in his heart, several lumps on his countenance and minus the wayward army mule.

The simple truth was that the Texas hornets, which are lazy beasts, thought the new insulators were a shelter kindly provided by the government for their special use and had gone to work and filled every blessed one of them from San Antonio down with mud, sour honey and general cussedness and the line was literally 400 miles of Hades in active eruption. Lieut. Greely wrote to Washington experts, who promptly got a new breed of insulators, solid as a brick and burglar proof. They were shipped and Lieut. Greely induced a gang of unsuspecting linemen to sign a cast-iron contract to take the old insulators off. The "repairing" party left Fort Brown on April 10. By this time the hornets had raised an uproarious family in each insulator and the first lineman who shinned up to serve the writ of ejectment got a dose of trouble that made his hair curl, and in his haste down let the pole slip up through his hands burning them, besides taking all the buttons off his clothes. The way the hornets expressed their opinion of signal service hospitality

was sinful. It cost the contractor forty-six able bodied men, nineteen barrels of bread poultice and a cask of refined arnica to "repair" the first eight miles, and operations ceased. When the linemen got so they could see well enough out of one eye to shoot they went gunning for Lieut. Greely, but he had already fled the state in a blue fog, and the next that was heard of him he had barricaded himself somewhere in the neighborhood of the North Pole. The line remained in an active and warlike status until winter and the telegrams were forwarded by the aid of a slow but persevering mule. After the first blizzard had calmed the hornet families into solid lumps the contractor resumed his labors and recouped his loss by shipping the insulators to Baltimore for canning clams, and seven dozen crates of assorted stings to England for sale as sewing machine needles.

High Speed Telegraphy.

The *Elektrotechnische Zeitschrift* of Berlin, Germany, recently published an article on high-speed telegraphy, by Otto Arendt.

It is no longer correct, the author states, to distinguish the two types of high-speed telegraph systems as machine telegraph systems and multiplex telegraph systems. The former system has not been restricted to the substitution of machine work for manual work, and the latter system has not been restricted to endeavors to utilize the line to the utmost by suitable connections of different sets of apparatus to the line. The advantages of either system must have been made use of by the other as far as possible. The distinguishing feature now is that in the one type of system one single transmitter supplies in succession the telegrams to their receivers (simplex high-speed telegraphy), while in the second type of system several transmitters in succession and in regular repetition are connected through the line to their corresponding receivers for short periods in which always one signal is transmitted, so that several telegrams are transmitted at the same time (multiplex telegraphy). The author compares both systems as to their advantages and disadvantages in practice. He finds that the multiplex-telegraph system may transmit more quickly a single telegram under certain conditions, while the simplex-telegraph system permits sending more dispatches in the same time.

TERRESTRIAL MAGNETISM.—The United States Coast and Geodetic Survey, Department of Commerce, has issued as Serial No. 3, Special Publication No. 25, a quarto pamphlet of 69 pages entitled "Results of Magnetic Observations Made by the United States Coast and Geodetic Survey in 1914," by D. L. Hazard. This publication contains the results of magnetic observations made on land and at sea during the calendar year 1914, together with descriptions of the stations occupied. The volume will be supplied without charge to persons interested by application to the Division of Publications, Department of Commerce, Washington, D. C.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 are for sale at the office of this Journal, 233 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, 1915.

Telegraphy an Honorable Occupation.

The telegraph profession of to-day is largely made up of men of honor and worth, who, in many instances, are identified with the welfare and material progress of the communities in which they live. Those who reside in the smaller towns and cities of medium size are men of standing and often leaders in society and business; but when we consider the large cities we meet with a floating body of telegraphers who have no particular aim in life and no anchorage. In some of the larger cities this roving element forms a small proportion of the whole body. The telegraph profession offers unusual opportunities to young and adventurous souls to see the country and they take advantage of the chance. This class of telegraphers, however, is small, compared with the whole, even in the large cities, so care must be taken not to assume that because a few are afflicted with wanderlust all are. In the large offices are found a considerable proportion of the members who have high and honorable standing in their respective communities and who have made the best of their opportunities.

We have lately made a careful analysis of conditions in New York City and we find that there are fully thirty per cent of the operators who could

retire if they chose to live modestly for the remainder of their lives. Fully 60 per cent are systematically saving a portion of their salaries, so that they are well on the road to independence. About 20 per cent live up to their income, and when the day of adversity overtakes them, they find themselves compelled to borrow money, which is, usually, the beginning of a great deal of worry and financial trouble that could have been avoided if they had exercised better judgment in the management of their incomes in previous years. Five per cent of the operators might be classed as living beyond their incomes at all times and in debt most of the time. However, this class is rapidly diminishing, largely, no doubt, through the instrumentality of the officers of the various associations—mutual benefit, loan and social, who exercise, at all times, an influence for the uplift of the members of the craft.

Improved Telegraph Key.

A modest but very essential part of a telegraph key has recently received the attention of a prominent manufacturer of telegraph apparatus and really improved.

The little platinum contact points, which have frequently been charged with being the cause of bad sending and been pounded into a shapeless mass by glory-seeking young operators, are being displaced by tungsten, which is taking a very prominent place in the manufacture of electrical devices.

Tungsten, which is a metal, used as key points, has proved to be a distinct advance in key construction. The points never stick or corrode and they are practically indestructible. They are, moreover, much cheaper than platinum points, which is an important consideration with telegraph companies.

Few know that the platinum used in keys is one of the most expensive items of cost in manufacture, the value of the metal required for each key being, at present, between forty and fifty cents for standard requirements.

Tungsten points can be made for less than one-half the cost of platinum, and this price will, no doubt, be reduced with improved methods of manufacture.

How to Succeed.

Many men spend much time, thought and substance in devising schemes to get something for nothing, but they finally fail; it cannot be done honestly. This applies as well to the acquirement of knowledge. No one can learn anything without using the brain, and studying. Every successful man has attained his success mainly by study, and technical men all agree that to acquire all the information in a book or an article written by an authority the writings must be read, re-read, studied, re-studied and then studied some more. Each time a published work is read new ideas and important facts are revealed which cannot, by any possible means, be acquired by one superficial reading. Success in any line of activity is attained only by hard work and persistence. There is no "just as good" and easier way.

The Good of Telegraph Tournaments.

Do telegraph tournaments accomplish any lasting good to the telegraph profession? is a question that is frequently asked at times like the present, when active preparations are being made for an event of this kind at the Panama-Pacific Exposition in San Francisco. This question is like any other, in that it can be answered in the affirmative or in the negative, according to the viewpoint of the individual. For our part, we positively believe that tournaments are beneficial in their effects, and we base our opinion on these two facts: First, that they create a spirit of enthusiasm among operators, which is always desirable, and, second, that they establish standards of performance which the younger and ambitious members of the profession naturally strive to attain or excel. Every employee possessed of enthusiasm takes an interest in his work, and if he enjoys renown for skill he will jealously guard his reputation and not allow it to become tarnished through neglect.

It is quite clear that in order to achieve the most satisfactory results, tournaments should be held under uniform conditions, in order that the work of one may be compared with the records of others, otherwise there would be no possible way of ascertaining whether any progress is being made over former efforts. The essential thing in tournaments is to use in all the same copy for transmission, as far as possible. This at once gives a basis for comparison. A tournament conducted along independent lines, with no relation whatever to the methods and materials employed in former contests, would be useless as far as practical results are concerned, for no lessons could be derived therefrom. Perfect and rapid Morse might be prominent characteristics of such a tournament, but who could tell whether it was any faster or any better than the record if it could not be compared, in every detail, with that record? All progress in the world is judged by comparison with things we already know.

The use of the same matter over and over again is perfectly fair, but to introduce new matter in each tournament would be the reverse. By examining the records of previous tournaments where new matter has been introduced, those who were called upon to send it first simply blazed the path for those who were to follow. The winners of the prizes were among the last senders, because they had become familiar with the matter at the expense of earlier senders, and had that much more advantage over the latter. The remedy for this is not to let the contestants hear the matter being sent, but this, of course, is a practical impossibility under ordinary conditions.

In our July 1 issue we printed a list of the events to be held at the San Francisco tournament, which will take place August 27 and 28.

In regard to Mr. McClintic's communication in the previous issue, Mr. A. S. Weir, of Philadelphia, writes:

"For the good of future telegraph tournaments, rather than to enter into personalities, I deem it my duty to challenge Mr. F. M. McClintic to prove the charges he makes against the management of the Philadelphia Tournament Association, of which

I was chairman of the committee on prizes, and not chairman of the executive committee. The article which appeared in TELEGRAPH AND TELEPHONE AGE of July 1 contains many statements that have no real foundation, and would pass unnoticed by me were it not for the fact that his excuse for the loss of the Carnegie medal would find lodgment with contestants at the forthcoming San Francisco tournament.

"I repeat that the Philadelphia tournament would be well worth patterning after."

Telegraph Oddities.

A writer has suggested that we keep a permanent heading standing regularly in our paper, reading as follows: "Another Gold Medal Awarded to Thomas A. Edison." He adds, "Comment is unnecessary." We presume that Mr. Edison has so many gold medals presented to him by governments, societies, associations, exhibitions and individuals that he is perplexed to know what to do with them. The writer concludes that it would be a good idea for Solomon Isaacs to establish a branch of his pawn brokerage concern adjoining Llewellyn Park, West Orange, where Mr. Edison resides, for the purpose of having a handy and safe custodian for Mr. Edison's gold.

A judge has just decided a case for damages against a telegraph company for the delay in the delivery of a message which caused the recipient to remain in Memphis forty-eight hours longer than necessary. The judge decided that it was worth \$7.15 to remain in that beautiful city forty-eight hours and that is the amount of the damages awarded. The telegraph company proposes to appeal the case on the ground that it was not worth more than \$1.15 to remain in Memphis forty-eight hours.

An Interesting Document.

An old requisition for line material was recently found among the records of a Western Union official and sent by Mr. W. J. Lloyd, general manager of the Mountain Division, Western Union Telegraph Company, Denver, Col., to colonel R. C. Clowry, New York, by whom it was signed in 1869. It throws some light on line troubles in the West in the early days. The requisition is dated St. Louis, January 18, 1869, and colonel Clowry was then superintendent of the second district, Central Division. It calls for 1,600 insulators to repair lines damaged by buffaloes rubbing and scratching against the poles and breaking down the lines.

Incidentally, some one suggested as a remedy that spikes be placed in the poles. This proved attractive to the buffaloes and they all wanted to scratch their backs against the spikes, with the result that every spiked pole was torn down.

Mr. J. M. Barnes, of the Canadian Pacific Railway Company's Telegraph, St. John, N. B., writes: I renew, with much pleasure, my subscription to TELEGRAPH AND TELEPHONE AGE for 1916. I am looking forward to another year of much useful information.

Ohm's Law and Electrical Measurements.*

BY JOHN F. SKIRROW, ASSOCIATE ELECTRICAL
ENGINEER, POSTAL TELEGRAPH-CABLE
COMPANY, NEW YORK.

When it is desired to calculate the flow of water through a pipe it is necessary to know the size of the pipe and the pressure used in order to determine the volume that will flow in a given time. Similarly, before establishing telegraph circuits calculations are made to show the amount of battery, size of wire, etc., needed. It is desirable, therefore, to know how to measure electricity so that we can make these figures. These calculations are simple and easily understood, so do not shy off at the formulæ given—they are not algebra.

Let us first consider the various electrical factors we must measure, and their names. First, there is the volume of current required.

We call the unit of volume of current an ampere. Second, there is the resistance offered by the wire to the passage of the current. The unit of resistance is the ohm. Third, there is the pressure needed, or voltage, as it is called. The unit of electrical pressure is the volt.

Various instruments are provided for measuring these units, the ammeter for amperes, the voltmeter for volts, and the Wheatstone bridge and other instruments for measuring ohms.

We find that the voltage of a single cell of gravity battery is about one volt. We also find that about one-fifth of an ampere of current flowing through a standard Postal ten-ohm sounder will operate it, and that a piece of ten-gauge copper wire one thousand feet long measures about one ohm.

Now Ohm's law says that if we have any two of the three factors stated, viz.: volts, ohms and amperes, we can find the third. Thus if we know the voltage and resistance of any circuit we can find the amperage or current flowing, or if we know the resistance in ohms and the current flowing in amperes we can figure the voltage. Similarly, if we know the voltage and the amperage we can figure the resistance of the circuit in ohms. Let us designate the current or amperes flowing as I , the voltage (sometimes called electromotive force) as E , and the resistance in ohms as R .

The rule is that $I = \frac{E}{R}$

$$R = \frac{E}{I}$$

$$E = I \times R.$$

Suppose we give each letter a numerical value, thus: $I = 6$, $E = 12$, and $R = 2$.

If we say $6 = \frac{12}{2}$, and $2 = \frac{12}{6}$, and $12 = 6 \times 2$, this looks simpler than the lettered formulæ and expresses the idea.

Let us apply the rule: We have a circuit which measures 200 ohms resistance, and which requires one-fifth of an ampere of current to operate a sounder in it satisfactorily. How many volts are needed to give this result? The current I ($\frac{1}{5}$) $\times$ by the resistance R (200) = the volts E , or 40. We therefore need 40 volts, or say about 40 cells of gravity battery on such a circuit.

If we have 100 volts on a wire which measures 1,000 ohms, we know that the current in amperes

$$\text{will be } I = \frac{E (100)}{R (1,000)}, \text{ or one-tenth of an ampere.}$$

Similarly, if we have a line that has had 150 volts pressure and three amperes of current flowing, we

$$\text{know that the resistance must be } R = \frac{E (150)}{I (3)},$$

or 50 ohms.

In telegraphy the volume of current used is so small that for convenience the term milliampere is used, meaning one-thousandth of an ampere. Thus we say 200 milliamperes instead of one-fifth of an ampere, and so on. Telegraph main line and local circuits work on currents of from 25 to 250 milliamperes, depending upon the kind of instruments used and the size and length of wire used in winding the magnets of these instruments.

When we know the strength of current required to satisfactorily operate any instrument we can, by the use of Ohm's law, decide upon the kind and size of wire to use in the circuit according to its resistance, and the voltage (number of battery cells) needed to do the work.

To measure the quantity of electrical energy used upon a circuit we multiply the amperes by the volts and call the product "watts." Thus a current of 50 amperes with a pressure of 100 volts would give 5,000 watts consumption. Because the figures are too big to handle conveniently, the term kilowatt (abbreviated to K. W.) is used for 1,000 watts, and when speaking of the consumption of electrical energy of 5,000 watts for one hour we call this 5 K. W. H. The H for hour is sometimes dropped out, it being understood that the unit of time of measurement of kilowatts is by the hour, so that energy consumed is referred to by the kilowatt, and is measured by meters, and billed at so many K. W.'s, when purchased from the power or lighting companies.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. 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.

* From Postal Telegraph.

Censorship of Railway Messages.*

BY W. H. HALL, GENERAL SUPERINTENDENT OF TELEGRAPH, MISSOURI, KANSAS AND TEXAS LINES,
DENISON, TEX.

The author introduced his subject with a reference to his efforts to eliminate unnecessary telegraphing on his company's lines.

"We tried the plan," he said, "of having our managers send in messages which in their opinion contained superfluous words, then we drew rings around these words or rewrote the telegrams and filled out a printed form that we had, calling the attention of the writer to the unnecessary words or other infraction of telegraph department rules, and endeavored in this way to obtain an improvement. We accomplished very little with that system of handling.

"In August, 1912, my attention was called to a file system which I believe was then in use on the Santa Fe, which consisted of a symbol letter and file number being placed at the end of every telegram. I thought this an improvement over every other telegraph file reference, and in that month I issued a circular letter to agents and others concerned giving instructions as to its use."

The instructions in part are as follows:

"Select a letter which is not likely to be misread in telegraphing and affix to each telegram sent, this letter followed by a number, the letter and number serving the purpose of identifying the telegrams. For example: An agent wires the general freight agent as follows:

"Quote rate carload household goods to Allegheny, Pa. A-1."

"The general freight agent, who is also observing the plan, will reply as follows:

"A-1. One dollar eighty cents cwt. F-15." The F-15 being used to identify the general freight agent's telegram.

"All telegrams sent should be numbered consecutively, commencing with number one and may run as high as number 999, when the renumbering may be started again at number one.

"In addition to this," the author continued, "a letter was written to the head of every department calling their attention to the large amount of unnecessary telegraphing and asking their co-operation in our campaign to effect a reduction.

"In going through the files of one of our relay offices recently, I did not find but four or five messages in a day's business that did not end with a symbol letter and file number. Even the roadmasters, bridge foremen, and other employes that are out on the road a great deal, use this system.

"I have always believed that all of the telegraph codes in use were too voluminous, and entirely impractical for general use. My idea has been that a thoroughly practical code should not consist of over two hundred sentences."

Mr. Hall then gave the code used on his road.

"By the use of our symbol and file number at the end of telegrams and this code we have been en-

abled to reduce our telegraphing about fifty per cent," he said, "and messages have been shortened until the number handled by each operator is greatly in excess of what it was formerly. In a recent inspection of one of our relay offices, I found several instances where operators had handled an average of eighty-five messages per hour. A large number of these, however, consisted merely of the symbol letter and file number and two or three words.

Mr. Hall then described the "Mailgram" system used on his road for communications requiring special attention but which should not be handled by wire. Continuing, he said:

"We also have on our line a system of telegraph reports covering fast freight. The office of the superintendent of transportation is closed from 5:30 p. m. to 8 a. m., and by getting out special instructions to offices within a radius of four hundred miles we have been enabled to mail these reports in on night trains instead of sending them by wire, and thereby reduced our telegraph force at the point where the superintendent of transportation is located and have relieved the telegraph force at a large number of other offices.

"I believe that the telegraph has its place on the railroad," said Mr. Hall, in conclusion, "that it is not proper to arbitrarily reduce force or abandon telegraph facilities to such an extent that it cripples the service. I believe that it is nearly a universal practice on railroads to abuse the telegraph service by handling business by wire which could just as well be handled by mail. It is our purpose to endeavor to follow a middle course; to handle business by wire with dispatch which requires immediate attention and to insist that all business which does not require immediate attention be handled in our mailgram service or by letter."

Electrical Measuring Instruments.

The Bureau of Standards, Washington, D. C., has just issued a second edition of Circular No. 20, referring to electrical measuring instruments. The fundamental principles underlying the construction and operation of commercial electrical measuring instruments are presented, together with such information concerning the advantages and limitations of the various types of instruments as will assist the user in the determination of the general type best suited to a given purpose. The question of sources of error has been treated in some detail. Other related subjects are treated as follows: Current and voltage transformers, which make it possible to measure currents so large and voltages so high as to be out of the range of ordinary instruments; standard apparatus by which ordinary instruments may be checked; and some notes on the design of electrical instruments.

Mr. J. W. Ware, division traffic supervisor, Western Union Telegraph Company, Atlanta, Ga., in remitting to cover his subscription, writes: "I am glad you thoughtfully renewed my subscription. The fortnightly coming of the AGE is like the visit of a congenial friend."

* Abstracts from paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, Rochester, N. Y., June 22.

Primary Battery for Transmission on Train Dispatching and Other Telephone Lines.*

BY G. W. NELSON AND E. E. HUDSON.

The authors gave a summary of data obtained from twenty-eight railway telegraph superintendents out of seventy-five addressed as to batteries used for transmitters on dispatchers' and way-station circuits, for booth telephones and common-battery for several functions at one station. As to battery used on dispatchers' circuits the average life of dry cells on one road is given as fifteen days and that of caustic soda batteries, nine months. Sixteen roads reported using dry cells on way-station transmitters, with a life of from three months to eighteen months. One road reported the life of the soda battery as three years. Twelve roads reported an average life of eleven months for dry cells for booth telephones, pole-box transmitters, etc. Three roads reported favorably on common battery of the caustic soda type for several functions.

Caustic soda cells, the authors continue, are now generally used for dispatchers' transmitter battery, and have been selected for this service because of the reliability, the long life to be obtained without attention, and the uniformity of voltage at the constant discharge rate.

While dependability of operation is essential at all stations, the dispatchers' transmitter is the most important. Caustic soda cells in this service handle the load with no perceptible drop in voltage from the time the cell is set up until it is renewed, notwithstanding the nearly continuous use of the transmitter.

There are, at present, more automatic signals operated by caustic soda than by all other sources of current combined.

Assuming an average current consumption of fifty ampere-hours per year on a way-station transmitter, the life of a battery of 200 ampere-hour cells used only for such transmitter service will be four years on one charge.

Reliability being the first consideration, the use of a dependable battery of relatively high capacity, and of sufficiently low internal resistance to be adaptable to all way-station functions, provides equally efficient and reliable operation of each function for a long period (probably from one and a half to three years) without attention to or renewal of the battery, as contrasted with two or more separate batteries of short or uncertain life, requiring frequent inspection of each set and possible interruptions of service. A battery of small capacity necessarily requires frequent inspection and renewal and is liable to cause interruption of service because of possible sudden failure between inspection periods.

As the cost of inspection and maintenance is made up chiefly of inspectors' or linemen's expenses en route, the use of single battery of high capacity, capable of taking care of all functions at a station for a period of two years or more without

attention or renewal, should possess the essentials of low maintenance cost for way-station use and tend toward ideal operating conditions.

Occasionally there are installations in which emergency battery is desired and the question arises as to whether or not the caustic soda battery can be used in this class of service, and if so, what would be the effect of a prolonged period of open circuit. The action of these cells under these conditions is best shown in their operation in industrial fire-alarm work. A number of states have, in the last few years, established regulations requiring fire-alarm protection in factories. The specifications require caustic soda battery of not less than 300 ampere-hour capacity, the batteries to be in duplicate. This capacity at the discharge rate necessary to operate the relays, etc., specified, gives approximately one year's service from each set, and one battery is ordinarily used until it becomes exhausted. When the emergency battery is put in use, after having been an open circuit for about a year, it properly operates the circuits, having lost none of its capacity because of standing idle.

Caustic soda cells may also be used to advantage on local sounders. For this purpose either a separate battery may be used, or the sounder may be connected to a common battery used for one or more telephone functions.

Cleanliness about a station is a desirable factor. Blue-stone cells, even with the best of care, are, as a rule, mussy, and more or less likely to be neglected by reason of the nuisance of handling and the frequent attention required.

In general, the use of blue-stone cells at way stations is highly uneconomical, because of the conditions under which the material is supplied and used.

The long life of caustic soda cells, together with the fact that there is no loss of capacity while idle, and that no attention is required between renewal periods, make this type of battery highly attractive from the standpoint of convenience, cleanliness, operating cost and reliability.

The advantages of low maintenance cost, freedom of interruption to service for replacement of short-lived batteries, elimination of special inspection trips, with expense incident thereto, and the ability to use a single set of low internal resistance cells for several or all functions at a way station are sufficient in themselves to more than justify the installation of this type of battery for way-station service, but when the character of service is a factor, the most important consideration should be the great uniformity of service because of the constancy of voltage throughout the life of the battery.

Mr. S. L. Robinson, of Petoskey, Mich., an old-time and military telegrapher, for many years a prominent figure in telegraph management at Chicago, Ill., but now retired, in renewing his subscription to this paper for another year, writes: "Your paper is a welcome visitor. It keeps me in touch with old associates and recalls scenes of many years ago."

* Abstract of paper read at the Annual Meeting of the Association of Railway Telegraph Superintendents, Rochester, N. Y., June 22.

Circulation of Telegraph and Telephone Age.

An analysis of the circulation of TELEGRAPH AND TELEPHONE AGE discloses some very interesting facts. We find that we have a liberal list of subscribers in every state in the Union averaging from several hundred in New York City and State to twelve subscribers in Wyoming as well as many subscribers in Alaska. Our circulation is divided about as follows: Telegraph officials and employes, 50 per cent.; telephone officials and employes, 25 per cent.; railroad telegraph superintendents and train dispatchers, 12 per cent.; telegraph and telephone departments of foreign governments, 5 per cent.; miscellaneous, 8 per cent.

Our foreign circulation is as follows: South Africa, 9; New Zealand, 10; Australia, 13; Japan, 18; France, 12; Germany, 14; England, 54; Italy, 3; Switzerland, 2; Sweden, 2; Norway, 1; Denmark, 2; Portuguese South Africa, 1; Spain, 2; Hungary, 2; Austria, 3; Iceland, 1; Argentine Republic, 8; Mexico, 22; Philippine Islands, 36; China, 4; Guam, 2; Fiji Islands, 1; Midway Island, 1; Hawaiian Islands, 4; Java, 1; Cuba, 9; Porto Rico, 3; Jamaica, 3; Peru, San Salvador, Costa Rica, Guatemala and many other Central and South American countries from one to three copies. Several of the cable companies subscribe for copies for all of their offices located in the various countries of the world.

Every railroad telegraph superintendent in America is a subscriber. All officials and a liberal percentage of the employes of the Western Union and Postal Telegraph-Cable Companies in this country and the Great North Western and the Canadian Pacific in Canada are also paid subscribers to our paper. We have also a fair percentage of municipal electricians, wireless telegraph engineers, as well as submarine cable engineers on our subscription list. The American Telephone and Telegraph Company, the New York Telephone Company and all subsidiary telephone companies are also liberal subscribers, copies being forwarded to executive officials and all important offices comprising the various systems.

Many of the railroad companies subscribe for from six to fifty copies to be distributed at division headquarters to chief train dispatchers and to railroad reading rooms where the papers are accessible to employes.

A large number of manufacturing concerns are also subscribers to our paper such as Siemens Brothers, submarine cable manufacturers of London, Siemens and Halske of Berlin, Norddeutsche Seekabel Werke, Nordenham, Creed Bille & Company, London; Donald Murray, London, and many other representative concerns in England, France, Germany and other European countries as well as hundreds of manufacturing concerns in the United States, which not only subscribe for our paper but secure bound volumes each year.

A number of newspaper agencies, domestic and foreign, subscribe for many copies of our paper for delivery to people in America as well as foreign countries. There is no way of absolutely telling the destination of the papers subscribed for by the

various news companies. It would, if it could be obtained, make an additional chapter of this already most interesting story covering our circulation.

In many cases, particularly at cable stations and railroad centers, there are from ten to fifty readers for each copy of the paper. Numerous subscriptions are received from reading rooms located in many countries of the world.

Gift Making.

The following editorial article taken from the *Western Union News* expresses the sentiments of hundreds of telegraph people throughout the country in regard to the growing habit of making presents to officials.

"The occasional presentation to officials by subordinates of gifts testifying to their appreciation and regard is generally dictated by feelings so spontaneous and cordial that it seems ungracious to suggest that there may be valid objections to the practice. That there are objections to these presentations must, however, on reflection, occur to everyone. One of the objections grows out of the fact that however much the recipient may appreciate such tangible evidence of the good-will of those who work under his direction, he cannot fail to be embarrassed by the obligation when in receipt of a valuable present. A sense of such obligation must necessarily make impartial and disinterested action, when it comes in the form of criticism or removal of employes, exceedingly trying and difficult.

"There is another objection which is quite as important. If the custom of giving presents is once established, it is bound to become not a spontaneous but a perfunctory act, uninspired by genuine regard and involving contributions from persons who can ill afford to make them.

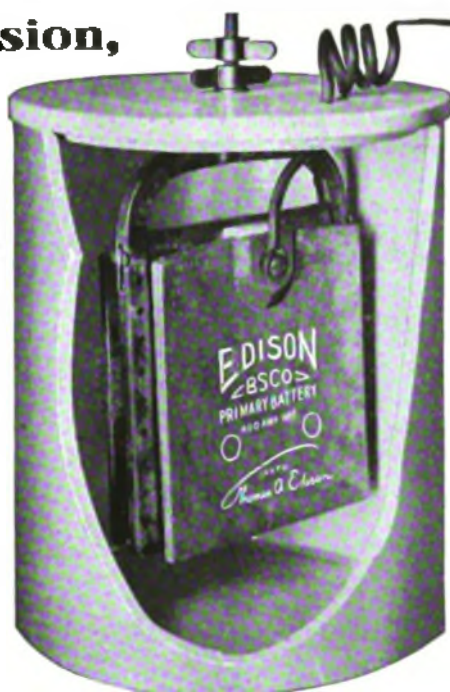
"There are so many ways in which employes can, by their work and their attitude of enthusiasm toward it, and by their helpful bearing toward those whom they happen to work under or be associated with, testify to their good-will, that we are of the opinion that the presentation of gifts can be done away with throughout the service without any loss of that spirit of loyalty to the company and to each other by which alone we can, each of us, personally be successful in our work, and the organization be successful as a whole."

We recently received a letter from a correspondent who stated that one of the employes in his office was continually making presents to a certain official and compelling other employes to contribute against their wishes. The man who was instrumental in starting these subscription lists was the poorest operator on the force, yet he held his position. All agreed that it was through his activity in making presents to his superior that he was able to hold on.

Mr. L. R. Daniel, manager, Western Union Telegraph Company, Augusta, Ga., writes: "Herewith please find my check for \$2.00, covering renewal of my subscription to your splendid paper for another year. I consider value received more than two-fold."

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



THOMAS A. EDISON, Incorporated
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ORANGE, N. J.

DISC TELEGRAPH RECORDS.—Diamond metal 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. Full set, \$8.00; single records, \$1.00 each.

Mr. W. F. Williams, superintendent of telegraph of the Seaboard Air Line, Norfolk, Va., in renewing his subscription, writes: "You please me by renewing my subscription, for really I could not well be without the AGE. I look forward to its appearance with eagerness."

Mr. E. J. Little, superintendent of telegraph of the Great Northern Railway Company, St. Paul, Minn., in remitting to cover his subscription for another year writes: "Enclosed find money order for \$2.00 to renew my subscription. I wish to extend my thanks to you for the prompt action taken in this matter."

Subscribe for TELEGRAPH AND TELEPHONE AGE, \$2.00 per year.

THE CHIEF INSPECTOR

SAYS

**"Our Gill Selectors
Require
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**CORRECT PRINCIPLE
PROVEN BY
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A Significant Fact

Of the three Cables in the Trans-Isthmian Duct Line, one is a paper-lead telephone cable- the other two are **KERITE** (taped and braided)- the Panama Railroad's signal cable, and the Central and South American Telegraph Company's connection between its Atlantic and Pacific cables.

The severity of the conditions and the importance of the service, determined the selection of Kerite for these installations



KERITE INSULATED WIRE & CABLE **COMPANY**
NEW YORK CHICAGO

Gilchrist 80-297

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THE RAILROAD.

TELEPHONE DISPATCHING ON GRAND TRUNK.—A telephone train dispatching system has been installed over the whole of the Grand Trunk Railway's main line. Portable telephones are carried on each train, placing the train crew in touch with dispatchers at all times and places.

B. B. Adams, Former Operator, Now Associate Editor of Leading Railway Journals.

Mr. Braman B. Adams, associate editor of the *Railway Age Gazette* and of *The Signal Engineer*, was born at East Brookfield, Mass., in 1851. He was educated at Monson (Mass.) Academy, and entered the railway service in 1865 on the Western Railroad, now the Boston and Albany. For a few months, in 1870, he was an operator at 145 Broadway, New York; but, aside from this, was in the railroad service from 1865 to 1887. On the Boston and Albany he served successively as clerk, telegrapher, yardmaster and freight and passenger agent. He was station agent at Westfield for fourteen years, resigning that position in 1886 to become associate editor of the *Railroad Gazette*, now incorporated in the *Railway Age Gazette*. He was author of "The Block System," a book on block and interlocking signals, published in 1902, and, in the years 1907-1912, was a member of the block signal and train control board of the Interstate Commission, a temporary body, which, on behalf of the government, investigated railroad signaling throughout the United States and Europe.

J. F. Mackie, Secretary-Treasurer, Train Dispatchers' Association.

Mr. John F. Mackie, secretary-treasurer of the Trains Dispatchers' Association of America, and editor of the *Train Dispatchers' Bulletin*, has occupied the position of secretary-treasurer for twenty-one consecutive years, and that of editor for twenty-three years. He first entered the railroad service in 1858 as relief agent and operator on the Grand Trunk Railroad. In June, 1861, he went with the Erie Railroad and remained in the service until May 1, 1872, as operator and ticket clerk, train dispatcher and station agent. He joined the New York and Oswego Midland, now the New York, Ontario and Western, in 1872, as chief clerk to the division superintendent, becoming division superintendent of the northern division in 1873, and in 1876 was appointed general superintendent. After occupying train-dispatching positions on other roads, he took a position in the general office of the Chicago, Rock Island and Pacific Railroad in 1894, which he held until his retirement in 1912. Since then Mr. Mackie has given his entire time to the interests of the Train Dispatchers' Association. Mr. Mackie was born June 24, 1842.

Mr. J. J. Barnett, manager, Postal Telegraph-Cable Company, Nashville, Tenn., writes: "Your action in renewing my subscription meets with approval, word for word and letter for letter, and herewith my check for \$2.00."

MUNICIPAL ELECTRICIANS.

CONVENTION OF MUNICIPAL ELECTRICIANS.—The twentieth annual convention of the International Association of Municipal Electricians will be held at Cincinnati, Ohio, August 24 to 27, both inclusive. Headquarters will be at the Gibson Hotel. Every effort is being made to make this gathering especially interesting to the members from a technical standpoint. Mr. C. R. George, city electrician, Houston, Tex., is secretary of the association, and will give further information.

NEW YORK NEW FIRE-ALARM SYSTEM.—The Board of Estimate of New York has allowed fire commissioner Adamson \$879,588 in corporate stock for the completion of the new fire-alarm system in the Borough of Manhattan. It is expected that the new system can be completed within two years.

TO PREVENT FALSE FIRE ALARMS.—Mr. William C. Matthias, superintendent of fire and police telegraph, Reading, Pa., has devised a fire-alarm box, the purpose of which is to prevent miscreants from turning in false alarms without detection. The box contains a six-inch gong, which starts ringing as soon as the box is opened, and attracts attention to the box and to the person sending in the alarm.

OBITUARY.

GEORGE B. SCOTT, aged seventy-seven years, for forty years superintendent of the Gold and Stock Telegraph Company, New York, died at Lakewood, N. J., July 6. Interment was at the same place. Mr. Scott was a native of Scotland. He entered the Gold and Stock Telegraph service in 1870 and became superintendent in 1872, retiring from active service in 1911. He devised many useful improvements in the stock ticker instruments, and was a well and favorably known electrical engineer.

Death of Marion H. Kerner.

Marion H. Kerner, aged seventy-six years, a well-known old-time and military telegrapher, died in New York, July 9. Deceased had an eventful career in the military service. While on duty as an operator at Harper's Ferry, he witnessed the execution of John Brown. When the Civil War broke out, Mr. Kerner promptly tendered his services as an operator to the government, and served in this capacity during the great conflict. He was confined as a prisoner in Libby prison for a time, and afterward retired from the army telegraph because of sickness. Thereafter, for a number of years, he was connected with the Adams Express Company in Baltimore, Md., where he was born, subsequently becoming interested in electrical ventures in Chicago.

Mr. Kerner traveled extensively abroad, his observations and experiences derived on such trips forming topics for lectures. He was a frequent lecturer in the public schools on telegraphy and other electrical subjects. Mr. Kerner possessed excellent musical ability. For over twenty years, on each Decoration Day, he decorated the Morse statue in Central Park, New York.

Mr. Kerner was vice-president of the Society of the United States Military Telegraph Corps.

The Telegraph and Telephone Life Insurance Association.

In a few quarters there seems to exist some anxiety regarding the future of the Telegraph and Telephone Life Insurance Association on account of the pension and death-benefit schemes conducted by telegraph and telephone companies. One correspondent states that the membership is not increasing as it should, and wishes something could be done to awaken interest in the association. The pensions and death benefits of the telegraph and telephone companies, he thinks, have had an injurious effect on the association, "though," he states, "it would be foolish to relinquish a life interest in the association in exchange for a conditional interest in the benefit, which ceases if one leaves the company's employ."

Mr. W. H. Baker, president of the association, touched upon this phase of the situation in a letter to the members last October.

"In response to our solicitation letters," he says, "a number of our agents and many of our enthusiastic members have written us, calling attention to the pension, sick benefit and life insurance plan promulgated by the telegraph and telephone companies, and citing the advantages of that plan as the principal reason for the indifference on the part of the telegraph and telephone fraternity to the proposition of the Telegraph and Telephone Life Insurance Association.

"While the insurance offered by the companies 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 pension, sick benefit, and 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.

"All employes of the telegraph and telephone companies should realize—

"First, that the life insurance accruing to them under the companies' plan depends on their continuous employment and—

"Second, that they should provide against this possible contingency by insuring in the Telegraph and Telephone Life Insurance Association while in the enjoyment of good health and within the age limit.

"The policies issued by the association are incontestable, are not restricted as to residence, and hold good regardless of how and where the member may be employed, so long as membership is maintained."

In all of the literature issued by the association, as well as its reports, there does not appear to be cause for alarm over the association's condition. It is true that it could be much stronger, but, as president W. H. Baker has recently pointed out, it is

a purely co-operative association, and this means that every member should co-operate.

The success of the association depends upon the activity of its members in getting new members. The individual member should take hold and do his share in building up the membership list and not depend altogether upon the agents and officers to carry the burden. "It is the work of the individual that counts," says president Baker.

The Value of Introspection.

Robert Burdette, in a talk to young men, once said: "Get away from the crowd for awhile and think. Stand on one side and let the world run by while you get acquainted with yourself and see what kind of fellow you are. Ask yourself hard questions about yourself. Ascertain, from original sources, if you are really the manner of man you say you are; if you are always honest; if you always tell the square, perfect truth in business details; if your life is as good and upright at eleven o'clock at night as at noon; if you are as good a temperance man on a fishing trip as you are on a Sunday-school picnic; if you are as good when you go to the city as you are at home; if, in short, you are really the sort of a man your father hopes you are and your sweetheart believes you are. Get on intimate terms with yourself, my boy, and, believe me, every time you come out of one of those private interviews, you will be a stronger, better and purer man. Don't forget this and it will do you good."

New York Telegraphers' Aid Society.

Statement of the New York Telegraphers' Aid Society for the quarter ended June 16 is as follows:

Balance on hand March 6.....	\$26,089.88
Receipts	1,744.00
Total	\$27,833.88
Disbursements	
Sick Benefits	\$1,277.25
Death "	400.00
Expenses	243.88
	1,921.13
Balance on hand June 6.....	25,912.75
Total	\$27,833.88
RELIEF FUND.	
Balance on hand March 6.....	\$ 6,134.44
Receipts	92.76
Total	\$ 6,227.20
Disbursements	186.00
Balance on hand June 6.....	6,041.20
Total	\$ 6,227.20

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 587 to meet the claims arising from the deaths of A. L. Glass, at Indianapolis, Ind.; F. C. Miller, at Whittier, Cal.; W. C. Walstrum, at Roanoke, Va.; W. P. Dinsley, at Chicago, Ill., and C. Van Matre, at Muncie, Ind.

The Late F. C. Miller.

Franklin C. Miller, whose death occurred very suddenly in California, on April 25, while on a visit to the Exposition, as previously announced in these columns, was a well-known member of the telegraph profession. He had been manager of many important offices. He was born in Albion, Mich., March 19, 1855. In 1870 he entered the service of the Michigan Central Railroad, as night operator in his native village, remaining there until April, 1871. During the next four years he found employment with the Chicago and Northwestern, and later with the Chicago, Burlington and Quincy railroads at various points in Iowa. The Leadville excitement in 1879 lured him to the Rocky Mountain region, where he worked as an operator for the Western Union, later becoming a train dispatcher for the Kansas Pacific Railroad at Denver, and for the Rio Grande Railroad at Buena Vista. The first railroad train into Leadville was run under his



THE LATE F. C. MILLER.

orders. In the spring of 1881 he entered the service of the Western Union Telegraph Company in Chicago, but returned to the railroad service in 1886 as dispatcher for the International and Great Northern Railroad at Houston, Tex. In 1890 he accepted the management of the Huron, S. D., Western Union office, where his parents then resided. In the spring of 1891 he was married to Miss Emma E. Fitch, manager of the Western Union office at Appleton, Wis. From this time on husband and wife worked as manager and assistant at various points, among which were Grand Rapids, Mich., Cairo, Ill., Cedar Rapids, Ia., Lincoln, Neb., and Houghton, Mich. In 1902 Mr. Miller returned to Chicago and filled various positions in that city until his death.

Mr. Miller was a man who had traveled widely, read extensively and thought deeply. Devoted to his wife and friends, a lover of the beautiful in life, and he found it everywhere and brought joy and happiness into the lives of all he met. Strong, calm and serene, he never missed an opportunity of doing good. Gentle, tender and thoughtful, he

made easier life's rough pathway for many tired and faltering feet.

Moonlight Excursion of St. Louis Western Union Electrical Society.

On June 18, the Western Union Electrical Society of St. Louis, Mo., gave a delightful moonlight excursion on the steamer "Alton." The weather was clear and cool, and the night just right for a trip on the river. About 400 persons, including members, their families and friends, were on board. The excursion was a marked success, and a credit to the officers and committees of the society who arranged it.

The programme included recitations and songs between the dances by members and others, which were rendered in a very creditable and able manner.

Chief operator G. R. Alger, who is president of the society; W. J. Armstrong, district traffic superintendent, and A. C. Cronkhite, district commercial superintendent, and his wife, acted as the reception committee. They greeted the guests as they entered the cabin, Mr. Cronkhite giving each gentleman a cigar and Mrs. Cronkhite each lady a fresh carnation.

Mr. C. W. Mitchell, the new manager of the St. Louis office, was also aboard, and when the fact became known there was quite a flutter of excitement and quickening of heart-beats among the young ladies, who, having heard that he was a bachelor, were anxious to meet him.

The boat returned to the city about 11:30 p. m., with everybody smiling and happy, and declaring that it was the best outing had in a long time.

The society is growing steadily and is becoming a great factor in promoting the welfare and goodwill among the telegraph employees of St. Louis.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

Mr. J. J. Whalen, manager of the general operating department at 253 Broadway, who has been absent about six months inspecting offices all over the country, is expected to return to New York in about ten days. He was in Cincinnati this week.

The following operators have recently been added to the force: C. M. Parsons, J. L. Zeinz, F. R. Brennan, W. C. Mullin, J. P. Meade, R. R. Johnson, T. B. Goodwin.

NEW YORK WESTERN UNION.

Mr. G. C. Gute has been appointed assistant general wire chief in the testing and regulating department.

Mr. A. J. Conti, chief mechanic of the operating department, was married on June 20 to Miss Belle Nicolini.

The employees of the automatic department will hold their second annual outing on Sunday, July 18. The use of the cable steamer "Western Union" has been tendered through the courtesy of president Carlton. Following is the committee of arrangements: R. H. Craig, chairman; P. J. Smith, treasurer, and Misses Margaret Cronin and K. Sheary.

BOSTON WESTERN UNION.

A multiplex circuit has displaced the Wheatstone on the first Chicago-Boston trunk line, the eight channels working successfully. A second New York-Boston multiplex has also been installed. Mr. A. J. Rheinhardt, of G. R. Benjamin's office, New York, was in charge of the installation of these circuits, being assisted by local printer chief W. S. Hamilton.

J. R. Palmer and B. R. Berthold, of the traffic department, New York, are in Boston, instructing the new multiplex attendants in their duties of operating the new equipment.

Mr. W. T. Wetmore, division supervisor of traffic, is in Halifax on company business.

W. S. Barker, division plant superintendent, is in the White Mountains, inspecting new construction.

Supervisor George Cunningham made a trip to the White Mountains, visiting every important office in that region, familiarizing himself with the physical layout of this division, in which preparations are being made for the handling of a heavy season's business.

A. E. Bradley has been appointed loop chief, W. T. Budds relieving Mr. Bradley on the repeaters.

Mr. T. F. Clark, of the New York main office supervising force, was a recent Boston visitor. He served in the Boston office in practically every position, from check boy to chief operator, and was greeted by many old friends. Mr. Clark was tendered an honorary dinner by postmaster W. F. Murray while here, Mr. Murray having served as corporal in Captain Clark's company, signal corps, during the Spanish-American war.

The mountain and seashore resorts of New England are now open and business is heavy with us.

PHILADELPHIA POSTAL.

J. H. Lieberman has been elected captain of the Postal baseball team, vice John Hardy.

Among recent visitors were J. H. Twyford, wire chief, New York; J. L. Osmond, manager, Broad street station, Pennsylvania Railroad Telegraph.

Mr. Philip J. Reilly, monitor on concentration cabinet, has it well in hand, and is giving fast, snappy service.

Mr. J. H. Wilson, manager, although located on the first floor, is still a frequent visitor to the four-

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.

teenth floor, ready to lend a hand should the emergency arise.

Mr. W. M. Phillips, solicitor, reports that our service is continually receiving praise from the business world. Mr. Phillips is also a good Postal hustler.

DALLAS, TEX., WESTERN UNION.

Mr. J. B. Dillon, wire chief of this office, has just been awarded a diploma for completing the electrical engineering course of study with the International Correspondence School of Scranton, Pa. He is being congratulated by his many friends on the final outcome of his five years of hard work.

DALLAS, TEX., MACKAY TELEGRAPH-CABLE.

Mr. W. L. Byrd, traffic chief of the Mackay Telegraph and Cable Company, Dallas, and member of the Hella Temple patrol, A. A. O. N. M. S., left on the Shriners' special train, July 4, for Seattle, Wash., to attend the Imperial meeting of the order.

The Hella Temple patrol, of which Mr. Byrd is a member, has won laurels at the various meetings it has attended, and, no doubt, will give a good account of itself on this trip.

The Hella Temple Band and patrol will lead the big parade in San Francisco, July 19, which has been designated as "Dallas Day" at the fair.

Mr. Byrd left with the best wishes of the Dallas force for a joyous trip.

OKLAHOMA CITY WESTERN UNION.

Mr. J. F. Slack contemplates building a home on his "Lauredale" farm in the near future, and with this end in view, is arranging for the necessary material. Mr. Slack will have an ideal fruit farm when all arrangements have been completed.

30TH ANNIVERSARY**Serial Building Loan and Savings Institution**

President. . . Ashton G. Saylor
Secretary. . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Dey Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 62c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y. P. O. Box 810, NEW YORK.

Telegraph and Telephone Age

No. 15.

NEW YORK, AUGUST 1, 1915.

Thirty-third Year.

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Facts About Magnets and Magnetism.

Magnetism is one of the most interesting of the natural forces, and notwithstanding all that is known of its effects, its nature is yet a mystery. Various theories have been advanced to explain magnetic phenomena, the one now generally accepted being that they have to do with the arrangement of the molecules of the iron forming the magnet. Man is always eager to know the cause of effects, but nature preserves her secrets, not because she wants to keep them from the knowledge of man, but because man has not yet attained to sufficient wisdom to reveal them.

There are natural magnets and artificial magnets, both of which exhibit the property of attracting iron. The earth itself is a great magnet whose poles coincide nearly, but not quite, with the geographical north and south poles.

If a bar magnet or a magnetized needle is freely suspended in air it will assume a position pointing in the directions we call north and south. The magnet takes this direction by reason of the influence exerted upon it by the earth's magnetism. How natural magnetism originates, no one knows.

The ancients knew of natural magnets in the lodestone. This stone, which is hard, and black in color, is found in various parts of the world, and is known to mineralogists as magnetite. It is an iron ore and is mined in quantities in this country, although it is not always in a magnetic condition. The ancients, besides observing that lodestone had the power of attracting small pieces of iron, also knew that it would point north and south when freely suspended. This property was turned to advantage in navigation and upon it is based the

mariner's compass. It was from this use of the material that it was given the name "lodestone," or "leading stone." Artificial magnets are, however, used in the construction of the mariner's compass of the present day.

Artificial magnets are familiar to everyone. They are made in a great variety of forms and sizes for different uses, from the pocket horseshoe magnet of the school boy to the great magnets used in the construction of electric power machinery. Some years ago an experimental artificial magnet was made from a large coast defence gun at the government proving grounds at Sandy Hook, N. J., and its magnetic attraction was so great that spikes stood out like great bristles on the body of a man standing in front of the gun.

If a piece of hard iron be rubbed with lodestone it will acquire from the stone the power of attracting small pieces of iron and will point north and south when suspended. Hardened steel is more retentive of magnetism than iron.

The attractive power of a magnet resides at or very near the ends, which are called the poles. The portion of the magnet between the poles exhibits less magnetism the further we move from the poles and approach the middle line of the magnet, where there is no attraction at all. As far back as the year 1600 Dr. William Gilbert, a celebrated English physician and natural philosopher, observed all of these facts.

The name "magnetic needle" is a very loose term, but for the investigation of magnetic forces the magnetic needle employed consists of a light steel needle fitted at its center with a little cup of brass, glass or agate, by means of which it can be hung on a sharp point so as to turn with very little friction. It is rendered magnetic by being rubbed upon a magnet. The small pocket compass sold by opticians is a very handy instrument for experimental work by students.

If we have two magnetic needles we soon discover that the north pole of one magnet will repel the north pole of the other magnet, but will attract the south pole. Hence the law, "Like magnetic poles repel one another; unlike poles attract one another." This is known as the first law of magnetism. The attractions and repulsions are due to stresses in the intervening medium—air, etc.

It is impossible to obtain a magnet with only one pole. We find the idea of duality running all through nature. If there is a north pole there must be a south pole at the opposite end of the material composing the magnet and it makes no difference if we cut a magnet into a thousand pieces, each piece will be a magnet with a north and south pole.

The force exerted by a magnet upon a piece of iron or on another magnet is not the same at all distances, being greater when the magnet is nearer

and less when it is held farther away. This force is interacting; the magnet attracts the iron and the iron attracts the magnet.

There is a distinction between magnets and magnetic substances. A magnet attracts only at its poles and they possess opposite properties, whereas a magnetic substance, such as piece of soft iron, will attract either pole of a magnet, no matter what part of the iron is presented toward the magnet. A magnetic substance, therefore, has no poles.

There are a few other substances besides iron that are attracted by a magnet, but in a much less degree. These are nickel, cobalt, chromium, cerium and a few others, but only nickel and cobalt are comparable with iron or steel in magnetic power, and they are very inferior.

If through some great upheaval of nature magnetism should cease to exist we would have no more telegraph, telephone, wireless, electric light, trolley cars and electric power, and chaos would reign.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED JULY 6.

- 1,144,997. Semi-Automatic Exchange System. To A. M. Bullard, New York.
 1,145,066. Transmitting Apparatus for Wireless Telegraphy. To A. H. Johnson, Washington, D. C.
 1,145,109. Telephone System. To J. L. Wright, Cleveland, Ohio.
 1,145,120. Telephone-Exchange System. To E. E. Clement, Washington, D. C.
 1,145,229. Telegraph System. To W. M. Bruce, jr., Springfield, Ohio.
 1,145,239. System for Direct Energization of Radio-Telegraphic Antennæ. To E. Girardeau and J. Bethenod, Paris, France.
 1,145,245. Telephone-Exchange System. To M. L. Johnson, Chicago, Ill.
 1,145,287. Telephone-Telegraphic Communication System for Railroad Trains. To F. Arens, New York.
 1,145,393. Cooler for Telephone Instruments. To W. P. Stunz, Lansdowne, Md.
 1,145,460. Printing-Telegraph System and Alphabet. To C. G. Ashley, Chicago, Ill.
 1,145,490. Printing Telegraph Mechanism. To O. L. Kleber, Pittsburgh, Pa.
 1,145,542. Automatic Telephone Switching Apparatus. To J. G. Blessing, Chicago, Ill.
 1,145,632. Means for Controlling Telephone Circuits. To W. C. Ude, West Haven, Conn.
 1,145,658. Wireless Telegraph Detector. To W. E. Ashton and A. M. Curtis, New York.
 1,145,659. Automatic Selecting Multi-party Telephone System. To O. Asmussen, Brooklyn, N. Y.
 1,145,735. Electric-Wave Detector. To C. D. Ainsworth, Worcester, Mass.
 1,145,751. Appliance for Telephones. To J. L. Creveling, New York.
 1,145,861. Telephony. To W. W. Dean, Elyria, Ohio.
 13,942 (Reissue). Sanitary Mouthpiece. To E. M. Jenkins, Italy, Tex.

ISSUED JULY 13.

- 1,145,976. Supervisory System for Telephone Lines. To W. W. Dean, Chicago, Ill.
 1,145,978. Telephonic Transmission Circuit. To H. G. Dorsey, East Orange, N. J.
 1,146,002. Telephone System. To E. Land, Grand Rapids, Mich.
 1,146,049. Telegraphy. To W. M. Bruce, jr., Springfield, Ohio.
 1,146,074. Telephone-Exchange System. To M. L. Johnson, Chicago, Ill.
 1,146,177. Telephone System. To E. Land, Grand Rapids, Mich.
 1,146,234. Telegraphy. To W. M. Bruce, jr., Springfield, Ohio.
 1,146,274. Printing-Telegraph Apparatus. To F. D. Pearne, Chicago, Ill.
 1,146,583. Automatic Telephone-Exchange System. To F. R. McBerty, Antwerp, Belgium.
 1,146,752. Telegraphy. To P. B. Delany, South Orange, N. J.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stock on July 28:

American Telephone and Telegraph Co.	121½
Mackay Companies	76
Mackay Company, preferred	64
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4¾
Western Union Telegraph Co.	69

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charge on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. CHARLES W. MCKIBBEN, superintendent of telegraph, Gulf Pipe Line Company, Beaumont, Tex., was a New York business visitor last week.

MR. RALPH W. POPE, honorary secretary of the American Institute of Electrical Engineers, New York, a former old-time telegrapher who is residing at Long Branch for the summer, was a New York visitor last week and called on numerous friends.

MR. CARL VON WIEGAND, formerly a telegrapher in the San Francisco office of the Associated Press, is one of the most active newspaper correspondents in the war zone. He is at present representing the New York *World* and other newspaper interests at the front in Germany and Austria.

MR. W. C. O'NEAL, of Washington, D. C., member of the Society of the United States Military Telegraph Corps, and Mrs. O'Neal, celebrated the fiftieth anniversary of their marriage on July 18. Mr. O'Neal was manager of the Georgetown office of the Western Union Telegraph Company for thirty-five years.

MR. W. E. HARKNESS, a well-known electrical engineer of New York, has established an office at 50 Church street, and is now prepared to draw up engineering plans and specifications, inspect plants, and investigate or develop new devices. He has had wide experience in engineering in telephone, telegraph, fire-alarm and signal systems, and any work entrusted to him along these lines will receive skilled attention.

MR. SAİM SALİM, representative of the Turkish Telegraph and Post, of Constantinople, Turkey, is in New York in the interests of his government, studying the telegraphs of the country. Since his arrival in the United States some months ago, he has spent some time in the General Electric Company's plant at Schenectady, N. Y. He has looked into the telegraph in many sections of this country and intends to remain in New York for the next



MR. SAİM SALİM, OF THE GOVERNMENT TELEGRAPH DEPARTMENT, CONSTANTINOPLE, TURKEY

year. He will study the various telegraph systems, including wireless telegraphy. He is an experienced telegraph operator and has made many valuable acquaintances since his sojourn in this country. Previous to his coming to the United States, he was identified with the Central Office in Constantinople as manager. Mr. Saım Salım is a native of Constantinople, where he was born in 1891. He has spent seven years in the post and telegraph service in his native country. Besides his own language, he speaks German fluently and English very well.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager of this company, visited Tacoma, Wash., a few days ago on his trip of inspection through the Western and Pacific Coast States. He left New York June 16, and expects to return in about three weeks.

COLONEL A. B. CHANDLER, former president of the Postal Telegraph-Cable Company, New York, is spending the summer at his home in Randolph, Vt.

MR. W. B. DUNN, assistant secretary of this company, is spending his vacation in the Catskill Mountains with his family.

MR. A. B. PARRISH, of the office of vice-president C. P. Bruch, has returned from his vacation.

MRS. THEODORE L. CUYLER, aged eight-three years, mother of Theodore L. Cuyler, jr., formerly and for many years assistant treasurer of the Postal Telegraph-Cable Company, New York, died at her summer home Saybrook, Conn., on July 12.

MR. DONALD MCNICOL, of the office of the electrical engineer, New York, is absent on his vacation, which he is spending in visiting points in New York State and Canada.

MR. W. O. GAFFNEY, manager of the Charlotte, N. C., office was a New York visitor last week, and made it the occasion to call on many of his friends. Mr. Gaffney was a delegate to the National Convention of the Dramatic Order Knights of Khorossan, the biennial convention of which organization took place at Asbury Park, N. J. Mr. Gaffney was honored by being elected a member of the executive committee of the Secretary's Association of the Order for the ensuing two years.

THE PORTSMOUTH, N. H., Chronicle recently referring to Mr. T. C. Leckey's enterprise as a manager said: "There are no keys to the Postal office, only the telegraph keys, which are always ready to serve the public with quick dispatch. The Postal wires are alive and full of speed in all kinds of weather."

MANAGERS APPOINTED.—J. E. Muns, Brunswick, Ga.; J. C. Benson, Greenville, Tex.; N. H. Petrie, St. Augustine, Fla.; J. E. Ashmore, Waynesboro, Ga.; H. C. Miller, Asheville, N. C.; L. F. Hennington, jr., Thomasville, Ga.; W. H. Easterlin, Tuskegee, Ala.; H. D. Thompson, Charlotte, Mich.; C. A. Ebert, Tulsa, Okla.; F. E. Schaeffer, Sioux Falls, S. D.; L. D. Friedly, Hastings, Neb.; A. H. Wilhelm, Connellsville, Pa.; R. Smith, St. Joseph, Mo.

New Postal Cablegram Service.

Beginning Saturday, July 24, the Postal Telegraph-Cable Company will accept, in the States of California, Oregon and Washington, messages known as "Pacific Coast Cablegrams" for transmission by telegraph to London, England, and thence by telegraph or mail to all other places in Europe at an

initial minimum charge for thirteen words, or less (including the necessary prefix), plus an additional charge for each word in excess of thirteen. Until censorship is relaxed or discontinued only English or French plain languages will be admitted. These messages are subject to delivery at the convenience of the company within twenty-four hours if telegraphic delivery is selected and the prefix DPT is written before the address. Delivery to points beyond London will be made by mail from London if the prefix DPP is written before the address.

Beginning on the same date, the Postal company will accept messages to be known as "Sunday Pacific Coast Cablegrams." This is "Week End" service only. Messages must be filed before midnight, Saturday, for delivery by telegraph, or for mailing at London, Monday morning. There is an initial minimum charge for twenty-five words or less (including prefix), and additional charge for each word in excess of twenty-five.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. NEWCOMB CARLTON, president, has returned to his office after spending a vacation of six weeks on the Pacific Coast and other points of interest in the far west, with his family.

MR. A. R. BREWER, vice-president, will go to his summer home in New Hampshire for the next four weeks.

MR. WILLIAM H. BAKER, secretary of the company, will spend the month of August in the Adirondacks.

AMONG OTHER OFFICIALS who will be absent some time during the month of August on vacation is E. Y. Gallaher, comptroller of the company.

MESSRS. LEWIS DRESDNER, treasurer, W. A. Sawyer, district commercial superintendent, and Frank Kitton, of the office of the general superintendent of plant, New York, have returned from their vacations.

MR. H. C. WORTHEN, general manager, Southern Division, Atlanta, Ga., makes the following announcement of changes in his division: The sixth district, comprising the states of North Carolina and South Carolina, has been created, with Mr. F. R. Veale in charge as district commercial superintendent, with headquarters at Charlotte, N. C.; the first district will comprise the state of Virginia, with Mr. J. S. Calvert in charge as district commercial superintendent, with headquarters at Richmond, Va. The first district, district commercial superintendent, Richmond, Va., will continue to be the office of record for the states of Virginia, North Carolina and South Carolina. All communications concerning changes in force, office supervision, equipment and public relations in North Carolina and South Carolina will go direct to district commercial superintendent F. R. Veale, Charlotte, N. C.

MR. C. R. TILGHMAN, general supervisor, ticker service, New York, is on a business trip to Washington, D. C., and Richmond, Va.

MR. H. W. GILBERT, formerly and for many years manager of the New York Produce Exchange office, now living in retirement at Adams, N. Y., was a recent executive office visitor.

MR. G. C. MATTES, manager at McAlester, Okla., gave a talk on the development of the telegraph at the luncheon of the Rotary Club in that city July 13.

MR. C. H. WALTON, manager at Palatka, Fla., has resigned to engage in other business in Tampa.

MR. HERBERT BROWN, commercial superintendent, Chicago, Ill., delivered a lecture entitled "The History of the Telegraph" before an audience of officials, employees and patrons of the company on the evening of July 20. It was illustrated by lantern slides and was highly instructive and enjoyable.

MR. C. P. POLLAK, general superintendent, Eastern Division, American District Telegraph Company, New York, is again at his desk after an extensive business trip through the Southern and the Middle West States.

MR. H. L. BROWNE, of Dallas, Tex., has been appointed wire chief of the Little Rock, Ark., office, vice W. D. Bard, deceased.

FRED L. RAMEY, night chief of the Western Union Telegraph Company at Denver, Col., died of consumption on July 13. He was a native of Omaha, where interment took place.

SEYMOUR C. RICE, aged seventy-five years, an old time telegrapher of Albany, N. Y., died in that city July 13. He had been in the employ of the Western Union Telegraph Company forty-eight years and was chief operator when he retired. He was a man of sterling character and charming personality and was prominent in church and civic affairs in Albany.

WILLIAM D. BARD, aged forty-eight years, wire chief at Little Rock, Ark., was drowned July 12 in the Saline River while endeavoring to rescue a young lady whom he heard crying for help. Mr. Bard could not swim, but endeavored to save the drowning woman and sacrificed his life in the unsuccessful attempt. Mr. Bard began service with the Western Union at Little Rock in 1887, and, except for short service at Memphis, Tenn., St. Louis and Shreveport, La., was employed as night chief, assistant day chief and finally was appointed wire chief in 1912. He is survived by his wife, son and two daughters.

EARNINGS REPORT.—The earnings report of this company for six months ended June 30, 1914 and 1915 (month of June, 1915, estimated), is as follows:

	1914	1915
Total Revenues	\$22,466,578.00	\$24,019,260.00
Maintenance Repairs and Reserved for		
Depreciation	\$ 3,511,571.00	\$ 3,878,138.00

Other Operating Expenses, including Rent of Leased Lines and Taxes...	16,186.556.00	15,481,607.00
Total Expenses....	\$19,698,127.00	\$19,359,745.00
Balance	\$ 2,768,451.00	\$ 4,659,515.00
Deduct Interest on Bonded Debt.....	668,625.00	668,600.00
Net Income	\$ 2,099,826.00	\$ 3,990,915.00

MULTIPLEX CIRCUITS have been established recently between the points named: Chicago-Boston; San Francisco-Panama-Pacific Exposition; San Francisco-Los Angeles; San Francisco-Seattle, Wash.; San Francisco-Chicago; Chicago-St. Paul, Minn.; Chicago-Minneapolis, Minn.; Chicago-St. Louis, Mo.

Outing of Morse Electric Club.

The summer outing of the Morse Electric Club was held at Donnelly's Boulevard Hotel, College Point, L. I., N. Y., Saturday, July 17. The party, over 200 in number, was conveyed to the grounds by the steamer "Western Union," loaned through the courtesy of the Western Union Telegraph Company. Refreshments were served on the boat and on the grounds, and in the evening there was a table d'hôte dinner at the hotel, followed by a vaudeville entertainment.

In the afternoon athletic events were held. The game of baseball between teams from the commercial and traffic departments was won by the former, 4 to 1.

The seventy-five yard dash, for members only, was won by L. C. Boocheever; W. A. Wallace, second; W. C. Merly, third.

The seventy-five yard dash, open to all—J. McCree, first; A. Finn, second; D. Kreiger, third.

The Fat Men's Race was won by L. Schmich; M. J. Hayden, second; J. A. Rice, third.

The 100-yard dash for married men (members)—B. R. Hawley, first; H. J. Schaper, second; Geo. Smith, third.

Two hundred and twenty-yard dash for single men (members)—H. Reipstein, first; L. C. Boocheever, second; J. W. Jacobis, third.

The final event, a one-quarter mile run, open to all, was won by C. B. McCann; N. J. Carafella, second; Jos. Kunze, third.

Mr. Joseph W. Connolly was clerk, of course; R. J. Murphy, starter; J. F. Nathan, Gardner Irving and C. B. McCann, judges.

Among the officials of the company present were Messrs. Belvidere Brooks, vice-president; A. G. Saylor, general manager, Eastern Division; J. F. Nathan, commercial superintendent; W. N. Fashbaugh, general superintendent of traffic; J. P. Edwards, division traffic superintendent, New York City; S. B. Haig, division traffic superintendent, outside of New York City; F. W. Lienau, superintendent, tariff bureau, and others.

The committee of arrangements consisted of W. C. Merly, R. J. Murphy and P. J. Casey.

THE CABLE.

MR. GEORGE G. WARD, vice-president and general manager, Commercial Cable Company, New York, who, accompanied by Mrs. Ward, sailed for San Francisco, May 22, via the Panama Canal, is now in Nova Scotia, on his way home. He is inspecting the various stations of the company. He has visited Halifax and Canso, and will go to St. Johns, N. F., where he will inspect the construction work going on at that place. An office is being established in St. Johns, which will be connected with the Cuckold Cove station by an underground cable two miles in length.

CABLE COMMUNICATION RESTORED.—Communication by the Commercial Pacific cable to the Philippines, Hongkong, China, Japan and the Dutch Indies was restored on July 22. Ordinary rates will apply to all under the conditions existing prior to the interruptions on July 9. There will be no unusual restrictions on cablegrams to the Philippines or China. Cablegrams to Hongkong or passing through Hongkong to China or the Dutch Indies, will be subject to the British censorship restrictions. Cablegrams to Japan will suffer no unusual restrictions as to language, address, text or signature, but will be subject to censorship and senders' risk.

UNSATISFACTORY CABLE SERVICE.—Complaint is made by Norwegian business men that the telegraph service between Norway and the United States, which is limited to the lines by way of England, has become unsatisfactory. It sometimes takes a week for the exchange of messages by cable and sometimes the cablegrams disappear altogether.

GOVERNMENT CODE BOOKS.—The American State Department code books from which the symbols are taken as represented by figures and letters, and sometimes by groups of both, together with spaces, are kept in locked safes when not in use, and are never permitted to reach any but trusted persons who have to do with this particular branch of the State Department work. In fact, the code books of the State Department are guarded with the same vigilance as the code of the navy, where, in case of necessity, the first duty of the naval officer is to throw the code book into the sea. The navy code books are bound in heavy leaded covers so that they will sink instantly.

New Cable Laid Between New York and Colon.

The Telegraph Construction and Maintenance Company's cable steamer "Colonia," on July 23, successfully completed the laying of a second cable between New York and Colon, via Guantanamo, Cuba, for the Mexican Telegraph Company and the Central and South American Telegraph Company. This duplicates the cable laid by the same company in 1907 and completes the duplication of the whole "via Colon" system from New York to Buenos Aires, Argentina.

The first adjustment of the duplex balance on this new duplicate New York-Colon cable indicates that when the balance is perfectly adjusted a speed of fully 200 letters per minute will be obtained.

The present average time of transmission between New York and Buenos Aires, "via Colon," is about eighteen minutes. The speed of the new duplicate cable will undoubtedly reduce this time.

The object of this new duplicate cable is not only for supplying additional facilities for the present South American traffic, but also to insure the prompt transmission of Brazil messages when the company's contemplated extensions from Buenos Aires, Argentina, to that country are established.

Mr. James A. Scrymser, president of the companies, has for over forty years endeavored to establish an all-American cable system between the United States and Brazil, but, owing to the existence of an English cable monopoly, has been unable to carry out his plan. The English monopoly having expired, and the Brazilian Government having declined to renew the same, president Scrymser expects to realize his long-cherished hope in this direction as soon as the European war is over.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to July 28, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Oran and Tanger, June 24.

Book on Cable Testing and Working.

The third edition of "Beginners' Manual of Submarine Cable Testing and Working," by G. M. Baines, Carcavellos, Portugal, has been issued. The author is a practical cable man and has written the book in as clear a manner as possible for the benefit of beginners and students. The book contains eighteen chapters, covering every branch of cable work, principles and practice, and will be found very useful by all telegraph, telephone and general electrical engineers.

The price of the book is \$3.50 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

CANADIAN NOTES.

DOMINION TELEGRAPH COMPANY.—The financial statement of the Dominion Telegraph Company for the year ended June 15 shows a balance to the credit of profit and loss account of \$201,961.88. The following were elected directors: Belvidere Brooks, Colonel Robert C. Clowry, E. Y. Gallaher, of New York; Sir John Morison Gibson, Aemilius Jarvis, Charles O'Reilly, Colonel Sir Henry Mill Pellatt, Frederic Roper and George P. Scholfield. At a subsequent meeting Colonel Sir Henry Mill Pellatt, was appointed president, Mr. Aemilius Jarvis, vice-president, and Mr. Frederic Roper, secretary and treasurer.

THE TELEPHONE.

MR. THEO. N. VAIL, president American Telephone and Telegraph Company, celebrated his seventieth birthday at his home in Lyndonville, Vt., on July 17. He received many congratulations by telephone, including felicitations of friends in San Francisco over the transcontinental line.

DR. ALEXANDER GRAHAM BELL has consented to serve on the naval committee on invention and development now being formed by secretary of the navy Josephus Daniels.

TELEPHONE EARNINGS.—The American Telephone and Telegraph Company reports earnings for the six months ending June 30, \$23,149,807.40, as compared with \$23,328,767.67 in 1914; expenses, \$2,707,178.52, compared with \$2,759,459.58; net earnings, \$20,442,628.88, and \$20,569,308.09. After deducting interest and dividends the balance is \$2,701,317.37, compared with \$2,580,030.14. The Bell Telephone system in the United States earned during the five months ending May 31, \$96,769,058, as compared with \$92,516,679 in 1914. Expenses were \$70,032,377, compared with \$67,571,920. Net profits \$18,959,247 and \$17,218,231. Surplus earnings \$5,631,406, against \$4,551,416.

NEW YORK TELEPHONE DIRECTORY.—The new edition of the New York telephone directory consists of 1,750,000 copies. It contains 345,000 names and a circulation of 865,000 copies in New York City and vicinity. There are 193,000 names in the general suburban directory, which has a circulation of 617,000. The combined distribution in metropolitan territory will reach 1,750,500.

TELEPHONE DIRECTORIES AS STORAGE FOR VALUABLES.—Some Chicago citizens use their telephone directories as repositories for money and other valuables. It took fifteen men an entire day to search 20,000 discarded telephone books before an envelope containing valuable papers, several small diamonds, a sapphire, and a diamond-studded platinum neckpiece was located. Sixteen men worked nearly as long over 8,350 directories before they came across \$40 in cash, \$35.42 in checks, and valuable papers left in a book by another subscriber. Still other searchers looked through 3,500 volumes for \$30 which a subscriber said he had deposited in the directory bank.

ENTERTAINMENT BY TELEPHONE IN LONDON.—The British post-office telephone department maintains a service for the Electrophone Company of London for the purpose of connecting telephone subscribers with Covent Garden, Drury Lane and practically all the London theaters at which musical performances are given. On Sundays connections are made with a number of churches. An extra charge is made for the service.

THE PENINSULAR TELEPHONE COMPANY, Tampa, Fla., is planning to increase its telephone system. The plans call for Western Electric switchboards arranged with modern devices, including the flashing recall and automatic ringing and listening, incorporating the secret service feature. The switchboards will be of the central-battery type.

Convention of Telephone Pioneers.

The fifth annual convention of the Telephone Pioneers of America will, as previously announced, be held in San Francisco, Cal., September 21, 22 and 23, and judging from reports, there will be a large attendance, notwithstanding the great distance of travel for the eastern members.

The trip to and from the convention city is one that will be worth taking, as many points of interest will be visited en route. All employees of the Bell system, whether they are pioneers or not, will be privileged to take the trip and enjoy the advantages offered by accompanying the parties.

The programme of the convention and trip were published in full in our May 16 and June 1 issues, and any further information may be obtained from secretary R. H. Starrett, 15 Dey street, New York.

Review of Principal Articles in Contemporary Telephone Publications.

SUBWAYS UNDER RAILROAD TRACKS.—In the July 17 issue of *Telephony* is published an account of the construction of a 44-duct subway under the tracks of the New York Central Railroad in New York for telephone cables. The difficulties encountered and how they were surmounted are described. The article is illustrated with plan and sectional views. Mr. Clifford H. Hartley is the author.

GOVERNMENT TELEPHONES IN AUSTRALIA.—An abstract of the government's annual report of the operation of telephones in Australia is printed in the July 17 issue of *Telephony*. The report covers the year ending June 30, 1914, and shows a loss of \$370,000 more than in the preceding year. It states that in each branch of the postal department, viz.: postal, telegraph, telephone and wireless telegraphy, considerable economies are possible. The portion of these savings applicable to the telegraph and telephone branches, the report says in conclusion, are not sufficient to make these branches self-supporting under the existing scale of charges.

STEEL POLE LINES.—Mr. Edgar S. Bradley is the author of an article published in *Telephony*, dated July 17, entitled "The Age of Living Steel and its Relation to Pole Lines." The author refers to the depletion of the timber supply, from the standpoint of pole and tie-using companies, and discusses the elements which must be possessed by steel to be an acceptable substitute for wood.

SOME APPLICATIONS OF THEORY TO THE TELEPHONE ART, is the title of a paper presented by professor G. D. Shepardson before the recent annual convention, at Minneapolis, Minn., of the Independent Telephone Association of America. Professor Shepardson discusses theory and its uses; relations between employees, the public and the company, and the physical elements involved in telephony. He believes that the large future steps in the improvement of telephony will be made by men who combine both practical experience and theoretical knowledge. The paper is published in *Telephony* for July 17.

RADIO-TELEGRAPHY.

Mr. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, accompanied by Mr. G. S. De Sousa, traffic manager, and Mr. E. B. Pillsbury, general superintendent, have returned from an inspection of the Marconi properties and stations in New Jersey and Massachusetts, including the station on the Island of Nantucket.

Mr. W. B. VAN SIZE, patent attorney, Marconi Wireless Telegraph Company of America, New York, and a well-known old-time telegrapher, will spend the month of August in Maine with his family.

THE SAYVILLE STATION.—It is stated by Dr. K. G. Frank, secretary of the Atlantic Communication Company, that the business of the Sayville station had increased materially since the plant was taken charge of by the United States Government on July 9. The reduction of tolls from \$1.00 to fifty cents has brought much more business than the station handled before. Mr. H. O. Boehme, of the Atlantic Communication Company, is manager of the station.

Wireless Between Japan and America.

The high-power wireless station of the Imperial Japanese Government is approaching completion. It is located at Funabashi, about ten miles east of Tokio.

Mr. Edward J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, has just returned from Honolulu, where he arranged for the preliminary tests between the Marconi Company's high-power stations at Kahuku and Koko Head on Oahu Island, and Japan. These tests were started on July 26, and congratulatory messages were exchanged between Mr. Nally and Jiro Tanaka, director general, Ministry Communications, at Tokio.

When both stations shall have been fully tried out, the transpacific service of the Marconi Company, in connection with the Western Union Telegraph Company, which has been in operation between this country and the Hawaiian Islands since September 24, 1914, will be extended to Japan, and at rates at least one-third less than the existing cable rates. From Japan connection will be made through the Japanese Imperial telegraph system with all points in the Orient.

Wireless and Coaling the Fleet.

One of the lesser-known uses of wireless telegraphy in warfare, and one which has an important bearing on the efficiency of the British fleet, says *The Wireless World*, is the rapid summoning of colliers for the replenishing of a war vessel's bunkers. A collier packed to the hatches with coal gets into touch by wireless with a battleship whose bunkers require refilling. On sighting the parent vessel the supply ship manoeuvres into the right position, about 400 feet astern of the battleship, and then dispatches a small boat carrying the cables, one set of which stretches from the masthead of the supply vessel. When it reaches the warship the

cables are made fast on the port and starboard sides of her stern, and the two lines being brought to the right tension, the two ships travel on in a straight line fastened together, whilst from the mast of the collier to the deck of the warship stretches a transport cable for carrying coal bags. By means of wheels running on the cable the load is forced by automatic winches along the sloping transport line at the rate of some 3,000 feet per minute. This apparatus enables about sixty tons of coal to be transferred every hour across the gap of water separating the vessels.

Wireless Telegraphy and the Weather.

Dr. H. R. Mill, director of the British Rainfall Organization, at a recent meeting of the Royal Meteorological Society, discredited the theory that the heavy rainfalls of last winter were due to the firing at the seat of war. In the same way, he said, the heavy winter of 1903 had been explained by the general adaptation of wireless telegraphy. The fact that 1873 was equally as wet, if not wetter, without the aid of Hertzian waves, and that no year since 1903 had been nearly so wet, in spite of the enormous increase of radio-telegraphy, showed the fallacy of the inference.

It had been argued that it was the concussion caused by the high explosives which determined the precipitation of rain from supersaturated vapor. The difficulty arose that if concussion was the cause, precipitation must occur immediately and presumably over the area within sound of the explosions. That, at least, was the principle which people who tried to induce public bodies to cannonade for rain had always adopted. The dryness of September, October, March and April, however, were difficult to explain on this hypothesis.—*The Wireless World*.

Wireless Receiving Station at Eureka, S. D.

The wireless receiving station at Eureka, S. D., is stated to be one of the most interesting and best equipped amateur stations in the country.

The receiving set consists briefly of tuning coil and rotary condensers, two audion detectors and three one-step amplifiers to amplify the signals as they come from the detectors. This arrangement makes use of five audion bulbs and their circuits for amplifying the signals. The amplification is so great that different parts of the circuits set up siren or whistling effects, which effectually put a stop to the operation of the set or further amplification.

The circuits for cascade connection of two audion detectors require one six-volt storage battery to light both filaments. The 35-volt battery is shifted to a different part of the circuit in the first detector from where it would be if they were not connected in cascade. Tests seemed to indicate that this circuit not only amplified as much as the one using separate batteries for heating the filament but amplified quite perceptibly more.

A magnet is used in connection with the audion detectors, and it seems to increase the strength of signals from the spark stations. For the impedance coil the secondary of a 1½-inch spark coil is used.

The plug box allows either one, two, or three

head sets to be connected to the third-step amplifier, the second-step, or the first-step, and one head set can be plugged in on the second detector of the cascade set. This is invaluable for testing the relative amount of amplification of the different amplifying units. The plug box is so wired that the head sets are connected in series.

The first step amplifier differs from the second and third only in the design of the transformer. It seems necessary that the secondary of the transformer or potential circuit be not connected directly between the grid of the audion or amplifier bulb and the filament, but that a very small condenser, usually bridged by a very high resistance, made of slate or a pencil mark, be interposed in the circuit. The purpose of the high resistance is to prevent the bulb becoming paralyzed by static or strong signals



RECEIVING STATION AT EUREKA, S. D.

and should not be any lower than necessary to accomplish this effect.

The detectors are operated from one six-volt storage battery, the first and second step amplifiers from another, and the third step from another.

The tuning coil will cover any wave length up to 16,000 meters or more without perceptible loss of efficiency from dead ends or from the volume of wire necessary to be used in a coil to cover the longer ranges, giving very close adjustment over the entire range. It is of the Clapp-Eastman De Luxe type.

The audion is a potentially operated device, and with a given tuning coil the signals are louder when the same wave length is tuned into the secondary circuit by using more wire and less condenser than when using less wire and more condenser.

The aerial is T shaped and each half is about 500 feet long and averages seventy-five or eighty feet high.

The Arlington station is heard very plainly every day at this time of the year unless there are unusual conditions, most of the receiving being done by day. The time signals sent out at noon nearly every day from Springfield, Ill., are also heard quite distinctly, and Bolinas, Cal., is often heard just after noon, the signals coming in very loud. Signals from Key West, San Diego or Mare Island on the Pacific Coast are not usually audible at this time of the year, but they have often been heard in the daytime when they sent out the time during the winter.

The Eureka wireless station is owned by John A. Gardner and E. R. Isaak, of Aberdeen, S. D.

How American "Notes" Are Sent to Germany

An account of the procedure of sending "notes" from the American Government to the German Government in these times when telegraphic communication between the two continents is difficult will be interesting to our readers, and will show, incidentally, the extraordinary disguises which the message takes in its journey from the desk of president Wilson to the hands of the German minister of foreign affairs.

The latest "Lusitania" note will be cited as an example. After secretary of state Robert Lansing had affixed his signature to it at 12:50 p. m., he handed it to the chief clerk of the State Department, who took it downstairs to the main floor, where the telegraph and cipher rooms are situated. The pages of the note, consisting altogether of approximately 1,500 words, were distributed among the cipher clerks, and the work of enciphering it began immediately.

Before important notes, such as this, are placed on the wire, it is the custom generally to prove the accuracy of the coding by deciphering it and comparing the result with the original.

The "Lusitania" note was tested in this way and did not leave the hands of the chief cipher clerk until he had satisfied himself that when decoded by ambassador Gerard in Berlin it would be identical, word for word, with the note as the president wrote it. He had, also, the absolute certainty that no one of the telegraph operators and officials through whose hands the message passed en route would be able to get the slightest clue to any part of the strange jumble of letters and numerals. Even the name of Herr von Jagow, the German minister of foreign affairs, to whom the American ambassador was instructed to present it, was undecipherable and concealed, like the rest of the message, in the symbols of the code.

The first page of the note was coded at 2 p. m., and an operator began to telegraph it from the State Department to the Commercial Cable Company's office at 20 Broad street, New York. At this stage the message was in the form of a stream of Morse dots and dashes which the operator in the cable office was busily re-translating and typing into the same coded form in which it existed at Washington. As the sheets were written up by this man, they were handed to the cable operator, who proceeded to prepare the message for transmission over the submarine cable, and at this point it took on another disguise—a very strange one, indeed. It is perhaps generally known that the Morse code of dots and dashes employed on land lines is not suitable for submarine cabling and that another system, known as the continental cable code, is used. In order to ensure regularity and evenness in the transmitted signals, nearly all messages, instead of being hand-keyed, are sent by an automatic transmitter. The nearest example to the operation of this machine is an automatic piano-player. As in the latter, the musical composition is disguised in a maze of perforations in a paper roll, so in the cable transmitter the message exists in the form of a procession of small, round holes in a continuous strip of paper.

Returning to the "Lusitania" note, we left it at the stage where it was being prepared for the cable. This was done on the "perforator," which is a machine with a keyboard exactly similar to a typewriter. The depression of a key, however, instead of printing the character on a sheet of paper, punches a set of holes in a narrow strip. Each letter and numeral punches its own special group of holes, and provision is also made for spaces. When such a strip is passed through the automatic transmitter, "current pickers" operating through the holes cause the correct electrical impulses corresponding to each letter to pass into the cable.

Simultaneously with the clicking of the automatic transmitter in the office of the Commercial Cable Company, the signals are received on a recorder at the distant end of the cable, once again in a different disguise. A paper tape runs through the recorder and a delicate glass siphon draws a fine ink line on it. When no signals are passing, this line lies in the middle of the slip, perfectly straight. When a "dot" arrives, the siphon draws a little hump above the line, while if a "dash" is sent, the hump is below. Thus the signals in a message are represented by a continuous line full of hills and valleys. Hopelessly unmeaning as this line may appear to the uninitiated, the expert cable operator is able to read it almost as quickly and with as much certainty as if it were ordinary print.

We have now followed the note to the cable terminals on the other side. From this point it was sent by leased wires to London, and relayed there by cable and telegraph lines, either private or government owned, to Amsterdam and Rotterdam, Holland, and Copenhagen, and thence by direct wires to Germany.

It will be interesting, in conclusion, to summarize the disguises which the "Lusitania" message assumed at different stages of its journey. The original note was, of course, in plain English, and in the president's handwriting. Then it appeared in coded form, undecipherable, save by aid of the secret key. On its way from the State Department at Washington to the office of the Commercial Cable Company it existed as electrical impulses of the American Morse dot and dash code, becoming audible on the sounder in the cable office. Once more it reverted to its coded form in the typed copy which the operator at the sounder handed to the cable man. In its next shape, the perforated strip it had lost the last vestige of meaning to the casual observer. Then, through the cable, once more it exists as electrical pulsations, becoming visible at the distant end as a wavy line trailing down the middle of a paper slip. The expert receiving operator translates and types this as fast as the siphon traces out the mysterious symbols, and if one were to compare the copy he makes it would be found identical with the coded message which a few minutes ago was being keyed on from Washington to 20 Broad street, New York.

This is not the end of it, however. Once more it is turned into electrical form and dispatched over other wires and cables until, finally, it is taken from the very end instrument and typed out for the last time in its coded form. Now comes the very

difficult and lengthy process of decoding, performed by aid of the key in the hands of ambassador Gerard in Berlin. This done, the note appears in its original plain English, inviolate and unaltered from the time it left the hands of the secretary of state Robert Lansing.

Dr. Bell on Vibrations.

Dr. Alexander Graham Bell was presented with the Edison Medal by the American Institute of Electrical Engineers May 18, and in his address of acceptance he made some extremely interesting remarks on the subject of vibrations.

Referring to the development of the telephone, Dr. Bell asked his audience: Have you done yet? Are you going to make any new advances in electricity? You have electric light, electric heat, electric power, electric speech, or, rather, hearing by electricity. Are you going on to do anything more? Are you going to see by electricity? I can imagine men with coils of wire around their heads connected together in one circuit communicating thought by induction. However, that is for you to do in the future.

But, speaking seriously, has the end of all things come, and is there really no great field for you? Now, I am struck by this fact, that nearly all the recent developments in electricity have had to do with vibrations. Starting out with the vibrations of sound in an electrical current, we have reached the height of vibrations in the luminiferous ether of space in wireless telegraphy, tuned to reeds that do not correspond to anything we hear.

Now, all our knowledge of the external universe is gained through our sensations, our sensations taking cognizance only of vibrations. Now that we know so much about heat and light and sound and other things, we can put to ourselves a hypothetical case. Suppose you had a rod, clamped at one end, and free to vibrate at the other. Now, pluck this rod and it vibrates. Now, endow it with the property of vibrating continuously, faster and faster, and observe its vibrations in a dark, quiet room. We pluck this rod—you see nothing, you hear nothing; but put your hand upon it and you will feel it move. It appeals to one sense, the sense of touch. Now, let this rod go on vibrating faster and faster, and presently it appeals to two senses, you can feel it tremble, and, what is that, a sound? You begin to hear low musical sounds, emitted by the vibration when it is about thirty-two per second. Let it go on vibrating. It appeals now to two senses, the sense of touch and the sense of hearing. As the vibrations increase in frequency, it appeals more and more to the sense of hearing and less and less to the sense of touch, what we call the pitch of the sound rises and gradually you get a higher and higher and higher pitch, until you get a regular shriek; let it go on still, and when it gets to 32,000 vibrations per second, you have a very loud, shrill tone, and then all of a sudden, at 35,000 or 40,000 vibrations per second, while the rod is going on

vibrating, we have no sense that can perceive the effect—feel it, and it is still, and we no longer feel the tremble; and no human ear can hear a sound at 40,000 vibrations.

Let it go on vibrating, 50,000, 60,000, 100,000, and we have no sense that can take cognizance of these vibrations. At 200,000, 300,000, 500,000 vibrations, still nothing. Well, when we get up to 1,000,000 vibrations per second, then we begin to perceive an effect, not with the sense of touch, not with the sense of hearing, but with the sense of temperature, radiant heat begins to be evolved, you have a sense of temperature. As the vibration goes on faster and faster, you have a heating effect, and radiant heat is more and more perceived by the sense of temperature, and then when you get up to something like 1,500,000 vibrations per second, the sense of sight is affected, red light is produced, in other words, the rod becomes red hot. It again appeals to two senses, one the sense of temperature and the other the sense of sight—it is red hot. Now, let it go on vibrating, 1,500,000 vibrations, 2,000,000 vibrations, and the color of the light changes, it goes through all the colors of the spectrum, and the perception of radiant heat diminishes, the luminous perception increases, and the thermal impression diminishes, and so you go through all the colors of the spectrum until you get up to the violet, something like 3,000,000 vibrations per second, and you perceive violet light.

Go a little higher, and again we have no sense to take cognizance of the vibrations, nothing can be seen, nothing can be felt, nothing can be heard, no temperature effect, and yet put a photographic plate near the rod, and you have actinic rays, ultra-violet rays, that will affect the photographic plate.

How much further up we might have vibrations I do not know, but now the thought that comes to me is this—in that great gap between the highest pitch of sound and the lowest pitch of radiant heat, a gap much greater than the whole of the rest of our sensations put together, we have no sensation, and all of our knowledge of the external universe is derived from our sensations which recognize vibrations. Nearly everything comes through the sense of sight. Just think of all the things you have ever seen, all derived through one octave of vibration, and of this vast gap that exists between the highest pitch of sound and the lowest pitch of radiant heat, we have no sense that can take cognizance of it, and yet these vibrations exist in nature.

But now we are beginning to discover that that term "electricity" comes in that gap. In the signals of wireless telegraphy, we are tuned to a pitch that lies in that gap. Why, then, are we not making instruments for our senses to use, new senses, and when you come to think of the great gap in nature, is there not a field for you in investigating that electrical gap? If we have derived so much knowledge of the external universe through one octave of vibrations that reach the sense of sight, may we not hope for an enormous increase of knowledge concerning the universe when we have means of determining the vibrations that reach us from between these points?

Disaster at Picnic of Western Electric Employees in Chicago.

On Saturday morning, July 24, over 2,000 employees of the Western Electric Company's manufacturing organization at Chicago, together with their families and friends, boarded the steamer "Eastland" for Michigan City, Ind., where a picnic and general festivities were to have been held, when, without warning, the steamer capsized while she was still fastened to the dock in the Chicago River, and over 1,000 men, women and children were drowned.

About 7,000 tickets had been distributed and a fleet of five steamers had been chartered to take the picnickers across the lake. The "Eastland" was the first of the vessels scheduled to depart for Michigan City and a great throng clamored to get aboard. Many of the higher officials of the company were on the dock or on the way there, intending to take the last of the boats to the picnic grounds. None of them was on the "Eastland" at the time of the accident, however, except Mr. F. W. Willard, superintendent of the cable plant. He saved himself and rescued twenty-two others.

Some heroic rescues were made, and the citizens of Chicago did everything possible to render aid to the unfortunate people. Nearby warehouses were turned into temporary morgues and the grief of the survivors and those who had lost relatives and friends was heartrending in the extreme.

The Western Electric Company at once opened a bureau of information at Chicago, also one at its offices at 463 West street, New York, for the purpose of giving all the news obtainable to relatives and friends in both cities. Two thousand of the employees at the Chicago plant were formerly employed in the New York shops and these, naturally, had many friends in New York who were anxious to learn everything possible concerning the disaster.

Dr. F. B. Jewett, assistant chief engineer of the company, had charge of the New York information bureau, where a telegraph operator was kept Saturday night, Sunday and Monday, with a corps of stenographers to make a list of the identified dead as the names came from Chicago, and to aid any person who might desire information. There were also private telephone and telegraph wires from the New York offices to the Second Regiment Armory in Chicago, which was used as a morgue.

The latest information given out by the Western Electric is to the effect that the bodies of 368 employees had been identified, and 442 are still missing, making a total of 810. Besides these, there are 229 relatives of employees dead and missing, making the total 1,039.

Relatives of employees of the Western Electric Company lost in the disaster are provided for under an insurance plan which is maintained through affiliation with the American Telephone and Telegraph Company. The death benefit provides payment of six months' wages to dependents of those having been in the employ of the company for five years or more and one year's pay to those having served for ten years or more, with a maximum allowance of \$2,000. In addition to this, the

company has made a special contribution of \$100,000 for the relief of the sufferers.

The mayor of Chicago has started a fund and called for public contributions. Up to the present time over \$300,000 have thus been raised.

A searching investigation is being made by the federal and state authorities into the cause of the overturning of the steamer.

Two United States government inspectors checked in the number of people who boarded the boat and declared that only 2,500, which was the capacity of the vessel, were admitted.

The bodies of several of those lost were brought to New York for burial.

Electromagnets in Surgery.

Powerful electromagnets are extensively used in European hospitals in removing pieces of shrapnel, steel-jacketed bullets, etc., from the bodies of wounded soldiers. One of the most powerful electromagnets in the world for removing small pieces of metal embedded in the flesh is installed in the relief department of the East Pittsburgh works of the Westinghouse Electric and Manufacturing Company.

The magnet is mounted on a box containing the resistor, which is used to regulate the amount of current flowing through the coils. It requires 4,000 watts for its operation. It is designed for operation on seventy volts.

It is not an infrequent occurrence for steel and iron workers to get bits of metal in their eyes or hands, and it is a very simple proceeding to extract such particles by the aid of this magnet. The portion of the body in which the foreign particle is embedded is placed near the pole tip of the magnet, the switch closed, and the magnet does the rest. The pole is removable, a number of different shapes being supplied for various classes of work.

It is very common for flying bits of metal to lodge in the eye. Should they strike with force enough to become embedded, the removal, without the aid of a powerful magnet, is apt to be difficult as well as painful.

Steel workers frequently have their hands punctured with minute pieces of metal, which become embedded under the calloused skin. If these bits are allowed to remain, the wound is likely to become infected. The use of a powerful magnet insures the removal of all traces of iron from wounds in the hand, or any other part of the body. Some remarkably small pieces have been extracted in this way, one recently recovered being not a twelfth of the thickness of a delicate needle.

BOUND VOLUMES OF TELEGRAPH AND TELEPHONE AGE for 1914 are now available at \$3.50 per copy. Sent by express, charges collect. Unbound copies for the entire year 1914 can also be had at a cost of \$2.00, carrying charges prepaid. This affords an opportunity to secure a complete record of telegraphic and telephonic events for the year, besides descriptions of new inventions, articles by well-known writers and other matter of general interest to the telegraph and telephone worlds. Address, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Reunion of Military Telegraphers.

Following is a copy of the notice sent out to the members of the Society of the United States Military Telegraph Corps by president Colonel William Bender Wilson and secretary David Homer Bates regarding the next annual reunion of that body:

Comrade: The European war and unsettled business conditions generally have caused the Old Time Telegraphers' and Historical Association to omit its customary joint re-union with our society this year. The annual reunion, however, of the Society of the United States Military Telegraph Corps will be held in New York City on Wednesday and Thursday, October 13 and 14, with headquarters at the Broadway Central Hotel, Broadway, corner of Bond street. The hotel rates are \$1.00 up for rooms; European plan for meals. Following is the programme:

Wednesday, 10:30 a. m.—Business meeting.

2:30 p. m.—Electric stage ride along Riverside Drive, through Central Park, down Fifth avenue and Broadway, visiting, en route, Grant's Tomb, Soldiers' and Sailors' Monument and making a call on Mr. Andrew Carnegie, founder of the society, if he is at home.

6:30 p. m.—Banquet at Broadway Central Hotel, dress informal. Five-minute speeches; no set address. Twenty-minute exhibition of appropriate screen pictures relating to the Civil War.

Tickets to the banquet will be \$1.50 per plate, and to the stage ride, fifty cents. These tickets are open for purchase by members of the "Old Time Telegraphers' and Historical Association" who may desire to join.

Thursday—Go as you please.

The reception committee consists of Charles A. Tinker, chairman; Henry H. Atwater, Stephen E. Barton, Charles P. Bruch, David Homer Bates, jr., Colonel Robert C. Clowry, Colonel Albert Brown Chandler, Jesse W. Crouse, Albert E. Chandler, Henry W. Dealy, James Clendenin Eckert, William L. Ives, Verdie J. Knittle, Isaiah D. Maize, Richard O'Brien, Charles W. Pearson, Arthur L. Tinker, Francis S. Wilson, John Wintrup.

In urging comrades to attend the reunion the notice reads as follows: "Not many more opportunities for our comrades to meet in reunion will occur, as the average age of the survivors of the United States Military Telegraph Corps approximates seventy-five years.

"In connection with this feature it is gratifying to observe that our male descendants are taking an increased interest in the affairs of the society, for it is only by this kind that our organization may be perpetuated on the lines of the Society of the Cincinnati, which began its existence at the close of the Revolutionary War. Come with your society button in the lapel of your coat."

Room reservations can be made through the secretary, Mr. David Homer Bates, whose address is 658 Broadway, New York. It is important that the secretary be promptly notified by members who expect to be present.

Mr. Richard O'Brien, of Scranton, Pa., one of the first four operators from the Pennsylvania Railroad line called to Washington by Andrew Carnegie in April, 1861, has been elected vice-president of the Society of the United States Military Telegraph Corps, vice Marion H. Kerner, deceased. David Homer Bates, the secretary of the society, is the only other survivor of the original band of volunteers from Allegheny County, Pa.

Care of Storage Batteries.

Acid should never be added to a battery whose specific gravity is higher than 1.210. If the acid which is furnished is of higher specific gravity than this it should be diluted until its specific gravity is not higher than 1.210. The new acid should be added gradually, that is, enough to replace that evaporated only. Often much harm is done to storage batteries if acid is added when it is not necessary. As a general thing, it should not be necessary to add new acid to a battery except when the sediment is being cleaned out of the jars.

In connection with the overcharging of the battery, the best practice for this type of battery is to give an overcharge for one hour, after the maximum voltage and specific gravity has been reached. If it is found that with this practice it causes sulphate to form, it will then be necessary to give additional overcharge from time to time until the sulphate is removed. It is better to give a small overcharge each week than to give a heavy overcharge once a month.

Care should be taken to start the new charge for the battery before the battery is entirely discharged. It is well to charge the battery when the same is about two-thirds discharged, instead of running each discharge to the limit of the capacity of the battery, because if this is done the limit is very apt to be overrun occasionally, which is detrimental to the battery. Greater life and efficiency can be expected when the cells are not regularly discharged to their limit.—*Signal Engineer.*

EARLY TELEGRAPHY.—Mr. Ralph S. Peirce, of the plant department of the Chicago Telephone Company, has in his possession the original of a message sent from New York to St. Louis in 1854 over the lines of the "National Telegraph," which operated wires "To New Orleans, N. York, Quebec and all other offices in the U. States and Canada." The blank is a curiosity in language and design, compared with the blanks of the present day. It took the telegram three days to pass from New York to St. Louis, and the message was a request for \$50 by telegraph, which was paid in due course. The charges for the telegram and money transfer were \$3.75 and the entire transaction is recorded on the back of the blank, which shows that the transfer service was not very highly developed at that time. St. Louis did not have a telegraph "office," but a "Telegraphy," as is printed on the blank. The sheet contains a decoration showing Jove, with a short beard, sitting in a chair and dispensing bolts of lightning in profusion from an uplifted hand.

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.

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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. Issues over one year old, 30 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

Mistakes.

A man who does things and occasionally makes a mistake is a much better citizen in the community in which he resides than the man who never does things and never makes a mistake.

Thrift.

One of the first recorded instances of thrift is found in the Bible, in the parable of the talents. There, we are told, that the wise servant made good use of the talents entrusted to him, while the slothful man buried his, and we all know the reward received by the former for his diligence and the reproof administered to the other for his lack of it. The lesson is as instructive and applicable to-day as it was then.

A subscriber writes that he has frequently noticed that we have urged members of the profession to learn systematic saving by joining the Serial Building Loan and Saving Institution of New York, and wants to know how becoming a member of this institution will bring about this result.

The benefits of this association are available to telegraphers in all sections of the country. Thousands of members of the craft who have had bank accounts in this institution during the past thirty years made at the start a small deposit, and at the

end of each six months, when they saw their investment growing, they became interested. They added to the deposits as their means would permit and the interest grew in proportion. This interested them still more, and they became thrifty. They economized in other ways and their bank accounts swelled in proportion. Many hundreds of them were paying rent. They then began to purchase homes and the money that had been previously paid out for rent went toward paying off the mortgages.

Let us analyze the meaning of the word "thrift" a little. Thrift, according to dictionary definition, means industry, frugality, economy, saving, prosperity, good husbandry, economy in the management of property, etc., and were it not for thrift on the part of managers of business enterprises these undertakings could not prosper. If this be true of a business why should it not be true of individuals.

Everyone who is able to work should provide a reserve in savings for emergencies and old age. The most wealthy of our citizens make provision for their future welfare in case of business reverses and it is a strange fact that many of those who work for small salaries are proportionately more extravagant in their expenditures than are those who have large incomes; in other words, they are careless, thoughtless and improvident.

There is nothing so satisfactory to the prudent man as the knowledge that he has stored away a fund, however small it may be, to draw on in case misfortune overtakes him. Those working for salaries, above all others, should be the ones to give this matter their earnest attention.

All men are agreed that it is a wise provision, but not all are willing to make the slight sacrifice necessary. Saving does not mean to deny oneself of necessities, but of luxuries if they cannot be afforded, and it is an acknowledged fact that a person can save something from his income, however small it may be, if he practices the virtues previously enumerated. Extravagances must be eliminated and what is ordinarily spent for useless and unnecessary things should be entrusted to some savings institution where it will accumulate interest. One great trouble is the tendency among men to defer action, when "now" is the time to begin. There is a good deal of the "mañana" in the make-up of most men—that is the putting things off until to-morrow what should be done to-day.

It has been truly said that in order to be rich there must be some motive to impel persons to save money with regularity; to encourage them to save their first dollar, and make the one dollar ten, then the ten one hundred, and so on. Building and loan and savings institutions offer every encouragement to save, and every wage-earner should take advantage of these opportunities to accumulate a competence. The main thing is to save something. The amount is of less importance than the fact that part of the earnings are set aside at regular intervals. The first one hundred dollars earned and saved has started many a man on the road to wealth. Therefore begin to save to-day and never stop until you are obliged to.

The Audion Amplifier.

BY S. M. KINTNER, CO-RECEIVER NATIONAL ELECTRIC SIGNALING COMPANY, PITTSBURGH, PA.

I have read with interest a communication appearing in your esteemed journal of July 16, under the heading "The Audion Amplifier, By A Subscriber." In this communication "A Subscriber" describes the characteristics of what he terms a new amplifier for use on telephone circuits and among the several characteristics of this amplifying device I note that no batteries or local source of power supply is required. This being the case I am at a loss to understand how the device mentioned can be properly termed an amplifying device, as my understanding of an amplifier is one which utilizes the received energy as a control of a mechanism which feeds a larger amount of energy than that operating the control into the system and which larger amount then operates the indicating mechanism. Such being the case it does not appear to me proper to call a device which does not feed energy into the circuit an amplifying one. If the device described by "A Subscriber" really does give an increased intensity of sound it must be due to the fact that it is a more efficient instrument than the ordinary telephone receiver, that is, it is more sensitive and converts into useful sound a larger proportion of the total electrical energy received. In this sense, therefore, it cannot be considered an amplifier but simply a more sensitive receiver.

The above comments are made purely in the interest of accuracy and with the hope of learning more of this interesting device which "A Subscriber" states is now in the field. I am sure that many readers of your journal would be interested in learning more of the details of this very interesting instrument and it is to be hoped that "A Subscriber" will give us more complete information regarding its structure and method of operation.

The following information regarding the operation and cost of maintenance of the Audion Amplifier has been furnished by the De Forest Radio Telephone and Telegraph Company, New York.

"The Audion Amplifier is far from being delicate in operation. It is simply necessary to adjust the battery 'B' voltage and thereafter the instrument will remain in adjustment indefinitely. Its reliable operation is one of its greatest advantages. Considering the results obtained, it is not costly to maintain. Like all other objects of value, it has a reasonable cost which is not out of proportion, as the results which can be obtained with it cannot be obtained with any other instrument.

"A large number of amplifiers are in use in the United States Navy, some on the Lackawanna Railroad, a great many in amateur stations, at a number of large commercial stations, such as Sayville, and are in service on the telephone line between New York and San Francisco where three three-step instruments are employed.

"The wire telephone and telegraph rights for this instrument for use in the United States were sold some time ago to the Bell Telephone Company.

We retained all the wireless rights and are always glad to demonstrate the instruments at our office.

"Prices range from \$65 for the one-step amateur type of instrument up to \$500 for the commercial three-step instrument. The bulbs furnished with them have an average operating life, if properly used, ranging from 400 to 1,000 actual working hours and cost \$6.00 and \$7.50 for each renewal."

Reducing Economic Waste.*

BY C. R. FISCHLE.

Unnecessary duplication, in other words, economic waste, is repugnant to the normal individual. No one wants to pay twice for the same commodity; neither does he care to duplicate labor when the same object may be attained by one expenditure of well-directed effort.

Although our nature rebels against the thought of wasted effort, we often find, on looking back over work accomplished, that time and effort could have been saved. Even when we arrange logically each successive step of a piece of work, duplication frequently results. For example, a loop may be built by starting at one end and working toward the other, but moving back and forth entails loss in time. A better method is to do all that is necessary at one particular point before proceeding to another. Cases in which this principle is involved arise continually.

It is obvious that if we preface our work with careful thought, each task accomplished will approach nearer the ideal of economic efficiency. However, we are not all born geniuses, and there will always be stars who do work a little better and more quickly than their fellows. It is no discredit to watch such individuals and imitate them.

A striking case comes to mind of an installer whose methods seemed the acme of economic perfection. He quickly planned his work after seeing the building to be wired. Then placing the necessary materials and tools in an apron with many small pockets of his own design, he went to his work. There was no running back and forth for material, no needless hunting for misplaced articles. Each movement accomplished something, and in the shortest possible time. Not only was his work accomplished in less than average time, but it was exceptionally well done.

The result of effort is largely dependent upon habit. Each individual should choose correct methods at the start, mould them into habits, and then use them for all they are worth.

There will always be a certain amount of economic waste in the telephone, as well as every other business, but if all of us are arrayed against it, sooner or later the minimum will be reached.

Mr. W. W. Morrison, manager of the Postal Telegraph-Cable Company, St. Louis, Mo., in remitting to cover his subscription for another year, writes: "I could not think of being without TELEGRAPH AND TELEPHONE AGE. I therefore thank you for renewing my subscription."

* From Telephone Review.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

How are the relays of the polar duplex at each end of the wire wound and how does the current from each home battery flow through the coils?

Why does the current from the home battery not affect the home relay?

How is a polar duplex balanced?

How is the static discharge from the line eliminated?

What is the condenser used for in connection with a polar duplex?

How is the discharge from the condenser regulated?

Is the quadruplex an apparatus entirely different to the Stearns and polar duplexes?

Is it possible to combine these two types of duplex so as to form a quadruplex?

How is a quadruplex battery divided and why is it divided?

When the key of the No. 2 side of a quadruplex is closed how much of the battery is connected to the line?

When the key is open how much battery is connected?

Does the opening and closing of the No. 2 key affect in any way the current controlled by the pole changer?

What is the purpose of a pole changer in a quadruplex?

Does the pole changer alter the strength of the current sent to line?

What is the tap wire and what is it for?

What is the difference in construction of pole changers for use with batteries and with electric generators?

Does one line-balance in a quadruplex answer for the polar and neutral sides?

Is it necessary to have two artificial lines in a quadruplex, one for the polar and one for the neutral side?

How is a quadruplex balanced?

In operating a quadruplex is the static discharge from the line the only cause of the mutilation of signals?

What is the effect on the signals at the moment the pole changer is closed or opened?

Was the breaking up of signals by the pole-changer reversals understood at first?

What device did Edison employ to overcome the trouble?

What did he call the device?

Are any other means employed to correct the mutilation of signals by the pole changer reversals?

What method did Jones use?

What is the principle of the Smith arrangement?
In what direction were efforts toward improving the quadruplex made?

(To be Continued.)

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(18) Q. What is a "selector" as used on railroad circuits? C.

A. A selector is a device employed to select a particular office or station from a number of others on the same circuit, and, at that point only, ring a bell which will sound continuously until the call is answered. Selectors are also used in large commercial telegraph offices for calling in repeater chiefs on circuits needing readjustment, etc., also in large offices where several way wires are concentrated and attended to by one man.

(19) Q. Can you tell me something about the Fleming valve rectifier, to which I have seen some references in your journal recently? J. R. M.

A. The Fleming valve consists of a filament sealed in a glass bulb, a metal plate being placed close to the filament, so as to leave very little space between the two. The bulb is exhausted of air and the filament is made to glow by means of an accumulator. To obtain the rectifying effect a source of potential is connected to the filament and the plate, the filament being made negative and the plate positive. The space between the filament and the plate then becomes possessed of unidirectional conductivity and is utilized in wireless receivers to rectify received oscillations. An interesting use of the Fleming valve principle was described in our July 1 issue in an article on the "Audion Amplifier."

(20) Q. What is the general method of laying electric cables (telegraph, telephone, etc.) underground? Are the cables laid directly in the ground or are they placed in boxes? A. T. P.

A. In modern practice telegraph and telephone underground cables are drawn through vitrified clay ducts laid in trenches dug in the ground. The ducts are made in short lengths and laid end to end, properly aligned, so that they form continuous tubes through which the cables are drawn. Manholes provide means of access to the ducts, for repairs and for drawing the cables in and out. The ducts in their usual form look like pigeonholes seen in offices, but are made of vitrified clay instead of wood.

(21) Q. Will you please tell me how electric waves are generated for use in wireless telegraphy. W. P. M.

A. There are three methods of generating electric waves, as follows: (1) The spark method, which is at present in general commercial use; (2) the direct-current arc method of generating continuous oscillations which are used in connection with the high-power type installations, and (3) the high-frequency alternator method of generating continuous oscillations, which is also used in connection with the high-power type installations.

INDUSTRIAL.

Improved Wire and Cable Connectors for Electrical and Mechanical Connections.

The Fargo Manufacturing Company, Poughkeepsie, N. Y., has recently brought out a line of mechanical wire and cable connectors and grips which are reliable and easy of rapid application. These features will readily appeal to telegraph and telephone line builders.

The connectors are made in two general types, in one of which the butt joints of cable ends are so tightly compressed by means of conical gripping cones that, for all practical purposes, they are



FIG. 1—STEEL CABLE GRIP.

welded together. This was shown when the case was sawn off. The two cones were forced together with so great a pressure that it was impossible to pull them apart. This is due to compression which forms the cold weld. In taking them apart with the wrench they separate easily, due to the friction of the cases.

In the other type, the "B" type, the ends of the two wires are twisted together by the use of a tool, which results in a joint that is stronger than the wire itself. No solder is used in these joints, and they can be used again after being removed from old work. This is a great advantage, since other connectors have to be scrapped after being used once. The bond is a cold weld and the contact surfaces remain bright indefinitely, due to the absence of solder, which causes corrosion.

The steel cable grip (Fig. 1) is an important product of this company. It is easy of installation and overcomes cutting and "beating" of wires, for the grip is stronger than the cable itself and there is no danger of pulling out or loosening. The strain on the strands is uniform, hence the life of the grip is prolonged and its reliability is

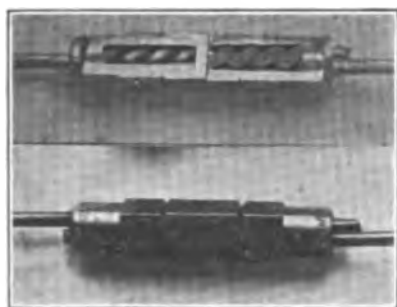


FIG. 2—STRAIGHT CONNECTION JOINT.

dependable. No solder is employed. The body consists of two conical wedging shells united in one piece. It is made of very tough steel and is capable of withstanding many times the stress ever likely to be imposed upon it. The more the pull

on the guy the firmer is the grip by the wedging clamp. The "A" type is made in thirty-five sizes, from 14 B. & S. gauge up to the 2,000,000 c. m.

Fig. 2 shows the exterior of a joint made with the straight connection and the connector cut away to show how the two ends of the wire are twisted together by the simple operation of screwing the couplings to place. This makes a joint of low resistance and of greater mechanical strength than the wire itself. The joint has three times the area of the wire, therefore has high conductivity. These connectors are made for wires from 14 B. & S. gauge up to 000.

The grounding device shown in Fig. 3 gives positive contact and is free from all the troubles arising from the use of bolts and nuts, which become loose and introduce resistance. The wires are locked together, forming a bond of high conductivity, which prolongs the life of the grounding device indefinitely. It is stated that the danger of loose or broken contacts is entirely removed, thus ensuring a reliable ground connection. The wires are firmly locked together in the manner shown in Fig. 2.

The ground points are made in both types "A" and "B" to meet all conditions. With this type of grounding device a perfect return is ensured, for there is no loosening up of bolts and set screws and poor soldered grounds are eliminated. All the

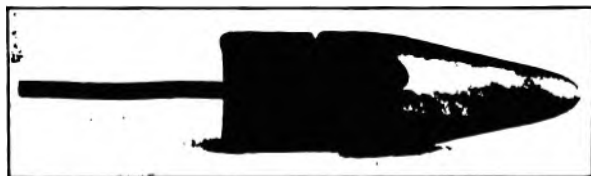


FIG. 3—GROUND POINT.

connections manufactured by this company, as proved by actual test, save twenty per cent of the current, compared with other methods of connection.

Western Electric Awards at San Francisco Exposition.

The International Jury of Award of the Panama-Pacific International Exposition, San Francisco, has awarded the following medals to the Western Electric Company: The Grand Prix for the exhibit as a whole. Gold medals, each were awarded as follows: One for telephone switchboards and equipment; another for telephone train dispatching and control apparatus; a third, for insulated wires and cables. Two bronze medals were awarded for the company's mine-rescue equipment and mine telephones.

The following silver medals were awarded to manufacturers of electrical devices, with the distribution of whose products the Western Electric Company is closely identified: To the American Electrical Heater Company for electric irons; to the Gray Pay Station Company for telephone pay stations; to Edwards and Company for annunciators; to Conlon Washing Machine Company for Western Electric-Conlon washing machines.

Care of Telephone Apparatus and How to Locate and Remedy Troubles.*

(Continued from page 116, March 1.)

At the central office a combination alternating and direct pulsating current generator or pole-changer is used. Thus, negative or positive current may be applied to either side of line at will. Impulses of current applied to one side of the line in such a direction as to cause the armature to move in the opposite direction to the spring will ring the bell, while impulses in the same direction will not. By arranging the two bells on each side of the circuit so that they will respond to opposite currents only one of the four bells will be rung at one time.

FOUR-PARTY SELECTIVE BELL (HIGH AND LOW-FREQUENCY SYSTEM).

This system requires for its operation two different frequencies of alternating current for ringing purposes. The two frequencies of the alternating ringing current which are described herewith are twenty and sixty cycles per second.

The twenty cycles may be obtained from the regular alternating two-pole ringing machine revolving at a rate of 1,200 revolutions per minute, thus giving 2,400 alternations per minute. A generator operating at 1,000 revolutions is satisfactory, as is also a generator running at even a speed of 800.

A satisfactory low-frequency pole-changer may also be used to give the low-frequency current of twenty cycles. A hand generator, when not turned too fast, will give satisfactory results.

The high-frequency alternating ringing current may be obtained from a regular ringing machine delivering a 60-cycle current, that is, one having 7,200 alternations per minute. This would be either a two-pole machine running at 3,600 revolutions per minute, a four-pole machine running at 1,800 revolutions per minute, or a six-pole machine at 1,200 revolutions. It is, of course, entirely practicable to use a power magneto, driven at the right speed, but care should be taken in this case not to get the voltage too high. The easiest way to obtain the high-frequency ringing current in cities having a sixty-cycle alternating-current incandescent light systems, is to use this current direct through a transformer, without the use of any motor-generator. The pressure or voltage should not exceed ninety volts.

In the practical operation of the system as a four-party selective line, four instruments are connected to one metallic line (with talking circuits metallic); two of these instruments have their ringing circuits connected between one line wire and the ground, and the other pair of instruments having their ringing circuits connected between the other line wire and the ground. Each pair of instruments comprises a high and a low-frequency instrument. A selective key having the requisite number of buttons is used at the switchboard for ringing the bells, this selective key serving the purpose of connecting either high or low-frequency

current between either one of the line wires and the ground, that is, sending high or low-frequency ringing current over either the tip or sleeve of the plug and the ground.

TROUBLES.

1.—Bell will not ring.

If the protector is not burned out and the bell is of the series type, connect the two main binding posts together. If now it will not ring, a wire is broken in the box. If careful search fails to find it, the break is in the ringer coils, or the generator is open or short circuited. The same test applies to bridging bells, except that the main bridging posts are disconnected from the line but not connected together.

In some of the later makes of bells, when the hook goes up it closes the generator circuit through the ringer coils so that the bell rings with the hook up for the purpose of testing the ringer coils.

When you have ascertained that the circuit is open in the bell box, you can locate the trouble with your receiver in this way: Disconnect your receiver and your local battery from everything. Hang something on the receiver hook to keep it down, while the receiver is off. Connect a wire from one binding post at the top of the bell to one pole of your battery. Connect the other pole of the battery to one post of your receiver. Connect another wire to the other post of your receiver. Open the bell box. Trace the wire that runs from the binding post to which your battery is attached. Touch it with the loose wire from the receiver, and you will hear a click. Follow this wire, touching it at each place where it makes contact with spring, hinge, generator, coils, ringer magnets, etc., and you will hear the click each time until you have passed the break. Then you will hear nothing. The break is between this point and the last place where you heard the click, because the battery current followed the wire to the point where the circuit is broken. The current cannot cross the break. If the bell is of the bridging type the ringer coils only may be tested in this manner, as the generator circuit is open when at rest. The generator circuit may also be tested from one side of the line to the spring and from the other side through the generator to the spring contact.

Of course it is necessary, in making this test, to disconnect the line and ground wires from the binding posts on the top of the bell box. This battery test may be used to test the coils and other apparatus.

Another simple test is made by disconnecting the wires from the bell binding posts on top of the bell; then remove the receiver cord tips from their binding posts and connect the receiver cord tips to the binding posts on top of the bell from which you have removed the line wires. Hang or place a weight on the hook to keep it down, then turn the crank and listen in the receiver. If you hear the noise or vibration of the bell-ringing apparatus, your ringing circuit is O. K.

A further test to see if the talking circuit is all right is to secure another receiver and cord and connect it up in its proper place, leaving the other

* From *Hyde's Telephone Troubles and How to Find Them*.

connected up on the line binding posts on top of the bell. Have some one else listen in on the receiver while you talk into the transmitter and hold the other receiver to your ear in the regular way (with the hook up). If you can be heard your telephone is all right and your trouble is outside of the instrument, either in the inside wiring or outside line wire. If a ground connection is used the trouble may be due to poor ground connection, or the ground rod may not be long enough to reach good moist earth.

Make careful examination of inside wire, ground connections and line wire, and if no trouble can be found, the trouble is outside of your station.

(To be Continued)

How to Write English Correctly.*

(Continued from page 116, March 1).

In the previous instalments of this article the subject of sentence building was outlined, but the grammatical construction of sentences does not alone constitute good writing. There are other things to be taken into account in writing correctly, such as style, punctuation, etc.

In the present instalment the subjects of style and elegance will be considered.

STYLE.

It is not easy to furnish rules for style. In time a man acquires a style which is as distinct as the features of his face. In news reporting one must be terse and vigorous. He will not require a very large vocabulary. He must be as alert in style as he is quick in action. Editors will not accept "florid" news matter.

But brevity does not mean partial statements of fact. Whatever is told should be told fully. Remember that every sentence must have a verb. It is improper to say "Wedding to-night." This is a phrase only, and has no place in a newspaper. Be exact in all things. Never get a man's name wrong. He will not forgive you, if you do. It is inexcusable to report things incorrectly. Collective nouns, nouns of multitude, usually are followed by a verb in the singular. "None" sometimes may have a plural verb. "Each" invariably has a verb in the singular. "Not only" should be followed by "but also."

The word "we" is rarely used and then only by the editor. Do not be free with the possessive case. This originally was the genitive, and "of" is preferable. Instead of writing "his wife's sister," put it "the sister of his wife." Do not use transitives intransitively. Transitive verbs have objects after them. Intransitive verbs require a preposition between them and the objective case. Do not write "Peter Smith had his head broken." Say "The head of Peter Smith was broken."

ELEGANCE IN WRITING.

Writing is but a record of thought expressed in words and differs from oral speech only in that it does not demand the use of the vocal chords. The reason that so many fail of success in composition is because they do not apprehend this all-important

fact. One should write as nearly as possible as he would relate a story to a friend. There is that radically wrong in the teachings of the schools which turn out yearly millions of boys and girls who have but faint conception of proper speech and far less understanding of what constitutes correct writing. If the teachers themselves were but grounded in the principles of the vernacular, this evil might be hoped to be overcome. While the language offers a very large number of nice and delicate minor rules, those which are important to the structure of a sentence and sentences are so limited in number that they may be learned thoroughly within six months by any child of twelve years of age who is possessed of average intelligence.

It is not the language itself which is difficult of mastering, but it is the teachers who essay to impart knowledge of it that make it mystifying and perplexing. A man or a woman inexperienced in writing attempts the task as though it were one mightier than the greatest feat performed by Hercules. He labors to find "high-sounding epithets and splendid superlatives," and mistakes flamboyancy for rhetoric. Obscurity of expression he ranks as the highest excellence and an involved sentence is to him the supremest proof of skill as a writer.

All writing may be divided into two classes, that which is elegant and that which possesses strength. Sometimes writers of the best class are able to combine the two, this being notably true of several of the ancient Latin authors, as Cicero, Cæsar and others. The Latins in their literature, as in their architecture, aimed first at strength and then at beauty, therein differing from their Greek neighbors, who were content in their development of æsthetics and evolved a language which in no age has had a rival in the elegance of its diction.

It is noteworthy that these ancient masters of literature saw strength in simplicity and beauty in modest apparel of speech. They sought clearness, purity, precision and unity and out of these evolved a leonine majesty of strength. These masters, as masters of written expression of speech in all languages, have survived in their works the wreckage of empires and the mutations of systems of ethics and the speech which conveyed in most simple, truthful, and expressive manner the pleasing burden of that thought.

The writers of this generation who would have the peoples of the future admire and cherish the children of their brain will succeed in their ambition only as they conform to the rules laid down by the ancient immortals of literature. Nature rejects the base, the inartistic and the brutal. Look where one will in all her domain and he will search in vain for what is homely, or repellent or disgusting. Whether one gaze upon the gemmed stars by night, or view from some lofty peak the hoary heads of the giant mountains, or look out upon the heaving waters of the great ocean, or observe the garniture of trees and the varied hues of the odorous flowers, he sees beauty in all. Yet Nature offers to the eye simplicity, candor, fidelity to herself and to her several trusts and an apt appreciation of the duties incumbent upon her.

(To be Continued.)

* From "The Writer's Vademecum," copyrighted by William S. Jewett. For sale by TELEGRAPH AND TELEPHONE AGE, at \$1.00 per copy.

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THE RAILROAD.

MR. P. F. FRENZER, superintendent of telegraph, Union Pacific Railway Company, Omaha, Neb., was a recent New York visitor. He was accompanied by Mrs. Frenzer and their son.

AMONG recent New York business visitors were Messrs. Charles Selden, superintendent of telegraph, and B. F. Thompson, telephone inspector, Baltimore and Ohio Railroad, Baltimore, Md.

RAILWAY TELEGRAPH SUPERINTENDENTS.—The next annual meeting of the Association of Railway Telegraph Superintendents will be held at St. Paul, Minn., June 20, 21 and 22, 1916. Following are the officers of the association for this year: E. C. Keenan, president; L. S. Wells and M. H. Clapp, first and second vice-presidents, respectively; P. W. Drew, secretary and treasurer.

MUNICIPAL ELECTRICIANS.

CINCINNATI CONVENTION OF MUNICIPAL ELECTRICIANS.—The twentieth annual convention of the International Association of Municipal Electricians will be held at Cincinnati, Ohio, August 24 to 27, both inclusive. Headquarters will be at the Gibson Hotel. Some interesting and valuable papers will be presented and discussed, and, taken as a whole, it is expected that the meeting will be a highly profitable one to the members. Mr. C. R. George, city electrician, Houston, Tex., is secretary of the association, and will give further information.

New Fire-Alarm System for New York.

An appropriation of nearly one million dollars has been made for the installation of a new, modern fire-alarm system for the island of Manhattan. The Borough of Manhattan will have an entirely new fire-alarm telegraph system, modern in every respect, including the cables, fire-alarm boxes, and a new fireproof central station in Central Park.

As planned, only ten street boxes will be attached to any single circuit. Each fire house will be connected with the central office by circuits wholly independent of the alarm-box circuits, a maximum of four companies being connected on any one of these circuits. The fire alarms will be sent to the new central headquarters from the street boxes, and will be thence transmitted to the fire house over the central office circuit. Provision is included, by means of independent circuits, for notifying independently the chief of the department, his under chiefs, all fire-boat stations, and the insurance patrol, so that they shall receive all alarms of fire at all hours.

In the preparation of the present plan the principles of engineering, as applied to this problem by Messrs. J. J. Carty and Kempster B. Miller in their preliminary plan, prepared in 1907, have been closely adhered to.

IMPROVING CONDITIONS IN MEXICO.—Large forces of linemen are at work on the telegraph lines in Mexico to restore communication to Mexico City. Thousands of messages have accumulated. The first cable message reached Mexico City on July 12 and the first through train from Vera Cruz arrived at the capital the same day.

OBITUARY.

MISS MARY F. HOBBS, aged sixty-nine years, an old time operator, died in Brooklyn, N. Y., July 13. She retired from active service six years ago.

HON. JAMES J. DELANY, judge of the Supreme Court, New York, and well known to the telegraph fraternity of that city, having occasionally been a guest and speaker at the Magnetic and Morse Club dinners, died on July 13. Mr. Delany was one of the best-known lawyers in the city and his death at the age of fifty-four closes what was destined to be a brilliant judicial career.

R. D. MOHUN, aged fifty years, one of the few surviving comrades of Baron Dhanis in the development of the Belgian Congo, and the only white survivor of the party which connected the east and west coasts of the dark continent by telegraph, died in Royal Oak, Md., July 13, from wounds received in twenty years' service in Africa. Mr. Mohun had been decorated by England, Belgium and France and the Sultan of Zanzibar. He did much to break up Arab slave traffic, and helped break up cannibalism. He went to Africa twenty-three years ago as commercial agent of the United States in the Congo. In 1895 he was appointed consul at Zanzibar and served there until 1897.

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.

DIAGRAMS OF POSTAL APPARATUS.—The official diagrams of the Postal Telegraph-Cable Company's apparatus and rules governing the construction and repair of lines are obtainable in cheap book form. It is a valuable book to have for instruction and reference. The diagrams are very clearly drawn, and the book taken altogether gives a vast amount of information. The price is only fifty cents per copy. Send orders to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

The Telephone in China.

Telephone development in China has been hampered by the great amount of educational work needed to develop a well-defined demand for it. In certain portions of China there is another reason. A large portion of the population lives in boats or sampans that are from twenty to fifty feet long and line the river banks everywhere. Entire families live upon them and change their location from time to time. It is inconceivable to think of telephone service for the masses in such centers when it is said that in the city of Canton alone over 800,000 people live in twenty-foot homes. There is, however, an increasing demand for telephone service and great progress is being made in that direction.

It is the intention of the Chinese Central Government, under the direction of the Ministry of Communications, to control and operate all telephone systems in China, as they do the telegraphs, and the development is gradually being worked along this line. At the present time, however, there are many systems operated by local governments and private companies.

Much of the telephone equipment that is in use in China, switchboards, telephone instruments and associated materials, has been made by the Western Electric Company and installed under the supervision of its experts.

The following are some of the most important equipments:

Peking: The system, as originally installed in Peking in 1911, consisted of two modern central-battery exchanges, each with an equipment for



FIG. 1—TELEPHONE CENTRAL OFFICE BUILDING, TIENTSIN.

1,500 lines. During 1914, an addition to the system was completed, bringing the equipment up to 2,300 and 3,400 lines, respectively, in the two exchanges or a total equipment for 5,700 lines. In January, 1915, there were 4,100 subscriber stations connected.

Tientsin: During 1914, a modern central-battery system was installed at Tientsin to replace the old magneto system. This consisted of one central exchange, with an equipment for 4,000 lines. In January, this year, there were 2,450 subscribers' stations connected.

Changsha: A modern central-battery system, consisting of one central exchange, with an equipment for 1,000 lines, was installed in Changsha in 1914. In January, 1915, there were 600 subscriber stations in operation.

Tsinanfu: In 1913 a modern magneto system, consisting of two central exchanges, was installed



FIG. 2—INTERIOR TIENTSIN CENTRAL OFFICE.

in Tsinanfu, with an equipment for 210 and 320 lines, respectively. In January, 1915, there were 450 subscribers' stations connected.

Lead-covered cable is used quite extensively for outside telephone plant work in those cities of China where any considerable amount of telephone service is given.

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.

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 San Francisco Telegraph Tournament.

Mr. E. Cox, secretary of Panama-Pacific International Telegraphers' Tournament Association, San Francisco, under whose auspices the telegraph tournament will be held August 27 and 28, writes to us as follows:

We are pleased to see that the forthcoming contests are causing some little interest in telegraph circles, as evidenced by your issue of July 1.

With regard to Mr. E. E. Bruckner's letter appearing in the July 1 issue, we would like to say that inasmuch as in former championship events straight sending was employed and the committee, not wishing to make too great a departure from former customs, it was deemed advisable to have the 500 words of press matter consist of 2,500 characters, or an average of five characters to the word, and spelled out, as this would give every sender a chance to best demonstrate his ability. However, realizing the fact that every first-class operator should be familiar with the code, we have made the receiving side of the all-around championship contest 1,000 words coded. You will note the code sending has been taken care of in the third event.

The object of the committee on contests in including all classes of telegraphic work in the all-around championship event was to demonstrate who was the best all-around operator, not merely who was the best in any particular class of work, and the committee feels that the event, as at present scheduled, will come nearer doing that than has this event in any former tournament.

What Mr. F. M. McClintic suggests in the matter of the location of the judges and guarding against possible interference with the contestants had already been anticipated by the committee on arrangements, and, in arranging for an auditorium, these features were given particular attention.

The judges in these events will be entirely removed from the contestants and will have to judge each event without knowing who the contestant is. This is no reflection on the integrity of the judges, whom the committee know to be men above reproach, but a precaution to prevent any suspicion on the part of anyone that he or she did not get a square deal and was not judged wholly on the merits of their performance.

Particular pains will also be taken to see that no one not directly connected with the contests is allowed on the stage while the trials are in progress.

Interest in the tournament is growing daily. Arrangements have been made for the use of the Moose Auditorium, corner Golden Gate avenue and Jones street, in the downtown business district. This hall is one of the most beautiful and commodious in the city and an ideal one for staging events of this kind.

Contestants will occupy a roomy stage at one end of the hall, while the judges will be in a room at the other.

Senders will "get away" to a flying start. A short news item will be furnished at the end of which he will proceed with the tournament matter and a competent handler of the stop watch in the judges' room will catch the time.

The committee in charge of this tournament is especially desirous that all matter, both sent and received, shall be handled in such a manner as to demonstrate the contestant's commercial value as an operator. The judges in these events will be thoroughly competent, and any attempt on the part of the senders to sacrifice Morse for speed will result in his disqualification.

In the receiving class any copy turned out which does not measure up to the standard of ordinary, every-day work will be thrown out.

Mr. F. M. McClintic writes as follows:

"My idea of why telegraph tournaments are held has always been that they were something more than just an opportunity to win money and medals. Those who compete are usually men of the highest ability, who have the improvement of a great profession at heart. If by word or deed we are able to benefit those who follow us, we have added our mite to posterity.

"If Mr. Weir will re-read my suggestions in the July 1 issue of TELEGRAPH AND TELEPHONE AGE, he will not find that I have made any 'charges.' I have suggested some ideas that, I believe, will obviate the possibility of any 'charges' arising during future contests. I was not, and am not satisfied with the Carnegie Medal decision at Philadelphia, but my protest to the judges at that time not being heeded, I have never, nor do I now attempt to 'excuse' the loss of the championship. The decision of the judges was final, right or wrong.

"If Mr. Weir desires to consider my suggestions as 'charges,' and will make a definite statement, I will take pleasure in furnishing whatever evidence he may desire. My suggestions were carefully considered, and in re-reading them, I do not see any that I am not fully prepared to substantiate."

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. 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.

The Barclay Printing Telegraph System.

A new edition of "The Barclay Printing Telegraph System," written by Mr. William Finn, the well-known telegraph engineer, has been published and is now obtainable. This book gives a very complete description of the Barclay system, and has been reproduced to meet the constant call for information on the subject. It is well illustrated and is printed in clear type on finely finished paper. Every telegrapher should be familiar with the system. The price of the book is only fifty cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MESSENGER'S HONESTY.—Joseph Sirocco, a messenger for the Western Union at Lynchburg, Va., recently found a check in the street for \$200, payable to "cash." Fellow messengers urged him to get the money and keep quiet, but he found the owner of the check and restored it to him. He was rewarded for his honesty.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 588 and 589 to meet the claims arising from the deaths of Henry L. Erdman, at Canton, Ohio; Clayton Van Matre, at Muncie, Ind.; Jeremiah Sullivan, at Brooklyn, N. Y.; Frank M. McGlathery, at Paducah, Ky.; Edward E. Williams, at Mount Olive, N. C.; Sheperd M. Dunlap, at Columbus, Ohio; James Beamer, at Detroit, Mich.; William O. Tremaine, at New York; Peter Gries, at New York; William D. Bard, at Benton, Ark.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Commercial agent W. A. Donovan, accompanied by main office operators W. J. Ryan and C. F. Dolan, has returned from the summer capital at Windsor, Vt. During president Wilson's stay a direct wire was maintained from Windsor to the White House, and this season the amount of official business handled has been great; the press file was also heavier than usual. Mr. Donovan, who is personally known to the president, as well as to many correspondents of the metropolitan dailies, has been commended upon the efficient manner in which he and his assistants handled the heavy file. Each day, the president took a fifty-mile automobile ride and the accompanying press car always contained one of the telegraphers.

Mr. W. J. Loveless, a well-known operator of Providence, R. I., is assisting manager Bailey at White River Junction, Vt., in the care of the additional quadruplex circuits and repeaters required in handling the heavy business at Windsor and the White Mountain resorts.

Mr. S. B. Haig, division traffic superintendent, New York, was a recent Boston visitor.

Mr. J. O. Carr, printer expert for the Morkrum Company, Chicago, stopped in Boston for a day

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.

en route to his home in Maine to spend his vacation. Mr. Carr began his telegraph career in the Boston office.

INDIANAPOLIS WESTERN UNION.

Mr. M. F. Beaber has been appointed manager at Salem, Ind., vice Mr. L. E. Shockney, resigned.

Mr. Ernest Grant, of Boonville, has been promoted to the managership at Washington, Ind., and is succeeded at the former point by Mr. George Foley, of Evansville.

Mr. M. J. Kluga, manager at Princeton, Ind., has been promoted to a traffic position at Elkhart. He is succeeded at Princeton by Mr. H. T. Nichols.

The Fort Wayne, Ind., office has been recently removed to larger and more commodious quarters on Calhoun street and new equipment installed throughout. Manager Bradley boasts that he has one of the most up-to-date offices in the state with nothing omitted but the front door key and that is not wanted.

Mr. Charles H. Slemmer, manager of the Union Stock Yards branch office at Indianapolis for more than thirty-two years, died very suddenly at his home on July 6. He started to his post of duty at the usual early morning hour, but after reaching the street car line felt so badly he returned to his home, where he died two hours later, after medical aid had failed.

ST. LOUIS WESTERN UNION.

Mr. J. A. McIntyre, an old timer of this office and agent for the Telegraph and Telephone Life Insurance Association, has gone to California on a leave of absence that will keep him from the office about two months.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

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Surplus	-	-	-	35,000

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You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
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Close at 1 p.m. Saturdays

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Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade
ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 60c. 30 to 35, Full Grade, \$1.25; Half Grade, 82c. 35 to 40, Full Grade, \$1.50; Half Grade, 78c. 40 to 45, Full Grade, \$2; Half Grade, \$1.50. M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 16.

NEW YORK, AUGUST 16, 1915.

Thirty-third Year.

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Facts About Magnets and Magnetism.

(Concluded from page 351, August 1.)

Some substances, notably bismuth, antimony, phosphorus and copper, possess the peculiar property of magnetic repulsion—that is to say, they are apparently repelled from the poles of a magnet. This phenomenon is called diamagnetism, and these substances, when placed in a magnetic field, tend to take a position at right angles with the lines of magnetic force.

Magnetism may be communicated to a piece of iron without actual contact with a magnet, by induction. Thus if a magnet be brought close to a piece of iron (unmagnetized) the latter will become magnetic and will possess the power of attracting iron filings to it. It becomes a medium for the lines of force emanating from the exciting magnet.

Magnetic induction takes place through air, vacuum, glass or other non-magnetic media. If a sheet of glass, or wood or paper be interposed between a magnet and a piece of iron or sheet it is attracting, it will still attract it as if nothing were interposed. Magnetism also acts through water, but it will not act through a screen of iron. This is the only exception. This latter fact is taken advantage of in the manufacture of electrical measuring instruments—voltmeters, ammeters, etc. The iron case of the instruments protects the mechanism from the effects of outside magnetic influences. The reason for this is that the outside magnetic lines of force are conducted off laterally through the iron instead of penetrating through it, leaving the interior space unaffected.

Not all magnetic substances can become permanent magnets. Steel and nickel retain permanently the greater part of magnetism imparted to them. Cast iron retains magnetism imperfectly. The softer and purer a specimen of iron is the less will be the magnetism it will permanently retain. Steel is harder to magnetize than iron, and harder to demagnetize. This power of resisting magnetism or demagnetization is called "retentivity." The retentivity of hard tempered steel is great, while that of soft wrought iron is very small. Soft iron is always used for the cores of the electromagnets of an electric generator because they are more easily magnetized and readily demagnetized when the exciting current is removed.

Laminated, or compound, magnets are made up of thin steel magnets, separately magnetized and afterwards bound together in bundles. Such magnets are more powerful than simple bars of steel. They are usually of the permanent type, although laminated magnets are also employed in alternating current apparatus principally to avoid the generation of eddy currents.

Magnetism may be derived from the earth. Iron bars set upright for a long time acquire magnetism from the earth and if a steel bar be held in the magnetic meridian and in this position struck with a wooden block or mallet it will be found to have acquired magnetic properties. A peculiar effect of terrestrial magnetism is that vertical iron columns in northern latitudes are found to have their lower ends N poles and their upper ends S poles, while in the southern hemisphere the tops of iron columns are N poles, and the lower ends S. Magnetism is imparted to steel wires by twisting them while in the magnetic meridian.

If a steel bar be heated to redness and cooled, either slowly or suddenly while lying in the magnetic meridian, it acquires magnetic polarity, but if it is laid east and west it will acquire no magnetism.

Permanent magnets lose their magnetism partially or wholly if subjected to rough usage. They will also lose their magnetism on being raised to a bright red heat. The slightest vibration will destroy any magnetism remaining in annealed soft iron.

Saturation of a magnet means that the magnet has received all of the magnetism it will absorb.

Residual magnetism is the slight trace of magnetism that remains in soft iron electromagnets after the current has been disconnected. This residual magnetism is utilized in electric generators as a basis for building up the magnetism when the machine is started.

The lifting power of a magnet depends upon the form of the magnet and on its magnetic strength. A horseshoe magnet will lift a load three or four times as great as a bar magnet of the same weight will lift. A long bar magnet will lift more than a short one of equal strength, and a bar magnet with

a rounded end will lift more than one with a flat end, the strength of the two being equal.

A twisted iron wire tends to untwist itself when magnetized, and when an electro-magnet is magnetized and demagnetized in rapid succession, as with alternating currents, it becomes hot, as if the magnetization were accompanied by internal friction.

Telegraph and Telephone Patents.

ISSUED JULY 20.

1,146,786. Telephone System. To B. M. Davis, Chicago, Ill.

1,146,889. Telephone-Exchange System. To F. A. Lundquist, Ingleside, Ill.

1,147,010. Wireless Telegraphy. To R. A. Fessenden, Brant Rock, Mass.

1,147,025 and 1,147,246. Telephony. To M. L. Johnson, Chicago, Ill.

1,147,312. Telephone Attachment. To D. J. Daniel, Little Rock, Ark.

1,147,347. Service-Meter System for Telephone Exchanges. To H. S. Turner, San Diego, Cal.

1,147,389. Automatic Telephone System. To C. L. Goodrum, Rochester, N. Y.

1,147,390. Switches and Circuits for Automatic Telephone Exchanges. To C. L. Goodrum, Rochester, N. Y.

1,147,437. Sending Device. To J. N. Reynolds, Greenwich, Conn.

1,147,636. Telegraph Repeater. To J. McKeon, Great Falls, Mont.

ISSUED JULY 27.

1,147,716. Automatic Telephony. To C. L. Goodrum, Athens, Ga.

1,147,864. Automatic Telephone System. To D. S. Hulfish, Toronto, Ont.

1,147,895. Telephone System. To N. C. Schellenger, Chicago, Ill.

1,147,928. Automatic Telephone Exchange System. To H. G. Dietl, Vienna, Austria-Hungary.

1,148,141. Telephone System for Railway Trains. To E. H. Boudwin, Philadelphia, Pa.

1,148,142. Signaling System for Railway Trains. To E. H. Boudwin, Philadelphia, Pa.

1,148,319. Selective Signaling System. To R. N. Hill, New York.

1,148,458. Substation Telephone. To O. M. Leich, Genoa, Ill.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on August 11:

American Telephone and Telegraph Co.	122½
Mackay Companies	76
Mackay Companies, preferred	66¾
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4¾
Western Union Telegraph Co.	70½

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on

the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

THE RT. HON. HERBERT SAMUEL has succeeded Mr. C. Hobhouse as postmaster-general of Great Britain, this change resulting from the recent formation of the coalition cabinet in the British Government.

MISS ETHEL LYDIA CONGER, daughter of Mr. and Mrs. F. W. Conger, of Chicago, was married on July 28 to Mr. W. R. Gillespie. Mr. Conger was formerly division superintendent of the Postal Telegraph-Cable Company.

MR. GEORGE H. CORSE, JR., for several years identified with American railroad interests in Japan, and who was recently transferred to San Francisco, has been appointed special agent of the passenger department of the Union Pacific Railroad Company, with headquarters at Chicago. Mr. Corse was a New York business visitor last week and called on many of his old friends.

MR. SLINGO KNIGHTED.—Mr. William Slingo, engineer-in-chief of the British post office, London, England, was recently knighted by King George. Sir Slingo's duties since the outbreak of the war have been exceptionally onerous, particularly in connection with communication services. He began his career as a telegraph clerk at the central telegraph office in London in 1870.

DR. A. S. McALLISTER, has resigned the position of editor of *Electrical World*, New York. On his retirement he was tendered a farewell luncheon and presented with a gold watch by the editorial staffs of the various publications of the McGraw Publishing Company, August 6. Mr. F. M. Feiker, of Chicago, has been appointed to succeed Dr. McAllister as editor of *Electrical World*.

MR. JERRY L. NEWTON, San Antonio, Tex., who was for many years manager of the Western Union office in that city, and who recently wrote a history of the telegraph in verse, is the author of a poem entitled "Old Glory's Their Sentinel," published in the San Antonio *Daily Express* of July 25. The poem is dedicated to comrades buried in the National Cemetery at San Antonio. Mr. Newton is a Western Union pensioner. He has been appointed a first-class superintendent in the cemetery wing of the war department and assigned to the San Antonio, Tex., national cemetery for life.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. EDWARD REYNOLDS, vice-president and general manager of this company, has returned from his trip of inspection through the western and Pacific Coast states. Mr. Reynolds left New York June 16. He will spend a week with his family at Lake George, returning to his office August 23.

MR. E. KIMMEY, superintendent, recently made a business trip through New York state.

MR. J. F. SKIRROW, associate electrical engineer of this company, New York, has returned from a two weeks' automobile trip through the New England states.

ON VACATIONS.—MR. M. M. DAVIS, electrical engineer of this company, is at his old home, Chatham, Mass.; Mr. A. J. Eaves, of the electrical engineers department, New York, is on a camping trip in the Catskill Mountains; Mr. E. Kimmey, superintendent, New York, has gone to the Adirondacks, and Mrs. A. W. Porter, chief clerk to vice-president W. I. Capen, is visiting the exposition in San Francisco.

MR. J. J. WHALEN, manager of the main operating department, 253 Broadway, New York, has returned from his trip of inspection through the western and Pacific Coast states. He left New York January 18 and visited all the principal cities west of Chicago.

MR. J. HARGRAVE, superintendent of the Mackay Telegraph-Cable Company at Dallas, Tex., has appointed F. E. Clausen manager at Alexander, La., vice W. A. Relf, appointed manager at Waco, Tex., vice H. Chapman, resigned.

BENEFITS.—During the month of July sick and death benefits were paid to 57 employees.

THE GRAND FORKS, N. D., office of this company has been moved into new modern quarters. Mr. J. Bartness is manager.

A LINEMAN'S FEAT.—Clarence Prevost, a lineman for the Postal Telegraph-Cable Company, attracted much attention in Seneca Falls, N. Y., recently, by crossing from one pole to another over the new barge canal on a "messenger" wire in order to pull a heavy cable across.

REDUCED LEASED WIRE RATES.—On August 2 this company made a fifty per cent reduction in its leased wire rate to the press at night throughout the country. The reduction is from \$12 to \$6 a mile a year to news agencies, and from \$10 a mile to \$5 a mile per year to individual newspapers. The purpose of this reduction, as explained by Mr. C. C. Adams, vice-president, is to enable morning newspapers outside of New York to publish a fuller telegraphic news service.

NEW LINES.—This company is building two copper wires from Seattle to Sumas, on the Canadian boundary, where they will connect with the Canadian Pacific lines. The new line is being built along

the highway and will take the place of the present one on railroad right-of-way. This latter route will be abandoned. The new wires will be used for telephone as well as for telegraph purposes. In addition to the two copper wires a pair of telephone lines is also being put up.

LONG DISTANCE TELEPHONE SERVICE was recently established by this company between Atlanta and Augusta, Ga.; Birmingham, Ala.; Nashville and Memphis, Tenn., and Charlotte, N. C. These circuits connect with the long distance lines of the Mackay Telegraph and Cable Company at Memphis, which extend throughout Texas and Louisiana. Additional long distance circuits will soon be in operation between Atlanta, Ga., and Washington, D. C., and intermediate points. Telephone circuits are also being established from Chicago to Indianapolis, Ind., Cincinnati, Dayton, Columbus and Steubenville, Ohio, and Pittsburgh, Pa.

Western Union Telegraph Company.**EXECUTIVE OFFICES.**

MR. L. MCKISICK, assistant to the president, has gone to San Francisco, where he will spend a portion of his vacation. He will return with his family.

MR. J. C. WILLEVER, commercial general manager, New York, is absent on his vacation. He will return early in September.

MR. J. F. WALLICK, former superintendent at Indianapolis, Ind., now retired, was a recent executive office visitor.

MR. C. A. BOWEN, formerly district wire chief at Memphis, Tenn., has been transferred to the office of Mr. L. H. Beck, division plant superintendent at Atlanta, Ga.

MR. G. GREEN, chief clerk to the general superintendent of plant, New York, is spending his vacation on Lake George.

REDUCED LEASED WIRE RATES.—This company has reduced by one-half the night rate on wires leased to newspapers and press associations. The rate has been \$12 a mile per year for press associations and \$10 a mile per year for individual newspapers.

MOTOR-GENERATORS have been installed at the following named places during the past year: Beaumont and Austin, Tex.; Coffeerville, Salina, Fort Scott, Newton and Parsons, Kan.; Alliance and North Platte, Neb.; Bay City and Sault Ste. Marie, Mich.; Danville and Silvis, Ill.; Dubuque and Waterloo, Iowa; Elkhart and Tipton, Ind.; El Reno, Okla.; Hannibal, Sedalia and Trenton, Mo.; Livingston, Mont.; Newark, Ohio; Pocatello, Idaho.

CONFERENCE AT SCRANTON.—Officials and employees of the commercial, traffic and plant departments at Scranton, Pa., held a joint meeting and a banquet at the Hotel Holland in that city August 5. At the meeting plans for increasing the efficiency of the service were discussed. Mr. W. A. Sawyer, commercial superintendent, New York, spoke of plans made to better the service at Scranton and other important points in that region.

Others present from New York were A. C. Kaufman, J. W. Gaffey and C. O. Bentz, commercial agents.

AMERICAN DISTRICT TELEGRAPH COMPANY CHANGES.—Mr. Frank G. Myers, manager for the Missouri District Telegraph Company, St. Louis, Mo., has been promoted to division superintendent in charge of the southwestern division. Mr. George W. Ross, has been appointed manager at the St. Louis office. Mr. John Small, former night operating manager, is now general foreman of the St. Louis office. Miss M. A. Flannery, cashier of the St. Louis office, has been advanced to the position of chief clerk of the superintendent's division. Mr. Wesley G. Walker, inspector of the St. Louis office, has been advanced to be division inspector.

Statue of "Electricity."

The accompanying illustration is of the figure to be placed on the top of the Fulton street tower of the new Western Union building at Broadway and Dey street, New York. The figure symbolizes "Electricity." It measures, with its base, twenty-



STATUE OF ELECTRICITY.

four feet in height, and, when in place, it will be at an elevation of 434 feet from the sidewalk.

This fine piece of sculpture is the work of Miss Evelyn Beatrice Longman, of New York. She has embodied in her design an heroic figure of a man of strength and power, with the wings of the wind springing from his shoulders; in his left hand he grasps the lightnings of heaven, and in his right the coils of wires which harness it to earth and to the needs of men. These coils wind in

graceful curves about his body, descend to the earth upon which he stands and encircle the globe itself.

The figure is to be gilded, and electric lights are to be placed about the base, with reflectors so arranged as to strongly illuminate the statue, causing it to be seen at night from a great distance.

THE CABLE.

MR. F. B. GERRARD, superintendent, Commercial Cable Company, New York, is in Nova Scotia, where he will remain for two weeks.

CHINESE CABLES RESTORED.—The cables between Shanghai and Chefoo, China, and Shanghai and Foochow are restored. Messages for China now follow the normal routes.

ROCKAWAY CABLE STATION.—The building at Rockaway Beach, Long Island, N. Y., to be used as a cable station, has just been completed. The apparatus will be installed in the near future. The cables now landing at Manhattan Beach will be moved to the new Rockaway Beach station of the Western Union Telegraph Company.

THE BRITISH CENSORSHIP AUTHORITIES renew notice that cablegrams to or through Great Britain must be in plain language or in authorized code. This notice relates to the irregular joinings of words. Words joined together are not plain language, nor are they authorized code, and messages containing such irregular compounds are liable to detention by the censor.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to August 12, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Allucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Oran and Tanger, June 24.

CANADIAN NOTES.

MR. J. McMILLAN, manager of telegraphs, Canadian-Pacific Railway Company's Telegraph, Montreal, Que., and **W. M. Godsoe**, superintendent, Atlantic Division, of the same interests at St. John, N. B., recently made a business trip through the maritime provinces.

Canadian Pacific Telegraph Superintendents of Traffic and Inspectors.

Following is a list of the superintendents of traffic and inspectors of the Canadian Pacific Railway Company's Telegraph:

J. Fletcher, superintendent of traffic, Western Lines, Winnipeg, Man.; **W. D. Neil**, superintendent of traffic, Eastern Lines, Montreal.

Inspectors—**D. Mersereau**, Truro, N. S.; **J. A. Byrne**, St. John, N. B.; **J. Mitchell**, S. L. Elliott and **G. Kent**, Montreal, Que.; **A. J. Grant**, Ottawa, Ont.; **H. S. Ingram** and **E. A. Speer**, Toronto, Ont.; **P. Galbraith**, London, Ont.; **A. Allen**, Sudbury, Ont.; **R. R. Bacon**, White River, Ont.; **F. B. Scott**

and D. McMillan, Winnipeg, Man.; F. E. Camp, Brandon, Man.; J. Baker, Moosejaw, Sask.; F. J. Mahon, Saskatoon, Sask.; E. H. Goodfellow, Medicine Hat, Alta.; L. A. Hutton, Calgary, Alta.; C. H. Powell, Edmonton, Alta.; J. Tait, Nelson, B. C.; G. Wady, Revelstoke, B. C.; H. B. McIntyre, Vancouver, B. C.

THE TELEPHONE.

MR. H. F. HILL has been elected a director and a member of the executive committee of the Cleveland Telephone Company, succeeding Elmer E. Jackson.

MR. D. F. TURNBULL has been appointed division general manager of the Cumberland Telephone and Telegraph Company at Louisville, Ky., succeeding Mr. F. L. Woodruff, transferred to Atlanta, Ga.

MR. F. L. WOODRUFF has been appointed division general manager of the Southern Bell Telephone Company, with headquarters at Atlanta, Ga., succeeding Mr. M. O. Jackson, appointed special agent in the president's office.

MR. CHARLES L. POND, testboard man, American Telephone and Telegraph Company, Indianapolis, Ind., was recently in New York. Mr. Pond made the trip to this city by automobile.

REDUCTION IN LEASED WIRE RATES.—The American Telephone and Telegraph Company has reduced its night rates on leased press wires one half. The former rates were \$12 a year a mile for press associations and \$10 a mile a year for individual newspapers.

SERVICE METERS IN MASSACHUSETTS.—The Massachusetts Public Service Commission has issued an order requiring the New England Telephone and Telegraph Company to install service meters whenever requested by subscribers at the price of \$1.50 per year each, a reduction of 50 per cent in the previous cost of these instruments.

TELEPHONE OPERATORS.—Government supervision of the employment of girls in telephone exchanges is recommended by Nellie B. Curry, an investigator, who was employed by the Federal Commission on Industrial Relations to inquire into the working conditions in the telephone offices in seven cities. Miss Curry reports that as the results of her investigations she is of the opinion that the wages paid telephone girls are too low to enable them to maintain a proper standard of life unless they live at home.

CONVENTION OF TELEPHONE PIONEERS.—The fifth annual convention of the Telephone Pioneers of America, which will be held at San Francisco, Cal., September 21, 22 and 23, will afford the telephone veterans an excellent opportunity to see the most interesting parts of their country. The trip will be made on a splendid special train, and all employes of the Bell System, whether they are pioneers or not, will be privileged to take the trip with the party. The programme of the convention and trip were published in full in our May 16 and June 1 issues, and any further information may be obtained from secretary R. H. Starrett, 15 Dey street, New York.

THE POSTALIZATION OF THE TELEPHONE.—The memorandum by Mr. A. Lincoln Lavine, of the American Telephone and Telegraph Company, based on the remarks of Hon. D. J. Lewis in the House of Representatives, Washington, D. C., March 4 last, has been printed in pamphlet form. "If government regulation is a failure to-day (as was admitted by Mr. Lewis), what reason have we to believe it would be a success under government ownership?" asks Mr. Lavine. "Are we not led irresistibly to the conclusion that 'if government regulation is a failure, government ownership will be a failure, and if government ownership is a success, the reason for government ownership is eliminated,'" says Mr. Lavine, in conclusion.

Review of Principal Articles in Contemporary Telephone Publications.

TELEPHONES AND MOVING PICTURE BUSINESS.—The use of telephones in the moving picture business is told in an interesting way in the *Telephone News* for August. The article is written in a conversational style and is illustrated.

PAY-ROLLS.—"The Work of the Pay-Roll Division" is the title of an interesting article by Miss Edith M. Smith, pay-roll supervisor, published in the *Telephone News* for August. Miss Smith tells of the work of her department. The actual work preparatory to mailing weekly pay-rolls covering 13,000 employes consumes the time of three or four clerks for two full days each week. The work of paying this number of employes each week is a task of great magnitude, and the details make instructive reading.

TELEPHONES IN TARGET PRACTICE.—How the telephone is used in target practice at West Point is described in the August *Transmitter*. A view is shown of cadets at practice with a six-inch gun.

TRENCH TELEPHONES.—The *Post-Office Electrical Engineers Journal*, of London, in its July issue publishes an interesting description of the trench telephone used in the English army. The apparatus designed by the war department provides first grade speaking and ringing facilities and is, at the same time, capable of ready transportation from point to point. The article is illustrated with views of the switchboard, diagrams of connections, etc.

J. HEDLEY is the author of a lengthy article in the July number of *The Post-Office Electrical Engineers' Journal*, of London, on "Developments in the Strowger Automatic System." The article is fully illustrated. The author states that the lines of progress in future will probably be the introduction of a rotary form of line switch which will enable the master switch to be dispensed with, and selectors and connectors mounted on racks instead of on self-contained boards.

"YESTERDAY, TODAY AND TOMORROW IN THE TELEPHONE FIELD" is the title of a paper read by

O. F. Berry before the convention of the Illinois Independent Telephone Association and published in *Telephony* for July 24. The author gives an account of the beginnings of the telephone industry and its development from a luxury to a necessity. He also shows charts illustrating the growth of the business.

RESULTS OF GOVERNMENT OWNERSHIP IN CANADA are set forth in a paper read by Francis Dagger before the convention of the National Independent Telephone Association and printed in the July 31 issue of *Telephony*. Mr. Dagger outlines the conditions which brought about government ownership in Manitoba, Saskatchewan and Alberta, and shows the results of government operation as compared with privately owned systems. The author favors government ownership of long distance telephone service and local ownership of local systems.

A Telephone Book Worth Having.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the most instructive books for telephone students. It gives a very thorough and correct explanation of electricity and magnetism as related to telephone practice, and when one has read and studied it he feels that he has learned a great deal about the fundamentals of the telephone, and that, easily, because the book is plainly written. It has chapters on current, pressure, resistance, magnetism, electromagnetic induction, capacity, batteries and circuit drawing. This work may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price \$1.50.

RADIO-TELEGRAPHY.

MR. LEE LEMON, superintendent, Marconi Wireless Telegraph Company of America, New York, accompanied by his wife and son, has returned from his vacation spent at Beach Haven, N. J.

THE TUCKERTON WIRELESS STATION.—The New Jersey Court of Chancery at Trenton has decided to hear the suit brought by corporations of France to compel corporations of Germany to comply with an alleged contract entered into for the sale of the wireless station at Tuckerton, N. J.

WIRELESS IN ALASKA.—The Marconi wireless service between Astoria and Alaskan points was opened for public traffic August 7. Traffic is now handled for Ketchikan, Juneau, Wrangle, Petersburg, Cordova, Sitka, Douglas and Treadwell. Extension of the system to other points in Alaska is contemplated.

BROWNSVILLE RADIO STATION.—The government wireless station in the control of the army at Brownsville, Tex., has been increased to nearly double its former capacity and now can communicate with vessels at sea 800 miles from the station. The station handles a large portion of the military messages from the border patrol along the lower Rio Grande to the Army Department at Fort Sam Houston in San Antonio.

ARMY PORTABLE RADIO APPARATUS.—The Signal Corps of the United States Army has completed two

types of portable radio-telegraphic apparatus, one employing a one-kilowatt, alternating-current generator of the high-frequency type and the other a two-kilowatt generator. The crew is able to put up the eighty-foot mast supporting the umbrella-type antenna in about five minutes. Under favorable conditions, the set can communicate with a receiver at a distance of 150 miles, and it is believed that it can be depended upon, under ordinary conditions, for 100 miles. These outfits are now being used throughout the country in tests and practice.

Institute of Radio Engineers.

On Thursday and Friday afternoons, September 16 and 17, joint meetings of the Institute of Radio Engineers and the American Institute of Electrical Engineers will be held at the Native Sons of the Golden West Hall, Panama-Pacific Exposition Grounds, San Francisco. Two papers for the radio Engineers will be presented, one on each day. Thursday afternoon Prof. Harris J. Ryan will read the results of investigations on the "Sustained Radio Frequency High Voltage Discharge," by Mr. Roland G. Marx and himself, taking up the flame and brush type of discharge obtained from conductors when a powerful arc generator is used to apply voltages up to 50,000 at frequencies as high as 200,000 cycles per second. On Friday, Mr. Robert H. Marriott will read a paper on "Radio Development in the United States," giving especial attention to Pacific Coast conditions.

Marconi Ideal of Courtesy.

Following is the Marconi ideal of courtesy as expressed by Mr. E. J. Nally, vice-president and general manager, Marconi Wireless Telegraph Company of America, New York:

"COURTESY AMONG OURSELVES AND TOWARDS THE PUBLIC.

"Courtesy means respect, politeness, kindness. It is synonymous with good breeding.

"The reputation of any public utility rises or falls on the friendship of the public. An act of indifference to a patron, though it be from the humblest employee, is a reflection on the whole organization.

"The spirit of the Marconi Company will be known to the public chiefly as it is reflected in the acts and attitude of its employees. An inquiry, no matter how trifling it may seem to the employee, may be of relatively large importance to the questioner and should be met with respectful interest. That man is approaching closest to the Marconi ideal who, in the performance of this or any other service, behaves with a politeness which relieves the customer of a sense of obligation.

"Every reference to 'Marconi,' whether written or spoken, is a reminder of a great service rendered to mankind. It is our company's privilege to bear a birthright founded on one of the greatest of all man-given benefits to humanity. Let us be worthy of it, and of its ideal, and in so doing, build character for ourselves and promote the fair fame and prosperity of our company."

Tesla Suit Against Marconi Company.

Mr. Nikola Tesla has brought suit against the Marconi Wireless Telegraph Company of America for the annulment of the principal Marconi patents, also a suit for infringement of his patents. Mr. Tesla bases his action on the allegation that his two patents were granted in 1900, and that the Marconi patent was not granted until 1904. The Marconi Company denies that the Marconi patent covers the invention or combination of apparatus described by the Tesla patents.

Mr. E. J. Nally, vice-president and general manager of the Marconi Company, makes the following statement: "The Marconi Company has a right to its patent and can establish that right in the courts. Many individuals and companies have infringed the Marconi patents, and others have attempted to disprove the originality of our inventions; but when our present litigation shall have gone through the courts, I am confident that the leadership of the Marconi Company in the invention and development of wireless communication will be established."

Naval Radio Stations.

Out of a total of forty-seven naval radio stations which are now in use in various parts of the United States or possessions, twenty-one are open to commercial messages, while the others are reserved for official business. In the Canal Zone there are two stations—at Balboa and Colon—which receive commercial messages. The new station at Darien need not enter that field in order to accommodate the public, as the facilities are already adequate.

Besides these the Army of the United States, through its signal corps, has stations that are open to commercial business at Fairbanks, Alaska; Fort Mills, Philippine Islands; Fort St. Michael, Alaska; Kotlik, Alaska; Nome, Alaska; Petersburg, Alaska; and Wrangell, Alaska.

Plans have been made for radio communication between San Francisco and Manila by way of Honolulu, but work on that project will not be commenced until fall, and the section to Honolulu will not be in operation until a year from this time.

A naval station at Point Isabel, Tex., and Great Lakes Training School station are under construction.

The Darien station, which has just been put into operation, has three masts 900 feet apart, each mast being 600 feet high. The equipment is of the 100-kw continuous oscillation type of apparatus. The station is situated at the edge of Gatun Lake.

Useful Book on Wireless.

"Operators' Wireless Telegraph and Telephone Hand-Book," by Victor H. Laughter, is a book that every wireless man should possess. It is a complete treatise on the construction and operation of the wireless telegraph and telephone, including the rules of naval stations, codes, abbreviations, etc., and is written in plain language and very thorough in its treatment of the subject. It has 172 pages and 86 illustrations. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway New York. Price, \$1.00 per copy.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

ADMIRAL SIR HENRY JACKSON, First Sea Lord of England, well known in wireless circles through his active interest in wireless telegraphy, is the subject of a biographical sketch in *The Wireless World* for July. It has been stated that Sir Henry Jackson preceded Mr. Marconi in the invention of Hertzian-wave wireless telegraphy. He has made many improvements in modern naval wireless telegraphy.

"WIRELESS IN THE NEAR EAST" is the title of an article in the July number of *The Wireless World*, describing the Port Said, Egypt, station. The installation, which is of a composite system, has a power of about five kilowatts. Current for transmission is supplied from a large battery of accumulators, which are periodically charged from an oil-engine driven generator. The wireless conditions in this part of the world are not, by any means, ideal, as atmospherics are at times very strong and troublesome.

PHOTO-ELECTRIC PHENOMENA.—The July number of *The Wireless World* contains the second Tyndall lecture at the Royal Institution, London, delivered by Dr. J. A. Fleming, his subject being "Photo-Electric Phenomena." Dr. Fleming stated, in conclusion, that there is not only a diurnal but also an annual variation in signal strength which follows the path of the sunset line. The whole question of wireless transmission over great distance is very complex, he said. Diffraction of the space wave, wave energy also travelling through the crust of the earth, refraction and interference, all play a part. No theory can be complete which does not admit the photo-electric effect of solar light and the effect of solar dust.

THE NAVAL STATION at Radio, Va., is described by Mr. Charles J. Pannill in *The Wireless Age* for August. A brief history of the station is given, together with an account of the work done there, and the names of the official staff. The article is illustrated.

MR. WILLIAM J. BROOKER, one of the oldest radio operators in the employ of the American Marconi Company in point of service, tells the story of his fourteen years in the wireless industry in the August number of *The Wireless Age* (New York). Mr. Brooker has had a wide and varied experience.

"THE RAPID AND SIMPLE CALCULATION OF THE INDUCTANCE OF A CYLINDRICAL SINGLE LAYERED COIL" is the title of an article by William A. Priess in *The Wireless Age* (New York) for August. The article was especially prepared for amateur experimenters and is highly instructive. The subjects covered are the capacity of a condenser and inductance of a coil, both being treated mathematically. Examples are presented to show the application of the formulas.

Plenty of Opportunity for Advancement.

BY PETER HIGGINS, A FORMER OPERATOR.

I have read with much interest your editorial articles in recent issues aiming to encourage operators and other employes to make the best of their opportunities and fit themselves by study and observation for higher positions.

Many employes of the telegraph companies who are earnest and working hard for advancement experience periods of discouragement by allowing themselves to fall into the belief that there is no room at the top and that they are doomed to remain in the lower levels of employment. It is hardly necessary to state that they are wrong—positively wrong. They are wrong because it is not true, and it requires very little argument to prove that it is not true. If they think that it is so it is because there is something wrong with themselves, and the sooner they stop thinking that there is no chance for them and go to work with determination to succeed the better it will be for them.

The principal trouble with those who get discouraged is that they are in many cases in too great a hurry to gain the rewards they think they are entitled to or that their efforts are not appreciated.

In the business world it is true that the higher up in the scale the fewer are the positions. But the positions are there and become vacant occasionally through death, resignation or other causes. Some one must be found to fill them and those who are best qualified are selected. This is the secret of the whole situation.

Let those who feel disheartened look at the names of the officials of the telegraph companies. Every one of them worked his way up from a messenger, an operator or a clerk, and their success is due largely to their having learned while they worked.

There is as much and, perhaps, more opportunity now for advancement than there ever has been, because there are many more positions to fill and the field is much wider. But he who is not willing to work in patience and overcome obstacles cannot reasonably expect to receive preferment.

Among the names of officials that stand out as shining examples of success are found those of Edward Reynolds, E. J. Nally, W. H. Baker, A. B. Chandler, the latter three being former presidents of the Postal Telegraph-Cable Company, and the first named the present vice-president and general manager of the same company. They all started from the bottom of the ladder. In the Western Union service are found the names of Belvidere Brooks, J. C. Willever, A. G. Saylor, H. C. Worthen, W. W. Ryder, W. J. Lloyd, S. M. English, C. H. Gaunt and many others, all of whom reached their present positions of responsibility through merit. These men were not of the kind to get discouraged; they mastered obstacles and did not let obstacles master them. Favoritism is a negligible influence in filling higher positions; merit alone is what counts.

What I have said with regard to the telegraph is equally true of the telephone. Most of the official positions in the telephone industry are held by men who started their business careers as telegraph mes-

sengers, clerks and operators. Beginning with president Theo. N. Vail himself, who was formerly a telegraph operator, we find many old-time operators holding high positions with the telephone companies in various parts of the country. Among these may be mentioned Messrs. B. E. Sunny, Thomas D. Lockwood, H. J. Pettengill, W. T. Gentry, C. H. Wilson, F. H. Bethell, J. S. McCulloh, and many others who have "made good" by reason of their earlier telegraphic experience. This process of development of character and ability is going on all the time, and in the nature of things will never end.

I do not want to convey the impression, however, that an operator, for instance, can at once step into the president's or a general manager's position. He must get there by degrees. There is always the possibility and it depends largely upon a man's own efforts how far he will succeed.

My advice is: Do not be tempted to stop learning; to believe that one knows all that it is necessary to know; to be ruled by natural laziness instead of keeping to the fact that one must be a new man each day if he is to meet its new requirements. These are dangers that confront all of us, and we must be on constant guard to repel them as we would an enemy.

Every operator who has a spark of ambition in him should study such books as "Correspondence School Lessons in Elementary Telegraphy," by J. H. Penman; and "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by Willis H. Jones. Telegraphers should be thankful that they have two such excellent books at their disposal, for nowhere else can such a fund of valuable information be found within book covers.

Military Telegraphers' Reunion.

The annual reunion of the Society of the United States Military Corps will be held at the Broadway Central Hotel, New York, October 13 and 14. The business meeting will be held in the morning of October 13, and the afternoon will be spent in an electric stage drive to points of interest. In the evening there will be a banquet at the hotel. On October 14 the members will be free.

We are advised that acceptances are coming in freely to the secretary of the Society of the United States Military Telegraph Corps, and that the reunion will be very well attended. Of course all military telegraphers in New York and vicinity will be present, and also many members of the Old Time Telegraphers and Historical Association, who are privileged to attend, will be welcomed, particularly at the banquet on the evening of Wednesday, October 13. The largest banquet room of the hotel, where many telegraph dinners have previously been given, will be crowded, so that those who expect to be present should send in their acceptances promptly to the secretary, Mr. David Homer Bates, 658 Broadway, New York.

The exhibition of Civil War pictures relating to the telegraph after the banquet will be of special interest, and will include a number of views never before shown.

Col. William Bender Wilson, Holmesburg, Philadelphia, Pa., is president of the society.

How War News Is Censored.*

With censors sitting constantly at the end of every European cable, using huge blue pencils without stint or diffidence, it is perhaps no wonder that definite, detailed news of the great European war is difficult to get and that there are suggestions of unfairness in the handling of despatches from some of the war stricken nations.

This especially applies to Germany, from which no cable news can come at all until it has filtered through either a French or English cable station.

Since the first guns were fired in the siege of Liège, in Belgium, Germans throughout this country have lodged bitter complaint that news of their armies was colored to make it appear that the Fatherland was suffering disastrous reverses, whereas, it was asserted by the same persons, Germany was holding up her end with her accustomed bravery and success in all the early engagements.

While there is no disposition on the part of the great newspapers of America to misprint or mislead, it is not improbable that some news from Germany that might have given a more optimistic picture of conditions from her standpoint has not been published.

This is due to the fact that it has been next to impossible to get information through by way of cable stations in other nations unless the other nations desire to have it published.

For the same reason it is perhaps a fair assumption that some of the other nations have been able to have published news of their own affairs which they were glad to see in print.

At the present time the German cables are interrupted. It is assumed that they have been cut. Therefore, if the German army officials should give out an official report of a battle in which they were victorious, the news would have to be sent either through a French or English cable station—unless it were carried overland to the Far East and ticked from there to the Pacific coast of America, and as, under the rules of nations which hold forth now, "All is fair in love and war," the English or French censors could, if they wished, suppress the entire cable despatch.

While they have most likely suppressed some, it is nevertheless true that they have let many come through as originally written. There is every indication also that the French and English have emasculated many of the despatches bearing on their own victories and reverses, the whole aim of the censorship being to surround the army movements with secrecy so that the "other side" will not know what is being done.

Never within the memory of cable operators now living has there been anything like the rigid censorship over cables that is now exercised by all the nations and, of necessity, by the cable companies themselves. No cipher or code messages are accepted by the companies to any of the nations now engaged in war. No "mystery" or code messages are accepted to any European countries, for the simple reason that at present to reach almost any section of the European Continent they would have

to go through a British or French station, and there they would be held up. War time is, in the rulings of war generals, no time for secret messages.

Should a correspondent manage, after "riding" the lines of a dozen armies, to make his way to a cable station far from the scene of conflict and try to file a story to his newspaper in the United States or South America, or to some other country which is at peace, the chances are twenty to one that he would find himself in a British or French cable station and as helpless as though he were in the most rigidly censored station in either France or England.

The rules are the same the world over, and the censors everywhere understand them and are inflexible. The governments now fighting do not want anything printed that might inflame adverse public sentiment in their own countries, cause uneasiness among sympathizers in friendly and peaceful nations, shed light upon the movements of troops or battleships or give the slightest clew to the enemy.

According to the cable company officials, every message that is filed in the war countries for publication in this country must have a duplicate sent at once to the State Department of the country in which it is filed.

The government is supposed to visé this before the cable company can send it. But this is only a preliminary part of the censorship system. The manager of the cable office in which the message is filed looks it over and decides whether it is worthy of submission to the government censor who is stationed at the cable office. Sometimes the cables, it is said, are so cryptic that the manager himself destroys them without even bothering the censor.

The censor, who is either an army or an interior department official and as heartless—from a business point of view—and as keen sighted as it is possible to be, looks over the despatches, which must be written out, of course, in full, and crosses out anything that he thinks would be detrimental to his government if published either in America or anywhere else.

It is possible they also cross out things which they think might reflect glory upon the countries with which they are at war. There is no evidence, however, that they have done this.

The theory that despatches are "colored" is without justification. Governments at war have no hesitancy in suppressing cables. They announce they are going to do so. But they never interpolate. They never change the meaning. It often happens that they eliminate so much from some news despatches that it is very difficult for the recipients to interpret the meaning of what is left, but there is no wanton misrepresentation, even, it is always assumed, when the strife is bitterest, and public sentiment and publicity become vital factors in a great struggle.

When the war was in its preliminary stages the German cables were being operated. Then German news came to this country without being viséd at French and English cable stations. Then, suddenly, they were interrupted, and since then news of the German army has been sifting through stations of

*From the *New York Herald*.

other nations. This will continue until the German cables are repaired.

Many persons ask why it is not possible for a correspondent to study the operations of, for instance, the armies along the German, Belgian and French frontiers; fill himself with information of the kind the American nation is hungering for; speed post haste to Denmark, Sweden, or even straight to America, and publish whatever he pleases, regardless of censorship. It would appear to the average person unacquainted with conditions that this could be done; but it is next to impossible.

But let us assume for purposes of illustration that an American correspondent bumped his way by every opposition and landed in America with a complete, unpublished story of some great battle. He could publish his story in his own paper here without question. There would be no restriction whatever. In this way, many people think, the details would get back to the countries affected. But they wouldn't.

In the first place, they would again have to run the gamut of British and French censorship, and even if they got by—which they wouldn't—the papers in the countries under martial law would not dare to publish anything that is under the ban. In other words, if a newspaper printed information that was regarded as helping the enemy the government could take drastic means of suppressing for the time being any such newspaper.

It has been stated lately that "cable despatches" intended for publication pass the eyes of nine censors before they are delivered to the publications addressed.

First, on the other side they go to the first or preliminary censor. Then, concurrently with this, they are inspected at the interior department, then they pass the eyes of the official censor at the point of leaving the country. Then they are inspected at many other points before being delivered, the last important one being the receiving station in Nova Scotia or Newfoundland, from which points all the French and English cables have their start.

In the old days before the telegraph, cable and telephone service was perfected, and when such a thing as wireless was unknown, the governments were not so particular as now, because news was necessarily slow in getting out and before it was published the dangers of publicity were passed. The operations outlined in despatches, which were chiefly by letter, had been completed.

Now all this is reversed. Methods of communication are so instantaneous and means of travel so swift that the whole war programmes could easily be upset and ruined if newspapers were permitted without restriction, to utilize all their facilities for news gathering and publication.

No doubt, throughout the war there will be criticism of newspapers here and abroad by statesmen who see bias or prejudice in published reports. But it is a fair assumption that the newspapers in America are moved by the one desire to publish the news without color, and without wishing to hurt or help anyone engaged in the strife.

Whatever false impressions may be created will,

it may be safely assumed, be due to the action of governments themselves and not to the newspapers who print the news as they get it.

The General Manager's Duties.

The general manager of a telephone company in one of the large cities sat in his office talking to two men about questions relative to development of the business. He did not seem to be overburdened with work. There were but few papers on the top of his desk and they were arranged in one orderly pile. The younger of the two visitors noted these things, noted also the interruptions by telephone, when the general manager decided questions apparently offhand, saw him sign several papers brought in by the stenographer. Then the young man wondered if he had not received a wrong impression of the general manager's work. He wondered if there were not beneath the outward appearances of an apparently easy position, things below the surface which sometimes caused the general manager many restless and sleepless nights. He determined to find out all he could about a general manager's duties.

The results of his investigation revealed many things regarding general managers which he had never thought of.

He found the general manager had to satisfy not one, but three masters—the owners or stockholders, the public and his workmen or employees.

The owners or stockholders of the company expect him to make the business pay, in other words, to make it grow; to keep the cost of operation and maintenance at such a point to secure the greatest economy; to foresee the trend of business and to be just a little ahead of it in providing for the future; to avoid incurring a large debt; to so run the business as to accumulate a surplus to provide for emergencies—periods of general business depression—and yet continue the payment of the regular dividends. That is what he found is expected by the stockholders.

The public demands of the general manager, that the quality of the service be kept up to a satisfactory standard; that service facilities be provided them promptly as the growth of the city and of business demand; and that they be dealt with honestly as to rates and other questions.

The employees expect of the general manager, fair treatment—the practical application of the "square deal" policy—reasonable hours with fair compensation and steady employment. They expect opportunity for advancement and satisfactory working conditions which include, among other things, "heads" of departments and others in authority who are reasonable with and possess "human feeling" for those under them.

After learning these things, the investigator's attitude and his opinion of the general manager's position underwent a radical change. It has many angles and responsibilities which are often not considered by the stockholders.—*Telephony*.

J. P. McQUADE, aged sixty years, a well-known electrical wire and conduit man in New York several years ago, died in London recently.

Production of Telegraph and Telephone Poles.

It is often stated that the supply of woollen poles for telegraph and telephone lines is rapidly diminishing and that the time will come in the not distant future when it will be cheaper to substitute some other material than wood, such as concrete, iron, etc., for pole line construction.

Concrete poles are being used to some extent in exposed situations and are giving excellent satisfaction, but their cost is the determining factor in their selection as against wood.

Glass poles have been manufactured in Germany. The glass is reinforced by a frame work of heavy wire. The advantages of these poles, as compared with wooden poles, are that they are less affected by atmospheric influences and are not attacked by insects.

Wooden poles are often treated with some preservative in order to extend the life of the timber, but there, again, the question of expense becomes an important consideration.

The production of wooden poles in this country is an industry of considerable magnitude. In the year 1913 the shipments aggregated 5,000,000.

Woods of different varieties are best suited for and used in different parts of the country, but the old stand-by—chestnut—is rapidly growing scarcer. In the northern part of the country white cedar is extensively used; in the west, red cedar; in the east and south, chestnut, yellow pine and juniper. The white cedar of northern Michigan, Wisconsin and Minnesota forms a large proportion of manufactured poles. This timber has the essential elements of strength, lightness and long life in such a measure that they are used all over the country.

In the manufacture of poles, referring particularly to the production of white cedar poles, there are many difficulties to overcome, but brawn aided by snow and ice, successfully meets them. A soft or mild winter is a misfortune to the pole manufacturer, because his best work depends largely upon much freezing cold and some snow.

The making of a pole is a combination of growing it as a tree and then manufacturing it. A large manufacturing concern buys "stumpage"—which means growing trees. The stumpage is made up of a variety of trees of different sizes, which the operator must cut clean, making poles, posts, ties, etc., for he cannot afford to traverse the land a second time.

The operation of taking a growing tree and making it into a pole is about as follows:

In the summer a "camp" is established in the woods; this does not mean a tent city, for the buildings are of wooden logs, substantially put together. The "cook-house" is very important, for if the men are not fed well they will not work well. The men are known as "lumber jacks" and are chosen for strength and skill in their difficult work rather than for polish.

During the fall the trees are felled and made into poles; this work is generally carried on by one man with a one-man saw, axe and bark spud. After the tree is felled the branches are trimmed smooth, the tree is measured for length; top and butt are cut

square and the bark is removed by means of the bark spud.

When the frost has made the cedar swamp solid and the snow has come in good measure, the hauling begins. The first operation in this is to run a sprinkler over the roads, covering them with water which quickly becomes ice; then a groove is cut in this ice, in which the runners of the sleighs move; thus these sleighs keep from getting lost in the snow of the swamps and are able to carry gigantic loads, sometimes as much as 30,000 pounds to the sleigh.

The poles are brought in to the "landing yard," where the first inspection and rough sorting takes place. The next action is to ship them to the large "concentration yards," at which the stocks are carried. Here they are sorted and inspected a second time, more carefully and by men more directly in touch with specifications and customers' requirements. This ends the manufacturing process—the tree has become a pole.

The production of chestnut poles and cedar poles differs in that the former are produced every month in the year and, as the timber is not ordinarily found in abundance in any one locality, extensive operations such as are conducted in producing cedar poles are not possible. The source of supply is, therefore, largely obtained through small contractors who cut and haul the poles to the nearest railroad station from which they are shipped direct to the consumer.

Throughout the New England and middle Atlantic states, chestnut is the principal native timber suitable for telegraph, telephone, and electric transmission poles. It is naturally a long-lived tree, grows reasonably straight, is well proportioned from top to butt; the timber is soft and therefore easy to climb by linemen, and its lasting qualities, when set in the ground are only surpassed by the northern cedar pole. Chestnut possesses great strength and is, therefore, particularly well adapted for withstanding the sleet and wind storms peculiar to the section in which the timber is found, while another great advantage is its nearness of production to points at which it may be required for use.

Standard Ohms.

The Bureau of Standards, Department of Commerce, has just issued a publication by F. A. Wolff, M. P. Shoemaker and C. A. Briggs, dealing with the construction of four standard ohms.

This unit was defined by the London Congress as the electrical resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 14.4521 grams in mass, of a constant cross-sectional area and of a length of 106.300 centimeters. The work done at the Bureau of Standards consisted in the construction of material standards representing the unit realized in the form of mercury columns in glass tubes, and the work involved measurements of the highest accuracy of the length, the departure from uniformity of the cross section, and the mercury content of each tube as well as their comparison with working standard. All measurements had to be made at the melting temperature of ice prepared from specially purified water which was used in

order to avoid any temperature uncertainty due to possible impurities in the ice.

Electrical comparisons of the four standards showed the average deviation of their individual values from their mean value to be less than one-hundred thousandth of an ohm.

Similarly, accurate work has been done at the Bureau with regard to the ampere and the standard volt.

ANSWERS TO QUESTIONS.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(22) Q. I have seen somewhere rules for determining the weight of a body from its specific gravity; also for determining its volume or bulk from its weight. Will you please state these rules and oblige. J. F. B.

A. (1) The weight of a cubic foot of a solid or a liquid can be determined by multiplying its specific gravity by 62.425, which is the weight of a cubic foot of water. Thus, for instance, the weight of a cubic foot of cast iron, whose specific gravity is 7.207, would be $7.207 \times 62.425 = 449.896$ pounds avoirdupois.

(2) The volume or bulk of any given weight of a substance can be found by dividing the number expressing the weight in ounces by the specific gravity of the substance, omitting the decimal points. The quotient will express the number of cubic feet in the volume or bulk. For example, what is the volume of one pound of aluminum? 1 pound = 16 ounces; specific gravity of aluminum = 2.5. $16 \div 2.5 = .64$ cubic feet. Two pounds will have a volume of $2 \times .64 = 1.28$ cubic feet. All fractions of a pound must be expressed decimally.

Telegraph Athletes in 1881.

In going through his personal papers recently, Mr. Wm. Maver, jr., the well-known old timer of New York, found a document which possesses considerable interest at this time. It is a list of subscribers to and participants in athletic games held by the "Western Union Athletic Association" in New York, in 1881. F. W. Baldwin was the chairman of the committee of arrangements and Wm. Maver, jr., secretary.

In looking over the list the names of many telegraphic celebrities of those days are found, in their own handwriting. Among them may be mentioned John Brant, E. A. Leslie, J. W. Moreland, D. Harmon, jr., J. E. Fenn, H. Van Antwerp, E. M. Anson, W. C. Cherry, H. H. Henry, J. L. Edwards, E. F. Howell, A. E. Sink, A. S. Downer, E. F. Cummings, Thomas Brennan, G. W. Gardinier, Joseph Knittle, W. L. Prentice, L. B. McCarthy, F. W. Cushing, J. P. Bradt, T. E. Fleming, D. Le Rougetel, S. S. Bogart, W. L. Waugh, A. S. Brown, H. H. Ward, E. C. Cockey, F. W. Jones,

Wm. Hunter and many others. Judging from the long list almost every telegraph man in New York contributed.

The contests were held on May 19. Among the events were a green walk of one mile; messengers race, in uniform, and a three-legged race.

Fully three-quarters of those mentioned have died, but their names revive many interesting memories of over thirty years ago.

Kicking—Cause and Cure.

The human race is as prone to kick as the sparks are to fly upward, says a contemporary. Most men kick some of the time, and some men kick most of the time. The occasional kicker does not worry anybody—he usually has cause. The chronic kicker is a good deal of a bore, and this diagnosis is particularly for his comfort and edification. Most of the points in the study are taken from a very instructive series of talks delivered in Chicago recently by Mr. Walter M. Wood. Some of the other points are the result of everyday observation. Two things about the kicker ought to be faced squarely:

I. HIS CAUSE.

1. A pessimistic turn of mind. He is sure everything is going to the dogs.
2. An unfortunate heredity. "He's the same as his father was before him."
3. Physical exhaustion. A tired man is likely to be peevish.
4. Liver derangement. Some sage has truly said that "the question of whether life is worth the living depends upon the liver."
5. Mental misdirection. A misused mind tends to hypochondria.
6. Selfishness. The fear of being overshadowed or overlooked is always to the fore in the chronic kicker.
7. Pride. The desire to "show off" one's large ideas and keenness is frequently seen in the fault-finding person.
8. The wrong audience. A fundamental error of the average knocker is the tendency to talk to his own kind instead of to constructive people.

II. HIS CURE.

1. Critical examination of his conversation. Sit down alone five minutes just before retiring and think over what you have said during the day. If ashamed of some of it, try to do better next day.
2. The habit of commending. See how many things you can find that honestly deserve commendation. At the same time, eliminate from your conversation a number of the things you feel like denouncing.
3. Look on both sides of every question. Learn to see things whole and to consider the other party.
4. "Don't cry over spilt milk." If a thing is past helping, let it go at that. Fretting over it is injurious to one's disposition.
5. Make all criticisms to people who are in a position to mend matters, and endeavor to put your case in the form of positive suggestions. Anything may be criticized. An old proverb says: "You can criticize a dying groan." It takes constructive thought to make a helpful suggestion.

Mr. A. J. Coppin, of the Direct Cable Office, Halifax, N. S., Can., in remitting to cover his subscription for another year, writes: "I have to thank you for continuing the paper. Keep it coming, as I would not want to miss a copy."

The Late John Henderson.

BY R. F. EASSON, TORONTO, ONT.

John Henderson, who died in Portland, Ore., sometime ago, had a noteworthy career. He was born in Toronto, Ont., seventy-five years ago. In 1852, and when he was about twelve years of age, he engaged with the Montreal Telegraph Company at Toronto as office boy. The little chap wrote a surprisingly neat business hand, and was, for some time, employed in the clerical work of the office. Upon being called to the key he speedily became a first-class operator. Around 1860 he received a tempting offer from the telegraph authorities in California and emigrated to that state, going thither by way of Panama and Aspinwall. In seeking his fortune in that far distant land, in those early days, many of Henderson's friends, while admiring his adventurous spirit and pluck, advised him to let well enough alone, and remain a "Canuck." Nothing daunted, however, he started off. He had the example of James Urquhart, of the Toronto office, and John Skae, of Oshawa (Canada), before him. These two enterprising telegraphers, at a still earlier date, fascinated by the lure of the Great West, had preceded him to the Golden State, where, already, they had made their mark. Henderson, when a young man, was of a studious turn of mind, an omnivorous reader, a tireless pedestrian and fond of gymnastics. He wrote an exceedingly amusing account of his first journey out, which was published in the Toronto papers at the time. He returned to Canada in 1883, but wandered back to the old stamping ground on the Pacific Coast a year later. His family connections are well known in Toronto. J. J. Foy, formerly attorney-general for Ontario, being his cousin. Henderson was an operator in the Toronto office when the entire operating staff consisted of himself and two others.

Prior to the civil war Mr. Henderson worked as an operator at San Francisco. During the building of the proposed Siberian land line to connect the old world with the new by telegraph he was stationed at Victoria, B. C., and on its abandonment, owing to the successful laying of the Atlantic cable, he went south, working as manager at different Nevada points during the Comstock mining development. At the time of his death he was living in retirement, a Western Union pensioner.

Mr. Henderson made many friends, being intimately acquainted with Mark Twain, Bret Harte, Dan De Quille, and Charles Goodwin, noted authors, as well as other noted men of letters.

During his long telegraph career he was manager at Salt Lake City, Utah, Pioche, Nev., in the days of palmy gold digging; Walla Walla, Wash.; Astoria, Ore., and many other offices where he always acquitted himself creditably and made an excellent impression with the public.

Mr. Henderson was a man of exceedingly fine personality, handsome in appearance and of great conversational powers. He was a stanch friend and splendid and entertaining companion.

Are you a subscriber to TELEGRAPH AND TELEPHONE AGE?

Resistance and Inductance of Iron and Bimetallic Wire.

When a direct current flows in a wire the distribution of the current is uniform over the cross section of the conductor. When, however, an alternating current flows in a wire there is a tendency for the current to crowd to the outside. This phenomenon, which is caused by differences in the opposition to the current flow in different parts of the conductor, becomes more pronounced the greater the number of alternations of the current in a given time and in iron wire, the greater the current in the wire. In some cases the flow of current is confined almost entirely to a thin shell on the outside of the wire, and hence arises the term "skin effect" for this phenomenon. The effective resistance of the conductor increases as the frequency of the alternations increases and at the same time the inductance, which depends upon the magnetic field, is diminished. This effect is not only of interest from a purely scientific standpoint, but is frequently of importance in engineering practice.

When the conductor is of simple form and the magnetic permeability of the material is known the effective resistance and inductance can be calculated by formulas which have been developed. The investigation, the results of which have just been published by the Bureau of Standards, Department of Commerce, in Scientific Paper No. 252, was concerned with the skin effect in conductors containing iron. Two classes of conductors were considered in particular—the iron telegraph and telephone wires and copper-clad bimetallic wires. The latter have a core of steel surrounded by a shell of copper. The effective resistances and inductances of these conductors were determined experimentally for different strengths of current and for frequencies up to 3,000 alternations per second. The results for iron wires obtained with very small currents were compared with values computed by known formulas and the agreement is fairly satisfactory. Formulas are developed in this paper which permit a similar comparison between measured and computed values for the copper-clad wires. The paper concludes with wire tables computed by means of the new formulas. In these tables the effective resistances and inductances of copper-clad wires are given for wires of different sizes and conductivities and for frequencies up to 3,000 alternations per second.

The Unsentimental Telegraph.

The following telegram was presented at a telegraph office:

"I announce with grief death of Uncle James. We are his heirs."

"There are two words over the ten," said the clerk.

"All right," said the customer. "Cut out 'with grief.'"

Any book published on telegraph, telephone, cable, radio and general electrical subjects can be obtained of TELEGRAPH AND TELEPHONE AGE, 253 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. Issues over one year old, 50 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

SOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 are for sale at the office of this journal, 233 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 16, 1915.

Genius.

Edison defines genius as one-tenth inspiration and nine-tenths perspiration, and he ought to know.

Reunion of Military Telegraphers.

The decision of the officers of the Society of the United States Military Telegraph Corps to hold the annual reunion this year is a happy one. Last year's meeting was omitted, together with that of the Old Time Telegraphers and Historical Association, on account of conditions arising out of the war, and while this year's gathering of the Old Timers has also been cancelled, the Military Telegraph Corps will once more call the roll, this time in New York. There are not many members of this valiant band left, and it will be a pleasure for them to meet again and recite the exciting experiences of Civil War days.

Lower Leased Wire Rates.

The announcements given out recently by the two telegraph companies and the American Telephone and Telegraph Company of reductions of rates for night leased wires for press service is highly interesting from a telegraphic standpoint, but those who will be ultimately benefited by it are probably the ones who realize it the least, namely, the reading public. The new rates are just one-half of the old, and will undoubtedly result in hundreds of news-

papers throughout the country expanding their news service. That there will be a larger demand for leased wires it is hardly necessary to state, and the telegraph and telephone companies will find a larger use for their lines during the time when, hitherto, there has been the least demand for them.

It seems like a large amount of revenue for the various companies to deprive themselves of, but it would seem to be within the range of probability that they will recover their losses in the greater extension of the leased wire service.

Censorship of European News.

An interesting and illuminating article on the censorship of European war news is published elsewhere in this issue. Many people in this country have been led to believe that the news received of the war is "colored" and calculated to create false impressions, but a reading of this article will have the effect of dispelling such a notion. It cannot be denied that the reports we get here are unsatisfactory and contradictory, but when the difficulties of getting and transmitting authentic news are considered it is a wonder that we get any at all.

Rigid censorship is maintained from beginning to end, and as the cable facilities are all in the control of the British authorities, it is quite natural that news of the operations of the "enemies" of England should be carefully scrutinized. Indeed, the news of English operations is not spared by the censors, and what we are permitted to receive in this country is far from being satisfactory.

It may be stated that the American press is fair and has no desire to mislead their readers as to the actual state of affairs on the European Continent, but it can easily be understood, after a reading of this article, that the papers are, to a great extent, helpless to do better.

Vacation Time.

"All work and no play makes Jack a dull boy," is an old saying, and its truth cannot be questioned. Intelligent human beings need change and recreation to preserve a proper balance of their mental and physical lives, and the well-nigh universal habit of taking a vacation once a year is a wholesome one.

At the present time the enjoyment of these annual respites from business cares is in evidence, and many officials and employees of telegraph, telephone and kindred companies are hiding in the woods or disporting in the briny waters of the ocean. Others are taking trips across the continent to witness the beauties of the expositions in San Francisco and San Diego, and many are staying at home cultivating their gardens and tending their chickens.

It makes no difference, however, how their holidays are employed, they and their companies will be the gainers through the health and pleasure thus gained.

Vacations offer grand opportunities to become boys and girls for a short time each year, and these breathing spells help wonderfully to preserve our well-being. To those who are so situated that they cannot enjoy such pleasures we extend our commiseration.

Origin of the Word "Telegram."

W. B. Lasscell, who died in Mount Vernon, N. Y., in 1914, was a forty-niner of the telegraph, and was the author of many interesting sketches of his telegraphic experiences. Mr. David Homer Bates, of New York, has collected some of these writings and from them we have selected for publication the following on account of its historical character.

That the word "telegram" ever had to be coined to fit new conditions probably has never occurred to anyone in these days, and it is extremely doubtful if one person could be found in a thousand that could tell how the word came into being. Mr. Lasscell who was a contemporary of the times when the need for such a word arose, gives its history as follows:

"In 1850 I was boarding at the Seymour Hotel at Ogdensburg and it was the usual custom of various citizens to congregate at that hotel in the evening to hear whatever news was floating, and especially to discuss this most wonderful telegraph which had so recently been planted there; while I, the operator, was looked upon as a wizard, and when I would go in I was surrounded at once by a number of the sitters and plied with all sorts of the most absurd questions possible, the chief one being that they could not understand how my box, or message, could get around those glass knobs on the poles.

"One evening among the other guests was an elderly gentleman named Judge Brown—he was a lawyer, an educated man, and evidently a good grammarian. Up to that date the word 'telegraph' was universally used, and the usual question was 'have you seen a telegraph?' 'have you received a telegraph?' 'have you sent a telegraph?' One evening Judge Brown said to me, why do you always use the word telegraph, for that word is wrong, it is ungrammatical? Your wire, your battery, your recording machine, and all connected with it constitutes the telegraph, while the message which you send is a 'telegram.' I had to laugh, as the word was entirely new and it seemed to me to be uncouth and unmusical, and I passed it by without a serious thought. After going to bed I could not sleep, for this blessed word 'telegram' would keep coming up, and during a sleepless night I determined to ask our manager at Oswego about it and I related to him my conversation with Judge Brown the night before. The manager laughed but gave no opinion but he said he would send the word on to Syracuse and see what they said about it. The Syracuse people had their laugh over it without expressing an opinion, but said that they would send it on to Rochester and see what they said about it, and during the day the word came back that they thought well of the word 'telegram,' and also added that they would send it on to Buffalo and get their views. Soon after, word came from Buffalo that the word 'telegram' was quite correct. The editors of the papers in Syracuse, Rochester and Buffalo were called in and all seemed to agree that the word 'telegram' should be used in all messages instead of the word 'telegraph,' and almost from

that time the word 'telegram' came into general use. No, I do not claim that this was the first time that the word 'telegram' was used, but as none of the operators had ever heard of the word before, and as I have looked into all of the dictionaries that I can find that were published before 1850, and do not find the word in any of them, I am forced to the conclusion that Judge Brown, of Ogdensburg, N. Y., was the inventor of the word in 1850 and that I was the first one to send the word over a telegraph wire."

End of a Western Telegraph Company.

Charles P. Snyder, president and owner of the Angels Telegraph Company, was elected district-attorney of Calaveras County, Cal., recently. Then his troubles as a telegraph magnate began.

Snyder's line runs from San Andreas to Angels Camp, where Snyder had law offices. When he moved to the county seat an operator had to be brought in from outside. This was expensive, he says.

"Besides," says the newly elected district attorney to the State Railroad Commission, "the line is also unused."

The commission granted permission to Snyder to discontinue service on condition that the Western Union Telegraph Company took up the business.

The Western Union Telegraph Company recently applied for and was granted permission to discontinue the business on the ground that it would lose money.

The Pacific Telephone and Telegraph Company came to the rescue by agreeing to keep Angels Camp connected with the outside world.

Electrical Exhibits at Galveston Cotton Exposition.

The Jovian Order made a comprehensive exhibit of the modern uses of electricity at the seventh annual cotton carnival and exposition held at Galveston, Tex., July 22 to August 1.

The Marconi Wireless Telegraph Company had an operating exhibit of wireless telegraph apparatus, installed by Mr. C. D. Campbell, local manager for the company. Alongside of this exhibit the Postal Telegraph-Cable Company, Mr. Howard Jolly, manager, had a display of modern commercial telegraph equipment, the instruments being looped in on a regular wire. An operator sent and received messages for the enlightenment of the spectators. The Southwestern Telegraph and Telephone Company had a small modern telephone exchange switchboard under the supervision of Mr. L. M. Kelsey, local manager.

Electrical power generation, distribution and measurement were also exemplified as well as other applications of electricity, including its many uses in the home.

All of these exhibits were of an educational character.

Improve your knowledge by reading TELEGRAPH AND TELEPHONE AGE.

Care of Telephone Apparatus and How to Locate and Remedy Troubles.

(Concluded from page 300, August 1)

2—Bell receives and transmits a ring feebly.

The trouble is probably due to a bad connection inside the box, especially if you can talk clearly over the wire. Examine especially the connections through the hinges of the box. The springs on them should be bright and clean, and so bent that when the box is closed the springs will press firmly on a clean surface on the opposite side of the hinge. Otherwise the contact may be very bad. Beware of oil. Do not oil the hinges. It is useless, and causes bad connections and general trouble. If the trouble is not there, it may be a bad ground wire, as a ground connection that will suffice for talking may be so poor as to make it almost or quite impossible to ring. If the circuit is bridging metallic the trouble is likely a resistance cross; if it is a bridging grounded line, an escape or poor ground.

On lines with more than one set of telephones in series weak ringing and talking may be produced by an imperfect shunt around the generator coils in one of the magneto bell boxes on the line, which leaves the coil constantly in circuit. If bridging line, the trouble may be an escape resistance cross, or some hook on the line may not cut out the instrument.

3—The ringer rings other bells strongly, but its own bells are weak or will not ring.

The trouble, in this case, is weakness of the ringer magnet or poor adjustment of the armature. The armature (or vibrating bar to which the hammer lever is attached) is polarized, or magnetized by a bent steel magnet. This armature should be so adjusted that it will be equally near to both poles of the electromagnets, and loose enough in its trunnions to move freely. Unless interfered with, and thus thrown out of adjustment, the armatures seldom require attention. The trouble is generally found to be in the permanent steel magnet, which has lost its strength and does not magnetize the armature sufficiently to make it act vigorously. If the bell does not ring, the ringer coils are burned out.

4—If your ringer rings other bells feebly, but receives a strong ring from other bells.

In this case the trouble is plainly with the generator. It may result from weakness of the permanent magnets of the generator, but is generally due to bad connections. The connections to the revolving generator coils are made by friction bearings, one through the trunnion or axle and the box or bearing in which it turns, and the other is made through a flat spring that bears upon the end or side of the axle. If the first connection is too freely oiled, or if the latter is oiled at all, the oil, which is a very poor conductor of electricity, interposes so much resistance to the passage of the current as to weaken it very materially. But when the generator is not turning the shunt wires cut the generator out

of the circuit, and hence your own bells can be loudly rung by another bell.

5—It will not ring its own bell or others, but receives a ring.

A wire or connection is broken in the generator or conducting wire therefrom; or the shunt does not open to let the current to line, or the coils are short circuited, or the armature does not make contact with spring, if a bridging circuit.

6—Receives and transmits rings, but you cannot talk.

This may arise from a poor cord, or the trouble may be in the hook or battery circuit. When the receiver is taken down the hook should fly up, switching the line into the talking apparatus. If the hook does not move freely, or its spring is weak, it will not go up, hence your talking instruments are not connected with the line.

7—Can ring, but get no response.

The line is grounded in the protector, or elsewhere. If on a bridging line, it is open.

8—Cannot ring or receive a ring.

Open at protector, or line is open. Test for open line: Listening on line and tapping transmitter little or no sound will be heard.

If short circuited or grounded, the transmitter will come up very loud.

9—It rings frequently and without apparent cause. Swinging cross with telegraph or other lines.

10—Two bells or two annunciators ring together.

Open one line at central and ring on the other; if both bells ring, the line is crossed; if neither rings, the common return is broken. To test annunciators, open the line at one subscribers' station and ring on the other; if both fall, the line is crossed; if neither falls, annunciator ground is broken.

11—See No. 6.

12—Toll or party line bell. Call, but get no response.

Test as explained in No. 8.

13—Four party selective system bell. Rings, but cannot talk.

Test for open line as explained in No. 8. For other troubles see explanation No. 6.

14—Four party selective system bell. A. Calls, but can get no response. B. Rings weak or not at all.

A—See explanation Nos. 7 and 8.

B—Poor ground. If cold weather, frost may have gone below ground rod, or, see No. 3.

15—Four party selective system bell. Rings when not wanted.

Ring from central for one station on the line; if the other station of the same polarity on the line rings, the telephone has been left off the hook at some station, or the line is short circuited. If the spring is loose, the bell will ring when the other station on the same side of the circuit is called. If the

line is crossed with foreign wires, the circuit will be noisy.

N. B.—Never separate the permanent magnets from each other. There can be no trouble that taking them apart will remedy. If the permanent magnets have been taken off put them on with the same poles together. Touch the ends of the permanent magnets to each other. The opposite poles attract each other. Now turn one around, touching again, and they will not attract. The ends that do not attract each other are similar poles, and they must be put into their place with similar poles touching. If not, they will neutralize each other, and no effect will be produced on the armature coil.

How to Write English Correctly.

(Continued from page 380, August 1)

WRITING.

Writing should be simple art, a high art though it be. The language is rich in its vocabulary of adjectives—adjectives which enable one to modify the noun in every possible phase to give the most vivid and varied coloring, or to cast about the sentence the sombre shades of a cloud-hung night. The verb may be so modified by signs and by adverbs as to express the most delicate, the most intricate and the most weighty mode of action. These, with other parts of speech, may be employed to the forming of sentences as rhythmic as the songs of the gods, as harmonious as the chimes of golden bells; sentence may follow sentence, each as pleasing to the ear as the grand cathedral organ whose keys are touched with the divine fingers of a Liszt; each may be as elegant in structure as the temple of Diana at Ephesus.

But this perfectness does not come of forced or strained speech, nor of exaggerated adjectives, nor of harsh expletives, nor of strenuous effort in any direction.

When a writer guides his pen under stress of brain or diverts the simple, smooth current of his thought by searching after the seeming easier flow through resonant, meaningless modifiers, the pains of his effort pervades his every line. He is read most enjoyably who writes most freely and easily. When writing becomes a task, the after reader of it suffers pain. When one would write he first must be sure that he has something to say, else his writing will be as the chattering of the magpie or the senseless words of the noisy parrot. Better and much better were it that one should write clumsily and strainedly if he have something to say, than that he should give to the world an aggregation of rhetoric which stops before it reaches the inner end of the optic nerve. Thought undigested in the mind is as valueless as absence of thought. He who would write for the profit of the people must have mastered the lesson of oneness of thought and purpose. The labor of giving forth a story, long or short, which shall live, is done before the pen is called upon to record the work. One convinces, wins and holds his readers as he is persuasive, earnest and true to

himself. He is strong in the degree that they shall understand who read.

Good writing comes of practice. Minervas springing, fullarmed, from the brows of Joves are but the creations of poetic fancy; in real life skill in any art or in any one of the arts, comes after years of training. No man or woman can write well until his brain has been exercised in continuous thought and he has learned the value and meaning—the various shades of meaning—of the words embraced within his vocabulary. It is inexcusable that one should record a word except he is able to read its history upon its face. Given the thought and a well-understood vocabulary, with an understanding of the plain rules of the language, the art of successful writing becomes assured. Every writer should understand that that writing is most elegant which is simple in form and pure in expression.

PUNCTUATION.

Use as few punctuation points as possible. Avoid calling punctuation to your aid to clear obscurity of a sentence. The period should be used at the end of sentences; after abbreviations "Mr.," "Mrs.," "viz.," "ult.," "prox.," "inst.," "per cent.," after "dollars" when "cents" follow (\$150.00) but not when dollars alone are represented, as "\$150," etc.; after date line in a dispatch, as "New York, June 15.," when paragraphs are numbered, as: "1.—", "2.—", etc. The colon, once popular with classical writers, has gone into disuse practically, except where employed after the words "as follows," "to wit," etc. The semi-colon is valuable chiefly in extended sentences, where the comma does not divide sufficiently the several qualifying words and statements. Where the writer holds to short sentences, it has no place. The comma is used far beyond its requirements. Where care is used in the construction of a sentence it has little or no place beyond separating clauses and the modifiers of nouns and verbs. The comma may be used as a substitute for marks of parenthesis, where the sentence is clear and not too long. Place the paragraph mark ¶ at the beginning of each paragraph. Rules for quotation marks are few. Always quote verbatim. Have the words before the eye that no error may occur. All words quoted must be included within the quotation marks, which, therefore, must begin with the first word and end with the last one. Where the words run into paragraphs the quotation marks will precede the first word of each paragraph and the final ones must be placed at the end of the last word in the last paragraph. The terminals of the included paragraphs require none. A quotation within a quotation calls for single quotation points and one inside of this calls for a double quotation.

HOW TO WRITE ENGLISH CORRECTLY is the name of a little book that every young telegrapher should have to guide him in his work. It not only tells how to write correctly, but gives much valuable information on reporting, editing, illustrating, etc., besides a lot of things to avoid. The price of this work is \$1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Valuable Engineering Articles.

The following important engineering and scientific articles have appeared in this publication since January 1:

"Rules of the Postal Telegraph-Cable Company for the Wiring of Offices." January 1, January 16, February 16. Price, twenty-five cents per copy.

"Some Primary Battery History." By Donald McNicol. January 1. Price, twenty-five cents per copy.

"Improvements and Developments in Wheatstone Working." (Illustrated.) By W. Finn. January 16 and February 16. Price, twenty-five cents per copy.

"Opening of the New York-San Francisco Telephone Line." (Illustrated.) February 1, February 16. Price, twenty-five cents per copy.

"Western Union Ticker Service." By C. R. Tilghman. (Illustrated.) March 1, March 16. Price, twenty-five cents per copy.

"Electricity." By J. F. Skirrow. March 1. Price, twenty-five cents per copy.

"Morkrum Telegraph Printers." (Illustrated.) March 16. Price, twenty-five cents per copy.

"Batteries." By J. F. Skirrow. March 16. Price, twenty-five cents per copy.

"Western Union Quadruple Duplex, or Octuplex." (Illustrated.) April 1, April 16, May 1. Price, twenty-five cents per copy.

"How Electromagnetic Waves are Propagated." May 16. Price, ten cents per copy.

"Faults in Telephone Apparatus and Their Remedies." June 1 and June 16. Price, ten cents per copy.

"Magnetism and Magnets." By J. F. Skirrow. (Illustrated.) June 1. Price, ten cents per copy.

"Wet Batteries and Their Uses." By J. C. Wright. (Illustrated.) June 1. Price, ten cents per copy.

"Atoms and Electrons." June 1. Price, ten cents per copy.

"The Western Union Multiplex." By Donald Murray. June 16. Price, ten cents per copy.

"The Audion Amplifier." (Illustrated.) July 1. Price, ten cents per copy.

"Interference from Single-Phase High-Tension Power Lines of the New York, New Haven and Hartford Railroad Company." By N. E. Smith. July 1. Price, ten cents per copy.

"New Western Union Office at Boston." July 1. Price, ten cents per copy.

"Platinum—Where it is Found and How it is Used in the Electrical Arts." July 16. Price, ten cents per copy.

"New Postal Office at Philadelphia." (Illustrated.) July 16. Price, ten cents per copy.

"Screened Cable Conductors and Their Application in Telegraph Service." By R. E. Chetwood. July 16. Price, ten cents per copy.

"Ohm's Law and Electrical Measurements." By J. F. Skirrow. July 16. Price, ten cents per copy.

"Primary Battery for Transmission on Train Dispatching and Other Telephone Lines." By G. W. Nelson and E. E. Hudson. July 16. Price, ten cents per copy.

"Censorship of Railway Messages." By W. H. Hall. July 16. Price, ten cents per copy.

"Wireless Receiving Station at Eureka. S. D." (Illustrated.) August 1. Price, ten cents per copy.

"Dr. Bell on Vibrations." August 1. Price, ten cents per copy.

Papers three or more months old cost twenty-five cents per copy. Papers over twelve months old, fifty cents per copy. Papers printed within three months, ten cents per copy.

Address TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

When a quadruplex is balanced in the same manner as is a polar duplex, will both the first and second sides always work satisfactorily?

What are the causes of the unevenness of operation under an ordinary balance?

Why should more attention be given to the neutral side in balancing a quadruplex?

How can the greatest degree of efficiency be obtained in balancing a quadruplex? Study the instructions given on pages 68 and 69.

Can the home office determine the nature of faults in the adjustment of the apparatus at the distant office?

Should there be any difference between the "down stroke" and the "up stroke" of armatures in quadruplex transmitters and pole changers?

What precautions should be observed in securing proper adjustment of the pole changer?

In balancing and adjusting quadruplex instruments on poor wires and in wet weather, what plan should be followed?

How should the static be eliminated?

If, while manipulating the key on the number one side, the home polar relay records the signals, what is the cause?

If the signals are broken up, what is the nature of the fault?

If the polar relay lever should persist in clinging strongly to one pole of the magnet, what is the likely cause of the trouble?

If the wire fails, how is it possible to determine on which side of a repeating station the trouble lies?

If the wire quadruplexes easily at one end but the distant office fails to get the four corners to work, what is the cause of the trouble, and how can the trouble be located?

What are the effects produced by an improperly adjusted pole changer, and what are the effects of improperly adjusted transmitter points?

(To be Continued.)

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A detailed illustration of early 20th-century transportation and communication. It features a horse-drawn carriage, a steam locomotive, a trolley, and a man using a telephone. The scene is set in a city with buildings and a streetcar.

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THE RAILROAD.

THE RAILWAY SIGNAL ASSOCIATION will hold its twentieth annual convention at Salt Lake City, Utah, September 14, 15 and 16. Mr. C. C. Rosenberg, Bethlehem, Pa., is secretary.

TELEPHONE TRAIN DISPATCHING.—During the year ending June 1, notwithstanding the business depression among railroads, there was an increase of 6,701 miles of telephone train dispatching circuits, as compared with the preceding year, and a decrease of 1.085 in the mileage operated by telegraph. A tabulated statement giving the figures in detail was published in TELEGRAPH AND TELEPHONE AGE, dated June 16, and these statistics are being constantly referred to by all interested.

WIRELESS ON RAILROADS.—At the recent convention in Rochester, N. Y., of the Association of Railway Telegraph Superintendents, Mr. David Sarnoff, assistant traffic manager of the Marconi Wireless Telegraph Company of America, endeavored to correct the impression that many people have that wireless is being advocated as a substitute for other methods of dispatching trains. "I wish," he said, "to impress upon you the fact that wireless in railroad work can be utilized as an auxiliary service, for it has the advantage of being strong at the very point where the wire is weak, as in case of a storm, etc. That is the time, of course, when auxiliary communication is most desirable, and wireless fills the gap admirably well. Then, too, there is the possibility of the use of portable wireless equipments for field work in case of floods, or other similar instances where it is necessary to get in touch immediately with different points."

Telephone Dispatching on Street Railway Lines.

The increasing use of the telephone for dispatching trains on steam and high-speed electric railways has led to its adoption by some of the leading electric street-railway companies as the simplest and most efficient means for controlling the movements of cars.

An equipment that is one of the most complete of its kind has been put in operation by the Milwaukee Electric Railway and Light Company, Milwaukee, Wis. Three switchboards are in service—one for the use of the train dispatchers, another for handling all calls within the building in which the company's offices are located, and a third for handling public telephone messages, operated by the Wisconsin Telephone Company.

The train dispatchers' switchboard has sufficient capacity to talk to the 240 telephones located at various points along the car lines. These telephones, which are usually found at transfer points and track intersections, are mounted on poles.

The telephone instruments are of two kinds—the metal box type operated on central battery within the city and the magneto wood telephone for the outlying districts. The latter are enclosed in shelter booths. There are also twenty-five loud ringing call bells located at track intersections, parks, etc. These are mounted on poles with the telephone instruments and are used to signal the supervisors.

They are operated from the train dispatcher's switchboard. On the top of the switchboard in the first position is placed a small lamp signal box which indicates open bridges or closed steam railway gates, thus enabling the dispatcher to note the location and length of all delays to traffic.

The dispatchers handle 490 trains and receive approximately 3,900 calls daily. In all 1,600 miles of telephone circuits are operated, a part of the telephone lines being in lead-covered cable of which there is a total of eighty miles. The equipment is of Western Electric manufacture.

Mr. N. E. Smith, superintendent of telegraph, New York, New Haven and Hartford Railroad Company, New Haven, Conn., writes: "I enclose herewith remittance covering my subscription to the AGE. I am very glad you renewed the same, for I should certainly feel lost if it did not come to hand regularly."

MUNICIPAL ELECTRICIANS.

Convention of Municipal Electricians.

The International Association of Municipal Electricians will hold its twentieth annual convention in Cincinnati, Ohio, at the Gibson Hotel, August, 24, 25, 26 and 27.

Several interesting topics are to be discussed, among them being "Police Patrol and Fire Alarm Records," by Price L. Patton; "Lightning Protecting Apparatus for Fire and Police Telegraph Circuits," by L. S. Brach; "The Fallacy of Placing Fire and Police Alarm Wires in Telephone Cables," by C. E. Converse; "Discussion of Standards of Fire Alarm Installations," by F. A. Raymond; "The Advisability of Using Concentric Wiring in This Country," by R. A. Smith; "Fire Alarm Systems for Industrial Plants," by Albert J. Cross; "The Scope and Present Status of the National Electrical Safety Code," by W. J. Canada; "Practical Cable Maintenance Methods," with demonstration, by O. F. Tallman; "Storage Batteries for Fire Alarm Purposes," "The Work of the Bureau of Standards, Including Some Account of the Co-operation of the Bureau with Municipalities in Securing Electrolysis Mitigation and Improving Electrical Service and Meter Accuracy," by Dr. E. B. Rosa; "Uniform Electrical Standards," by Dr. John Price Jackson; "The Importance of the Superintendent of Fire and Police Telegraph to His Municipality," by W. H. Flandreau.

The officers of the association are: President, W. H. Flandreau, Mount Vernon, N. Y.; Dr. Charles P. Steinmetz, R. J. Gaskill, C. E. Converse and G. V. Tudhope, first, second, third and fourth vice-presidents, respectively; Clarence R. George, Houston, Tex., secretary; C. E. Diehl, Harrisburg, Pa., treasurer.

Mr. F. C. Hackett, of Toledo, an old-time telegrapher, now in another line of business, writes: "While I am out of the telegraph business, I look forward with pleasure for each issue, and usually read it, advertisements and all."

The Alternating Current Phase of the Telegraph.

BY C. G. ALLEN, BOISE, IDAHO.

The effects of the alternating current phase of the telegraph in multiplex circuits, and upon multiplex apparatus, will probably be of much interest to those concerned in multiplex operation, and especially to those who have confined their studies to direct currents only. In discussing this subject it will be necessary to mention some facts that are common knowledge to those advanced in alternating current study and practice, but have probably not been brought to the attention of the direct-current student.

It is not the intention of this article to treat any phase of multiplex operation mathematically, but rather to show that a study of alternating currents can be applied with advantage to multiplex operation.

The transmission of a telegraphic signal is not haphazard guesswork in any sense, where economy as well as efficiency is to be practiced. There are two general theories employed in predetermining the distance over which signals may be transmitted with commercial efficiency. The one used most generally in America is known as the "leakage" theory, because our conductors are mostly overhead and subject to the vagaries of the elements, interferences from other conductors, etc.; while in Europe, where the conductors are largely in cables under ground, the K R law is applied. The leakage theory takes into consideration such factors as terminal resistance, main line resistance, inductive and capacity impedance, leakage, efficiency of equipment, etc. From this it naturally follows that when any of these factors become abnormal, a corresponding loss is suffered. In applying formulas to arrive at voltages, currents and permissible resistances that will probably meet the average circuit condition, these factors are given values that will probably not be exceeded under ordinary conditions, but most of us who have been long associated with telegraph work, know that many circuits are made up that have not been surveyed for factors that might prove detrimental to their operation, therefore it might be advantageous for us to become acquainted with these factors more thoroughly.

To show the effects of an alternating current as compared with direct current upon the neutral relay of a quadruplex, we will mention a few established laws. In a strictly non-inductive circuit, e.g., a circuit without inductive or capacity impedance, the effective pressure of an alternator is equal to the average pressure of its maximum pressure. This average pressure is 0.637 of the maximum, but the real effective pressure is some greater than the average, and is that which is available for producing heat if applied to a resistance, and is equal to the square root of the mean squares of the successive pressures, this sum being 0.707 of the maximum pressure.

From this naturally arises the fact that the current in an alternating circuit is equal to only 0.707

of the maximum current. Applying this law, the voltage of a quadruplex remains constant during the operation of the pole changer. We therefore have two values of current affecting the neutral relay: one, when the pole changer is idle, equal to the maximum voltage applied, and the other equal to the 0.707 of the maximum voltage when the pole changer is in operation. It might be well to state here that these values would be the true values if the current followed the sine law, but as we have no coil displacement that follows this law, as we do in an alternator, the change would not strictly follow the sine law, but oscillograms made from current waves in multiplex circuits seem to indicate that we may assume the alternations to follow the sine law for purposes of comparison without great error.

The current required to commercially operate a neutral relay depends largely upon the design, material, etc., of the relay, but results arrived at through laboratory investigations indicate that forty milliamperes are required to commercially operate the average neutral relay. Assuming a relay with this value of efficiency, and a strictly non-inductive circuit and ninety milliamperes of current, when measured as a direct current, we would have ninety milliamperes when the pole changer was idle, and $90 \times .707$, or only 63.63, when the pole changer was in operation.

When the circuit has induction or capacity, or both, the loss is further augmented and it may be of some value to know the nature of these losses.

The unit of self induction is the henry. If the impedance in any circuit due to this factor acted in the same direction as the metallic resistance the total impedance would be simply arrived at.

Capacity is another factor of impedance of which the farad is the unit, but for all ordinary capacities the microfarad, or the millionth of a farad, is generally used. The capacity of the whole earth is only 635 microfarads, therefore a farad is too large for practical use.

It is obvious from the foregoing that when the capacity is equal to the induction one counteracts the other, which makes the circuit equivalent to one with neither capacity or induction. From this it is further obvious that by proper regulation of capacity and induction the circuit can be made equal to a non-inductive circuit. This is the theory that is used in telephone "circuit loading" by use of the Pupin coil. A circuit that has capacity also gives what is called a leading current, while induction gives a lagging current. The extent of this lead or lag may be determined by dividing the metallic impedance of a circuit by the inductive impedance, or by the algebraic sum when the circuit has both induction and capacity. The quotient thus obtained will be the tangent of the angle of lead or lag, and by reference to a table of natural functions this angle may be ascertained. When the current leads or lags the voltage ninety degrees it is obvious that the current will be acting negative when the pressure is positive, and vice versa. From this it naturally follows that there will be no power in such a circuit, because it takes

the product of positive quantities of current and voltage to give the power.

Telegraph conductors extending over great distances are subject to many conditions, such as varying altitudes, proximity to the earth, other conductors, transmission lines, weather conditions, etc., which no doubt give a great variety of factors, and it is reasonable to believe that these factors become abnormal at times and in some instances where careful survey of the circuits has not been made, the constant values of the factors are probably above normal, which accounts for the poor service we quite often get from certain circuits, although the same equipment with the same apparent current values is worked successfully on other circuits.

The effects of capacity and induction can be seen by taking an ordinary quadruplex and putting it on short circuit, e.g., open the main line wire and by some means rapidly vibrate the pole changer, which gives an alternating current in the artificial line, through one coil of the neutral and polar relays. It will be found that a higher tension of the retractible spring on the neutral relay is required to break up the signals made on the second side with the condensers off than with them on, which indicates that removing the capacity lowers the capacity impedance, which in turn increases the current.

From a study of alternating current triangles it is seen that the perpendiculars which represent the capacity and inductive impedance may be given any ratio desired to the horizontal which represents the metallic impedance. If we have means of varying the metallic resistance, we can make the ratios so small that the hypotenuse, which is the resultant, will almost coincide with the horizontal, in which case the horizontal resistance will be almost the true impedance. This feature can quite often be taken advantage of where multiplex sets have the main line resistance boxes.

The effects of the factors mentioned are of course very small, but in telegraph work we deal with very small values of current, and it follows that any loss or change, however small, contributes its portion to the already too many faults of multiplex apparatus, especially a quadruplex on long circuits. To make accurate survey for abnormal factors of this character is, of course, beyond the power of most attendants with the present day equipment, but a knowledge of them will enable us to take advantage of what few opportunities that come our way, and with the ever increasing efforts for increased efficiency and additional knowledge, we may some day see the evolution of instruments adapted to small currents, similar to those now used in power work, because our present direct-current measuring instruments do not indicate the true condition of circuits that are to be operated with alternating currents.

Mr. Harry Morlan, manager of the Postal Telegraph-Cable Company, Salt Lake City, Utah, writes: "Your action in renewing my subscription to the TELEGRAPH AND TELEPHONE AGE for another year meets my approval, and you may make it a standing order."

OBITUARY.

FRANK JAYNES, formerly and for many years general superintendent of the Western Union Telegraph Company at San Francisco, Cal., but for the past seven years living in retirement at Palo Alto, Cal., and Washington, D. C., died on July 30. He was born in Pittsburgh, Pa., and learned telegraphing in 1858. In 1861 he went to California as operator for the California State Telegraph Company, and in 1865 was appointed secretary of the United States Telegraph Company at San Francisco. When that company was consolidated with the Western Union Mr. Jaynes was appointed cashier of the latter company in San Francisco. In 1880 he was appointed superintendent of the fourth district of the Western Division, and on July 1, 1902, became general superintendent of the newly created Pacific Division, which position he held at the time of his retirement. Mr. Jaynes was a man of dignified bearing and an excellent executive.

The San Francisco Tournament.

Most satisfactory reports are made of the plans for the San Francisco telegraph tournament, which is to be held August 27 and 28. Mr. E. Cox, secretary of the tournament association, states that donations are still coming in, and that it is the purpose to make the prizes as large as possible.

From all reports it is believed that this tournament will be as successful as any of those which have been held in the past, if not more so.

In our July 1 issue was published the official list of events, of which there will be nine. A cash prize will be given in each event.

In the controversy between Messrs. A. S. Weir, of Philadelphia, and F. M. McClintic regarding the rules and decisions of the Philadelphia tournament, Mr. Weir sends the following communication in reply to Mr. McClintic's, published in our August 1 issue.

"In your previous issue you print an article from Mr. F. M. McClintic to the effect that he has not made any charges against the Philadelphia Tournament Association management of the tournament in which he contested for control of the Carnegie medal. I accept his apology, and no doubt the other members of the association will do likewise.

"It might be interesting to your many readers to learn that the executive committee of the Philadelphia Tournament Association worked in my offices many times until two and three o'clock in the morning in their efforts to perfect rules to govern the tournament held in this city.

"For the benefit of all concerned I trust you will print the enclosed letter from Mr. Harvey Williams."

Mr. Williams' letter is as follows:

"121 South 5th St., Philadelphia, July 12, 1915.
"Mr. A. S. Weir,

"Dear Sir: Referring to statements made by Mr. F. M. McClintic in TELEGRAPH AND TELEPHONE AGE, reflecting upon conditions that existed at the tournament held in Philadelphia in which we were both contestants, I would like to contradict Mr. McClintic when he states that contestants were in

full view of the judges during the contests. While the judges' room was constructed on the stage, the door leading thereto did not face the contestants, and there was no possible way for the judges to learn who the contestants were except by coming out of the room, which of course was not permitted.

"He also says that contestants did not draw lots for place. This is absolutely untrue, for I recollect that my number was five in one case and eighteen in another.

"And as to secrecy: A number of the judges in the 'Championship of America' (sending only) contest, which was awarded me, told me afterward that during the sending they were all under the impression that it was I sending, when it turned out to be Mr. George Conkling, who was among the first to send, while I was number eighteen.

"Regardless of what Mr. McClintic says, I assure you that I saw nothing during the entire tournament that could be honestly objected to by either contestants, judges or spectators.

"I agree with you most heartily that all future contests might well be patterned after the one held in this city, for it has been pronounced by a great number of attendants to be the most successful and fairest tournament ever held.

"As to Mr. McClintic's assertion that he did not have time to prepare for the conditions called for in the "All Round Championship" class, I will say that during his presence in this city, some time before the tournament, I went to his room at the hotel and sent messages to him from original messages furnished by the Western Union Telegraph Company, and at that time I found him to be in first-class 'tournament shape' in receiving them.

"In regard to return of copies of messages received: I made inquiry of the judges myself about same and was told by them that the copies were, as a rule, in such bad shape that they had decided it was an act of charity not to have them seen."

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Mr. J. B. Colson, late night chief, has been confined at his home for the past month through illness. Mr. J. J. Mullin has been appointed acting late night chief in his place.

NEW YORK POSTAL.

John Suglia, one of our day check boys at 253

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.

Broadway, was presented with two of the *Evening Mail* medals on August 3 at the City Hall. The awards were made by Mayor Mitchel, George Gordon Battle and S. S. McClure, editor of the *Evening Mail*, for athletic games held at the City Hall, New York, on July 4. Suglia was awarded the second prize medal for a 60-yard dash, and the third prize medal for a 220-yard dash.

NEW YORK WESTERN UNION.

Mr. Edwin Mesler, aged seventy-one years, one of the best-known operators in New York, died on July 29. Mr. Mesler was identified with the main office force for about fifty years, he having worked in the 145 Broadway, 195 Broadway and the 24 Walker street offices during his long career. He was identified officially with the New York Telegraphers' Aid Society almost since its organization.

Mr. J. V. Riddick, of the short line printer department, who acts as agent for TELEGRAPH AND TELEPHONE AGE in the main office, is again at his post of duty after an absence of five weeks on account of illness.

Mr. T. M. Brennan, chief clerk, is absent on vacation.

PHILADELPHIA POSTAL.

A. S. Johnson, supervisor of equipment, Chicago, was a recent visitor at this office.

Cashier C. F. Meyers has returned to his desk after a vacation spent in Boston and Providence.

Assistant wire chief C. S. Almer also has returned much refreshed after a vacation.

CHICAGO WESTERN UNION

James Barnett (brother of Thomas Barnett), formerly an operator in the Chicago main office, died July 22. Burial was at Mt. Auburn.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President. . . Ashton G. Saylor
Secretary. . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 80c. 20 to 25, Full Grade, \$1.50; Half Grade, 75c. 25 to 30, Full Grade, \$2.00; Half Grade, \$1.25. 30 to 35, Full Grade, \$2.50; Half Grade, \$1.50. 35 to 40, Full Grade, \$3.00; Half Grade, \$1.75. 40 to 45, Full Grade, \$3.50; Half Grade, \$2.00. 45 to 50, Full Grade, \$4.00; Half Grade, \$2.25. 50 to 55, Full Grade, \$4.50; Half Grade, \$2.50. 55 to 60, Full Grade, \$5.00; Half Grade, \$2.75. 60 to 65, Full Grade, \$5.50; Half Grade, \$3.00. 65 to 70, Full Grade, \$6.00; Half Grade, \$3.25. 70 to 75, Full Grade, \$6.50; Half Grade, \$3.50. 75 to 80, Full Grade, \$7.00; Half Grade, \$3.75. 80 to 85, Full Grade, \$7.50; Half Grade, \$4.00. 85 to 90, Full Grade, \$8.00; Half Grade, \$4.25. 90 to 95, Full Grade, \$8.50; Half Grade, \$4.50. 95 to 100, Full Grade, \$9.00; Half Grade, \$4.75.

M. J. O'LEARY, Sec'y, P. O. Box 610, NEW YORK.

Telegraph and Telephone Age

No. 17.

NEW YORK, SEPTEMBER 1, 1915.

Thirty-third Year.

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Composite Systems.

The following description of the composite system of telegraphy and telephony which is employed in railroad work is given in answer to frequent requests for information on the subject.

The railway composite telephone and telegraph system was devised for the purpose of enabling telephone and telegraph messages to be transmitted simultaneously over grounded telegraph lines. It is adapted to simple Morse circuits where interruptions in the telegraphic current are of comparatively low frequency, and where the change in potential of the current due to the operation of the telegraphic apparatus is not excessive.

On the composited portion of a line there may be three kinds of telephone stations: terminal stations located at each end of that part of the telegraph line used for telephonic purposes; intermediate stations, located between the terminal stations; and portable stations, intended to be carried on a train for emergency use between the terminal stations while the train is at a standstill.

To adapt a telegraph system to telephone operation requires no change in the telegraphic apparatus or in its operation. All that is necessary is to bridge the apparatus at each telegraph station with a condenser and a resistance, and at the telephone stations to connect the telephonic apparatus between the line and ground. A condenser in each telephone set prevents the telegraphic current from passing through the apparatus to ground.

Telephone signaling is accomplished by pressing a button which places high frequency current on

the line by means of an interrupter and induction coil. This current at the signaled station passes through a condenser and howler to ground, causing the howler to produce a sufficiently loud sound to be readily heard in the station. Regular local battery is used for the talking circuits and a condenser is joined in series with the receiver, which itself is shunted by a retardation coil to reduce the disturbance from the telegraph impulses.

Each telegraph station on the composited portion of the line is provided with a one-microfarad condenser and a coil having a non-inductive resistance of 1,200 ohms. The former is bridged across the telegraph station apparatus outside of the peg switch, thus providing a by-path for the telephonic talking and signaling currents, which otherwise would be seriously reduced by the impedance of the relays and interrupted by the operation of the keys. The latter, a coil of high non-inductive resistance, is bridged across the telegraph relay so that when telephonic signaling current is applied to the line, any of this current flowing around the condenser will pass through the resistance and so prevent a chattering of the relay.

At each terminal telephone station is located a telephone set, a protector, a retardation coil of fifty ohms resistance, and a one-microfarad condenser designed to withstand a potential of 1,000 volts. The retardation coil is joined in series with the line, and the condenser is bridged to ground from that portion of the telegraph line which is not composited. The retardation coil prevents the telephonic currents from passing to ground over the telegraph line beyond the telephone station, but does not impede the telegraphic currents, because these are of much lower frequency than those generated by the telephone. This coil and condenser prevent the impulses of the telegraphic current from producing annoying disturbances in the telephonic instruments. The condenser also aids in the dissipation of any disturbing currents that may reach the telegraph lines from inductive or other causes.

Each intermediate telephone station requires a telephone set, and a protector. Batteries are installed in all the telephone stations for providing signaling and talking current.

The protective devices installed at each telephone station not only protect the telephonic apparatus from lightning and abnormal currents, but owing to the fuses, prevent a permanent ground at the cut-outs from interfering with the telegraph service. The protector should be connected in circuit with the fuses next to the line. At intermediate telephone stations, only one side of the protector is used, as there is only one wire connecting the telephone to the line. The protector has copper blocks instead of the carbon usually used.

The length of telegraph line and the number of stations with which this composite system can be

successfully employed, depend largely upon the character of the telegraph line. On a short line, service will be better and more stations can be operated than on a long line; the length, gauge, material of the line wire, and the amount of wire in cable are the more important features which govern the perfect operation of the system.

Iron wire is much inferior to copper wire of the same size when used for telephonic transmission and conductors in cable are much less efficient than open wires. Paper insulated wires in cables are much more efficient than wires of the same size in rubber insulated cables, on account of the high electrostatic capacity of the latter.

Owing to the many different conditions governing the use of railway composite apparatus, and the variation in these conditions for each particular line, it is impossible to give inflexible rules applicable to every case regarding the length of line over which service can be successfully obtained, or regarding the number of stations which can be successfully operated on a single line. Each particular telegraph line must be considered separately before a definite statement can be made regarding its adaptability for telephone service.

As a general indication of the possibilities of the system, however, it may be stated that successful operation should be practicable over ordinary telegraph lines up to 100 miles in length, and with as many as five intermediate telegraph stations.

In view of the introduction of the telephone for dispatching trains on railroads the use of the composite telephone has been greatly reduced owing to the superior service rendered by the telephone dispatching circuits.

Telegraph and Telephone Patents.

ISSUED AUGUST 3.

- 1,148,521. Transmitter for Wireless Telegraphy. To G. Marconi, London, Eng.
- 1,148,665. Telephone System. To A. H. Dyson, Chicago, Ill.
- 1,148,781. Telephone Set. To P. L. Jensen and E. S. Pridham, Napa, Cal.
- 1,148,787. Calling Device. To J. L. McQuarrie, Montclair, N. J.
- 1,148,800. Current-Impulse Transmitter. To J. G. Roberts, Dobbs Ferry, N. Y.
- 1,148,827. Wireless-Telephone Transmitter. To W. Burstyn, Berlin, Germany.
- 1,148,923. Telephone System. To J. C. R. Palmer, New Rochelle, N. Y.
- 1,148,941. Telephone Receiver. To H. B. Wier, Plainfield, N. J.

ISSUED AUGUST 10.

- 1,149,229. Telephone System. To R. I. Utter, Chicago, Ill.
- 1,149,428. Telegraphy. To P. B. Delany, South Orange, N. J.
- 1,149,614. Toll Telephone System. To E. P. Baird, Evanston, Ill.
- 1,149,874. System of Electrical Signaling. To C. R. Underhill, New Haven, Conn.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on August 26:

American Telephone and Telegraph Co.	123 1/2
Mackay Companies	76
Mackay Companies, preferred	66 3/4
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4 3/8
Western Union Telegraph Co.	70 5/8

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charge on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 1/2 cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

MAJOR EDGAR RUSSEL, who has been acting chief signal officer of the United States Army at Washington, D. C., for some time past has been transferred to Honolulu, Hawaiian Islands, where he will occupy an important government position for the next two years. He is accompanied by his wife.

MR. P. J. CASEY, the well-known telegraph manager of New York, is an expert horseman, and is secretary of the Monmouth County Horse Show Association, of Long Branch, N. J. *The Call*, of Long Branch, for July contains an interesting interview with Mr. Casey on the old times at Long Branch when the horse was king.

DR. WILLIAM D. GENTRY, an old time and military telegrapher and a forty-niner of the telegraph, was in New York last week and made it the occasion to call on many of his numerous telegraph friends. Since his retirement from the key Dr. Gentry practiced medicine for twenty-five years and afterwards became a preacher of the Gospel. For twenty years he has been pastor of the Assembly of God, which has a membership of about 22,000 scattered all over the world. His headquarters are at Chicago.

FEMALE MESSENGERS IN BERLIN.—Telegrams in Berlin, Germany, are now being delivered by women, who have taken the place of the former boy messengers.

A TRUTH.—The time a man needs a vacation most is after he has had one.

Postal Telegraph-Cable Company.**EXECUTIVE OFFICES.**

MR. EDWARD REYNOLDS, vice-president and general manager, returned to his office August 19 after a two months' trip through the Western and Pacific Coast states. He reports a marked improvement in business conditions on the Pacific Coast and a bright outlook for the fall and winter seasons. The principal object of Mr. Reynolds' trip was to make the personal acquaintance of the members of the staff at all offices, both large and small, and to obtain first-hand information regarding working conditions surrounding the staff in each office, and arrange for such improvements as the conditions called for. He states that the subject of stringing additional wires to the coast to meet the increasing demands of the service is being considered.

MR. C. C. ADAMS, vice-president of this company, New York, will spend three weeks, beginning September 6, taking automobile trips. Mr. Adams has been made president of an association of property owners on Rockaway Peninsula, L. I., organized by leading property owners for the purpose of carrying on a campaign for the extermination of mosquitos in that section. The assessed valuation of property represented is \$80,000,000.

MR. CHARLES P. BRUCH, vice-president of this company, New York, has returned from two weeks' sojourn on the golf links.

MESSRS. J. F. SKIRROW, associate electrical engineer, and J. P. O'Donohue, division electrical engineer, New York, spent a few days in Washington, D. C., last week on company business.

MR. A. J. EAVES of the engineer's office of this company, New York, has returned from a rest spent camping.

MR. E. P. TULLY, city manager, New York, is passing his vacation at Schroon Lake, N. Y.

MR. CHARLES E. STUMP, manager of the 105 Dock Street Office, Philadelphia, Pa., was a recent executive office visitor in New York. He was the guest of Mr. T. J. Donovan, manager of the branch office located in the Terminal Building.

MANAGERS APPOINTED.—A. L. Marvel, formerly manager at Bridgeville, Del., has been appointed manager at Annapolis, Md.; C. T. Sterling, manager at Greenville, N. C.; M. H. Leahy, at New Castle, Pa.

TELEPHONE SIGNS.—The Postal Telegraph-Cable Company has designed an attractive sign for its long-distance telephone offices in the South, Southwest and West. The words "Long Distance Telephone Service" appear in white block letters on a bright red ground, surrounded by a blue border.

Solicitation of Business Under Present Conditions.

Some time ago Mr. W. S. Daniels, former manager for the Postal Telegraph-Cable Company at St. Louis, Mo., prepared an article giving some wholesome advice on the solicitation of business under present-day conditions. From this paper we extract the following:

Simplicity is hard to attain because it rarely comes to one who has not learned thousands of details and our success as a manager or solicitor is largely dependent upon whether or not by studious thought and experience we learn how to cut off the many expenses and schemes that do not count.

Get into step, therefore, by loyalty and enthusiasm after having acquired the necessary information or knowledge of the company's policy, because the man who is out of step and who views the instructions from his superior officers with a snarl, shelters himself behind a logical snare saying, "It can't be done," and watches the marchers sweep by him.

We must be representative and appreciative of the confidence of the officers of the company we have the honor to serve so as to maintain and constantly push forward the dignity of the position of our company in the business community.

It is as necessary therefore for the representative of the company, solicitor, manager or messenger to pay attention to his personal appearance as it is to any other form of instructions. Clothes help to create certain impressions, and to lead your friends to the conclusion that you are decent, clothe and care for yourself in the style customary among decent people. At the same time, if it can be avoided, never attract attention to your clothes.

Concentration is the next step, and the most difficult art of the business manager is to select the thing that is essential and do it first. It is impossible for any dragnet solicitation to be made personally, especially in a large territory, without a waste of energy, except as such solicitations may be made by a judicious distribution of circular dodgers issued by the company for that purpose. Effort must be concentrated on those patrons whose business counts. To make a hundred solicitations of firms or individuals who do little, if any, telegraphing is of no avail as compared to your competitor who is deaf, dumb and blind to every detail, but lands the big business.

Motion is a wonderful thing, but in many instances it is not the thing needed so much as is direction. There is a frenzied admiration these days for the business man who is always busy, yet perhaps the quiet chap across the street is laughing in his sleeve and piling up profits while the human whirlwind is simply making a noise.

Land the big customers because the momentum of their business will draw into the current the business of the smaller patrons, although we must by no means forget that each and every patron is alike deserving of courteous consideration and the most effective method of solicitation is now as it ever has been with our company which holds that competition, sincere, aggressive and progressive, is the one fundamental principle upon which its system has been built, and that the excellence of its service is the direct result of its independence and its aggressive and progressive policies.

Above all give your customers service-quality, service-courtesy, accommodations and attentions. If their business increases, thank them for it in

a happy and pleasant manner either personally or by letter, whichever may seem best under the circumstances. If it decreases, make sure that you understand the conditions, or by tactful conversation and inquiry ascertain the cause of the decrease without giving annoyance or offense to the patron, at the same time strenuously soliciting and making every effort to demonstrate the fact that the service given is the best telegraph service obtainable.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. BELVIDERE BROOKS, vice-president, New York, is passing his vacation in taking short trips around New York.

MR. L. MCKISICK, assistant to the president, has returned from San Francisco, where he passed a portion of his holiday. He was accompanied by his family.

MR. A. G. SAYLOR, general manager of the Eastern Division, New York, has returned after a short rest from office duties, which he spent in Maine.

MR. H. C. WORTHEN, general manager, Southern Division, Atlanta, Ga., has published a leaflet entitled "The Pessimist—His Cure," for distribution in his division. The substance is taken from an article published in TELEGRAPH AND TELEPHONE AGE for August 16.

MR. J. B. VAN EVERY, a former vice-president of this company, now retired, who has been passing the summer in Tenaflly, N. J., will return to New York September 1.

MR. G. M. YORKE, general superintendent of plant, New York, is resting at Point Pleasant, N. J.

MR. W. N. FASHBAUGH, general superintendent of traffic, New York, has gone to Denver, Col., on a recreation trip.

MR. GEORGE E. PALMER, traffic engineer of the eastern division, has been appointed chief operator of the general operating department, New York City, vice Mr. E. T. Burrill, who becomes force chief. Mr. Palmer before coming to New York two years ago was chief operator of the San Francisco office. He has held many other important positions in the service and is well qualified to fill the duties of his new position.

MR. T. P. CUMMINGS, former district commercial superintendent for this company at New Orleans, La., and now in the insurance business in that city, was an executive office visitor a few days ago, while en route to Boston on a business trip. He was accompanied by his daughter.

MR. A. E. BARNES, secretary to Mr. W. W. Ryder, general manager of the Western Division, Chicago, is visiting friends in New York.

MR. J. B. CHEATHAM, assistant superintendent at Nashville, Tenn., delivered a lecture on "The History of the Telegraph," before the Commercial Club in that city August 26. Before the lecture a reception was held by the company's local officials and the visitors were shown through the operating room.

MR. J. E. BAIRD has been appointed valuation engineer for the Southern Division, with headquarters at Atlanta, Ga.

MR. L. A. OTT, manager of the Dallas, Tex., office, gave a talk on the telegraph at the Electric Club luncheon in that city August 6. He told what the company is doing for the welfare of its employees and the opportunities it affords to messengers and students of telegraphy for advancement.

MR. C. M. MARRON, acting manager of the Portland, Ore., office of the American District Telegraph Company, has been advanced to the position of general inspector of the Pacific Division, with headquarters at San Francisco. Mr. Wm. Ingold has been appointed manager of the Portland office to succeed Mr. Marron.

MR. W. H. MCKELDIN, chief operator at Washington, D. C., and Mr. F. R. Webb, chief operator, Philadelphia, recently spent a brief season at Atlantic City.

A CONFERENCE of managers of south Alabama offices was held in Montgomery, Ala., August 11. Among those present were Mr. H. C. Worthen, general manager, Southern Division, Atlanta, Ga.; J. F. Wilson, district commercial superintendent, Meridian, Miss., and M. R. Sutherland, division cable manager, Atlanta, Ga. After the business meeting a dinner was given to the visiting managers.

THE CABLE.

MR. W. A. MCALLISTER, superintendent Central Cable Office, New York, has returned from a three weeks' trip spent on Long Island and up the Hudson River.

MR. S. FENN, traffic manager Western Union cable system, London, England, and Mr. J. H. Fraser, superintendent of the Western Union cable station at Canso, N. S., have retired after having served forty years in the cable service. Both gentlemen engaged with the Direct Cable Company when it was organized in 1874.

MR. J. A. BLENHEIM has been appointed traffic manager of the Western Union cable system, London, England, vice Mr. S. Fenn retired. Mr. Blenheim previous to his present position was assistant traffic manager.

MR. W. T. WHITE, of the Canso, N. S., cable staff of the Western Union Telegraph Company has been appointed assistant superintendent of the North Sydney cable office.

MR. A. J. COPPIN, formerly of the office of the district traffic superintendent at St. John, N. B., has been appointed assistant superintendent of the Halifax, N. S., cable station.

MR. E. A. KEENE, an old time cable operator of New York, is living in retirement at Ocean Beach, Fire Island, L. I., N. Y.

GERMAN CABLE DIVIDEND.—The annual report of the German Atlantic Cable Company for the year 1914, a copy of which has just been received from Herr Heinrich Dreisbach, director of the company, shows that a dividend of 6½ per cent was distributed among the shareholders.

CIPHER CODE.—The 1915 edition of the "Standard Telegraphic Cipher Code for the Cotton Trade" has just been issued and is ready for delivery. The book is arranged in progressive chapters and alphabetically, and has a comprehensive index which will facilitate its use and save time. The code has been brought up to the requirements of modern cotton business. The price is \$5.00 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to August 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Seattle-Sitka, August 13; Cayenne-Salinas, August 20.

CANADIAN NOTES.

HORACE MACDOUGALL, aged seventy years, an old-time Canadian telegrapher, died in Petrolea, Ont., August 19. He was a pioneer resident of Winnipeg, Man., and superintended the construction of the first telegraph line into Fort Garry from St. Paul, Minn. Before going to Winnipeg he was manager at St. Mary's, Ont., for the Montreal Telegraph Company. He retired in 1890.

VOLUNTEERS.—Messrs. R. J. Mills, A. D. Long, A. L. Bulmer and J. B. Bass, of the Montreal operating department of the Great North Western Telegraph Company, and Mr. R. Butwell, of the Toronto operating staff, have volunteered for overseas service.

Canadian Conference.

A conference of the officials of the Great North Western Telegraph Company was held in Toronto, Ont., recently. Among those present were Mr. G. D. Perry, general manager of the company; Mr. C. E. Davies, traffic superintendent, the various district superintendents and the managers of the larger offices. Mr. G. H. Stead, district superintendent at Saskatoon, Sask., and Mr. C. W. McKee, district commercial superintendent Western Union Telegraph Company, St. John, N. B., were also present by special invitation. Mr. S. B. McMichael, general manager of the Dominion Messenger and Signal Company, gave a lecture on "The Story of the Telegraph." General manager G. D. Perry entertained the visitors at a dinner at the Royal Canadian Yacht Club's house.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 550 to meet the claims arising from the deaths of N. J. Gibson, at Nashville, Tenn.; G. B. Scott, at Toms

River, N. J.; B. F. Coan, at Cincinnati, Ohio; C. A. Offutt, at Washington, D. C., and C. E. McCullough, at Philadelphia, Pa.

THE TELEPHONE.

MESSRS. F. H. BETHELL, president of the Bell Telephone Company of Pennsylvania, New York, and John J. Carty, chief engineer of the American Telephone and Telegraph Company, New York, are resting in Maine.

MR. T. D. LOCKWOOD, general patent attorney American Telephone and Telegraph Company, Boston, Mass., sailed from New York for San Francisco, August 28, on the steamer "Kroonland," via the Panama Canal. Mr. Lockwood will attend the meeting of the Telephone Pioneers of America in San Francisco, September 21, 22 and 23.

MEASURED SERVICE IN NEW JERSEY.—The New York Telephone Company on September 1 will put into effect a new schedule of rates for measured telephone service in New Jersey.

NEW YORK CITY'S TELEPHONE BILL.—A committee has been appointed by Mayor Mitchel of New York, to investigate and analyze the telephone service of the city with a view to determining whether the city's telephone bill can be reduced. The city is now paying \$300,000 a year for its telephone service. Among the members of the committee are Putnam A. Bates, electrical engineer in charge of the Bureau of Fire Alarm Telegraph of the Fire Department, chairman, and Michael R. Brennan, superintendent of Telegraph of the Police Department.

OMNISCIENT TELEPHONE BUREAU OF INFORMATION.—Information operators in telephone exchanges are asked many strange and foolish questions. A subscriber in Dayton, Ohio, asked, "Is it too cold to set a hen to-day?"

CONSOLIDATION IN PROVIDENCE.—A plan for the consolidation of the Providence Telephone Company, with the New England Telephone and Telegraph Company, has been submitted to the stockholders of the local corporation. The combination is to be effected by an exchange of stock on the basis of four shares of New England Telephone and Telegraph for five shares of Providence Telephone stock.

CANADIAN BELL TELEPHONE MEN IN THE WAR.—Of the 2,800 male employees of the Bell Telephone Company of Canada, 123 are "with the colors," either fighting for Britain in Flanders or waiting for the call from across the sea. In addition to these a large number have joined the Home Service regiments.

PROCEEDINGS OF RICHMOND CONVENTION OF TELEPHONE PIONEERS.—The proceedings of the fourth annual convention of the Telephone Pioneers of America held at Richmond, Va., October 29 and 30, 1914, have just been issued. The book contains 108 pages and many illustrations of points of interest in and about Richmond, besides portraits of many of the prominent telephone officials and a large group-photograph of those who took the boat ride from Richmond to Washington, via Old Point Comfort, taken at the Jamestown monument. It is hand-

somely gotten up and will make a valuable addition to the preceding Pioneer reports. The book reflects great credit upon the taste and work of secretary R. H. Starrett.

Telephone Pioneer's Convention.

Interest is growing in the fifth annual convention of the Telephone Pioneers of America, which will be held in San Francisco, Cal., September 21, 22 and 23, and applications for transportation on the special train from the east are continually being received by secretary R. H. Starrett.

The train will leave New York, Boston and Philadelphia, Tuesday, September 14, and Chicago the next day, and the entire trip, from eastern points and return, will consume about twenty-three days.

Following is a list of those who have up to the present time signified their intention of traveling on the Telephone Pioneers' Special, arranged according to cities:

NEW YORK.—Mr. and Mrs. E. Corrigan, Miss C. A. Wallace, Mr. and Mrs. H. G. McCully, Mr. and Mrs. E. H. Davey, Misses A. and E. Green-slade, Mrs. L. M. Davenport, Miss Minnie M. Walker, Miss Frances H. Endres, W. E. Huntington, Mr. and Mrs. J. T. Blake, Mr. and Mrs. Geo. P. Wilt, Steven B. Goodloe, Mr. and Mrs. J. O. Murphy, Mr. and Mrs. H. Boutillette, Miss Sarah A. Redden, Miss K. V. Pettit, Mr. and Mrs. F. W. Griffin, Miss Jean D. Westervelt, Mr. and Mrs. Sydney Wickham, Mr. and Mrs. W. L. Hermance, J. H. Mehaffey, Mr. and Mrs. P. J. Hartman, Miss Mary D. Cardwell, Miss Martha Smith, Chas. C. Wagner, Miss E. R. Millar, Miss K. M. Schmidt, W. C. Graham, Mr. and Mrs. A. S. Campbell, W. B. Perkins, James J. Donnelly, N. C. Watts, Mrs. W. W. Gibbs, Mr. and Mrs. H. F. Stevens, and Misses P. C. and E. B. Stevens, Miss E. F. Kittredge, Mrs. Geo. A. Kittredge, S. H. Meyers, Mr. and Mrs. R. H. Starrett.

BUFFALO.—Hugh C. Baker, Mr. and Mrs. H. B. Wilton, Cecil W. Mackenzie, Miss Mabel La France, Miss Agnes Sterling, Miss Alice Dinley, Miss Rosalind Cheney, J. W. Stearns, Mr. and Mrs. George Hope.

WORCESTER, MASS.—Mr. Clifford M. Wilson.

SALT LAKE CITY, UTAH.—C. F. Annett, J. S. Bennett.

DENVER, COLO.—Geo. R. Armstrong.

CHICAGO, ILL.—P. V. Warner, Miss Harriet M. Binnmore, Mr. and Mrs. A. P. Hyatt, Miss Harriet E. Hiler, Mr. and Mrs. H. J. Baumann, Richard T. McComas, Mr. and Mrs. F. R. Atwood.

BOSTON, MASS.—Mr. and Mrs. F. R. Starkey, Geo. B. Pierce, W. F. Crowell.

Further particulars will be given by Mr. R. H. Starrett, secretary, 15 Dey street, New York.

Review of Principal Articles in Contemporary Telephone Publications.

"WITH THE MEN WHO BUILD THE WIRE HIGHWAYS" is the title of an interesting account of the work of the installer, by J. O. Martin in the August *Transmitter*. The article is illustrated with views

showing different phases of the work of installing telephones.

"HOW MANAGERS MAY INCREASE THE TOLL BUSINESS," is the title of an instructive article in the *Bell Telephone News* for August, written by Albert Douglas, commercial agent of the Michigan State Telephone Company at Grand Rapids, Mich. He gives some sound advice on the building up of the service and how it should be watched and handled.

RESPONSIBILITY OF INDIVIDUAL EMPLOYEES.—While in the south Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, gave a talk on "Responsibility of Individual Employees" before the Telephone Society of Jacksonville, Fla. The address is printed in the *Southern Telephone News*. Mr. Vail gives some wholesome advice to telephone operators and managers.

PRUNING AND TRIMMING TREES.—W. W. Kinsley, jr., is the author of an interesting and instructive article in *Telephony* for August 14, entitled "Right and Wrong Methods of Pruning and Trimming Trees." He points out the best time of year for trimming different trees; methods of treating cuts to prevent decay and to hasten the healing process; the commercial value of trees; and names the proper tools and equipment for tree-trimming gangs.

PAYING BILLS.—The paying of the bills of large business concerns is not an easy task. How a large telephone company pays its debts is described by Mr. D. M. Brown, voucher supervisor, accounting department, of the eastern group of Bell telephone companies in the August number of *The Telephone News*. The story is of the department which watches over the expenditures and which, while others incur the indebtedness, must see that the bills are paid.

MAGNETO TROUBLES.—Mr. W. J. Herdman presented a paper on "Magneto Troubles—How Found and How to Cure Them," before the annual convention of the Canadian Independent Telephone Association, in which he covered the subject in a thorough and systematic manner. The clearing of trouble, he said, depends fundamentally upon elimination of possible causes by various tests on apparatus isolated from other connections. The paper includes a table of troubles and indications. It is published in *Telephony* for August 7.

THE TELEPHONE IN THE GERMAN ARMY.—An interesting story of the use of the telephone in the German army is printed in the August number of the *Bell Telephone News*. A feature of the article is a reproduction of an English field service post card. It contains various sentences in print, such as "I am well," "I have been wounded," "I have been admitted to hospital," etc. The sentence or sentences that apply at the time of writing are left standing all others are scratched out. If anything is written by hand the card is destroyed.

RADIO-TELEGRAPHY.

UNITED WIRELESS COMPANY DISSOLVED.—The affairs of the United Wireless Telegraph Company have been settled after long litigation and the company has been dissolved, the last step in the proceedings having been taken in Portland, Me., recently.

WIRELESS PHOTOGRAPHY.—An Indiana genius claims to have invented a system of wireless photography by means of which pictures of forts and armies miles away may be made either on the darkest night or the brightest day. His place is at the front, not in Indiana.

DEMAND FOR WIRELESS OPERATORS.—Marconi operators employed on Atlantic liners say that the demand made by the British Navy for operators is so great that when a steamer arrives in Liverpool or London there is an order waiting for the men to be sent to another vessel ready to go to sea. Up to the present 5,250 Marconi operators have gone to the navy, and 1,000 of that number have left the merchant service permanently. They are paid about \$50 per month. So far Marconi operators serving in the warships have earned one Victoria Cross, one Cross of the Legion of Honor and four Distinguished Conduct medals.

THE SAYVILLE RADIO STATION.—It is stated that the evidence which led to the seizure of the radio station at Sayville, L. I., by the United States Government, on July 8, was obtained from wax records made of the correspondence for one month prior thereto. The records were made at the wireless station of Mr. Charles E. Apgar, at Westfield, N. J., at the instance of Mr. W. J. Flynn, chief of the government secret service bureau. The Navy Department has sent additional officers and enlisted radio operators to the stations to enforce censorship with the greatest of care. The naval censors have been instructed to forward to the department every message filed or received there that is not clear to the censors or appears to be open to the suspicion that it is of an unneutral character.

The World's Radio Stations.

The 7,000 ship radio stations in the world require over 15,000 licensed radio men to operate them, while over 1,000 land stations with a working force of 3,200 men are required to handle the business which originates on board, or for, these vessels. These 1,000 land stations are scattered all over the world from the arctic to the antarctic, in the tropics, the jungles of South America, Africa and India, in the far east and in the far west, even in the middle of the Sahara desert. The records of the United States licensed amateur stations show that about 2,000 amateurs have been licensed in the past few years to operate their own stations. This number is a small percentage of the total amateur stations scattered throughout the country, as several thousand of them are operated under conditions which do not require a license. All the best equipped warships carry wireless and a fair estimate of the number of navy vessels at war so equipped is Great

Britain 500, Germany 200, Italy 200, France 180, Russia 110, Japan 70, Austria 60. There are also a large number of small vessels under colonial flags. The United States has over 300.

The Institute of Radio Engineers.

The next meeting of the Institute of Radio Engineers will be held Wednesday evening, September 1, at Columbia University, New York, at 8:15.

A paper on "The Operating Theory of Frequency Changers," by Prof. J. Zenneck will be presented. The fundamental equations of the theory of the frequency changer will be derived (with certain assumptions) and the application of the solution to unloaded and loaded frequency changers will be discussed.

Encouraging Improvements in Marconi Service.

MR. E. J. NALLY, vice-president and general manager Marconi Wireless Telegraph Company of America, New York, has issued a circular letter to the company's employes for the purpose of encouraging each and every one of them to give the company the benefit of their best thoughts in the direction of perfecting the service. Following is the text of the letter:

"The Marconi Company solicits suggestions from all its employes regarding improvements that can be adopted for the betterment of its service.

"Those in direct contact with the various branches of our organization learn from their actual experience much that is valuable which, if properly suggested and considered, would lead to general improvements.

"This applies to all departments and particularly to wireless operators who, in their daily duties, have every opportunity to observe the equipment, its operation, its care and maintenance, the methods employed in communicating between ship and shore stations, traffic regulations and the many other elements of which the organization consists.

"For the purpose of properly considering and acting upon ideas submitted by the members of our staff, a committee has been chosen, and anyone having suggestions to offer should address:

"Chairman, Suggestions Committee,

"Marconi Wireless Telegraph Company of America,
New York City.

"In submitting ideas the following requirements must be complied with: (a) Make your suggestions brief; (b) express your ideas clearly; (c) confine yourself to matters which will raise the standard of operating efficiency. Expressions of petty personal prejudices are of no value; (d) write only on one side of the paper.

"Substantial cash prizes will be given to those whose suggestions are favorably acted upon by the committee.

"E. J. NALLY,

"Vice-President & General Manager."

MR. J. DE JARA ALMONTE, formerly general solicitor for the Postal Telegraph-Cable Company at New York, has resigned and entered the service of the Marconi Wireless Telegraph Company of America in its foreign department.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

"GERMANY'S TRANSATLANTIC WIRELESS SCHEMES" form the subject of an article in the August number of *The Wireless World*, which is full of interest at this time. The Nauen (Germany), the Sayville (L. I., N. Y.) and the Tuckerton (N. J.) stations are briefly described. Illustrations of the plants are shown.

WIRELESS IN BRAZIL AND PERU.—An account of radio-telegraphy in connection with the Brazil-Peru Boundary Commission, profusely illustrated with picturesque photographs, appears in the August number of *The Wireless World* under the title of "Through South American Jungle Land." It depicts in a very graphic way the difficulties encountered in opening up this part of the world, where nature is encountered in her most luxuriant and riotous mood.

INVESTIGATIONS INTO AURORA BOREALIS AND ITS INFLUENCE ON WIRELESS TRANSMISSION.—An extremely interesting record of research work by Mr. H. M. Dowsett is contributed to *The Wireless World* for August under the title of "The Physical and Electrical State of the Atmosphere." The article deals with the various layers which surround the surface of the earth, especially from the point of view of their electrical condition. The various investigations and theories advanced by the leading authorities are discussed and illustrated with diagrams elucidating their several points. The whole discussion of the question of the influence of the aurora borealis on wireless transmission, hangs upon the conditions sketched by Mr. Dowsett. The subject is interesting, not only to the technical reader, but also to every intelligent enquirer as to what is going on around us in the world of nature.

Radio-Telegraphy.

Circular No. 1 on "Radiotelegraphy," revised May, 1915, by the chief signal officer of the U. S. Signal Corps, is one of the most practical publications ever issued on the subject. It has 128 pages and 88 illustrations. It covers the fundamental principles of wireless, circuits, apparatus, measurements, etc., all of which is made very clear. The price of this book is 40 cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

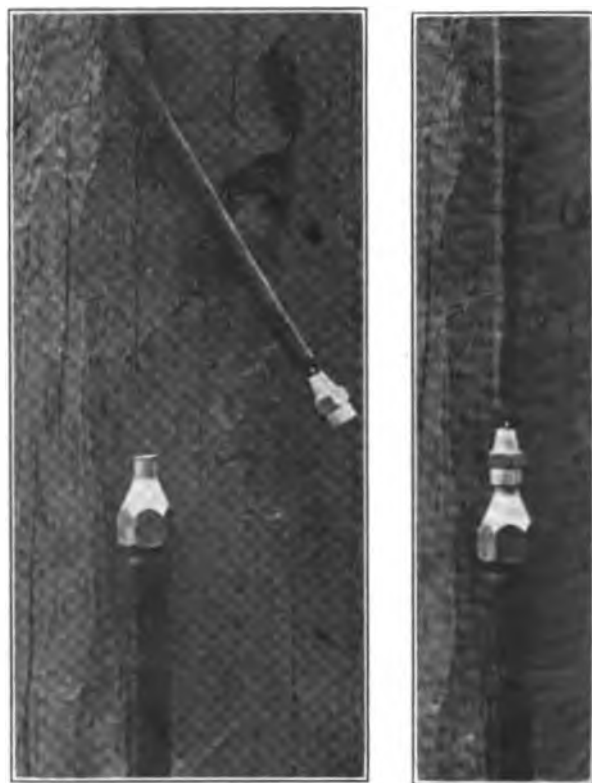
RADIO STATIONS OF THE WORLD, a book recently published, contains a very compact and complete list of the radio stations of the world. It has 197 pages and is of vest pocket size. It contains in one alphabetical order over 7,000 ship stations arranged alphabetically by name of vessel. In the next section of this list every land station of the entire

world is arranged alphabetically by name of station. The third section contains an alphabetical arrangement of all the three-letter calls that have officially been assigned, as well as all those which are at present unassigned. This section also contains such information as, the nationality of the station, notes, coast or ship; also the international code of abbreviations, etc. The last part contains blank alphabets which can be made into a call list of any special line of ships, any shore stations on a particular run, etc. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at 60 cents per copy.

INDUSTRIAL.

Improved Grounding Device.

The accompanying illustrations show the practical application of the grounding device now being brought out by the Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y. The great advantage possessed by this device is the facility of disconnect-



GROUNDING DEVICE DISCONNECTED FOR TEST AND CONNECTED AFTER TEST.

tion for testing purposes and the easy restoration of the connection, as shown in the two views.

The grounding device has a positive contact, and is attracting much attention from electric railway and power companies. It is of special value to telegraph and telephone companies, as it affords a rapid and reliable means of securing a good ground connection.

The grounding device and connection are made of heavy bronze and are practically indestructible and uncorrodible.

The Telegraph and the Press.

Seventy-one years ago the telegraph was born. It came to serve the new hunger of the modern world for news. In 1844 it transmitted a dozen words for fewer than 100 miles, and preachers called the petty performance a revelation of divine favor to men. In 1913 it sent more than 1,000,000 words about the "Titanic" disaster from New York across America and perhaps another third of a million under the Atlantic within four hours, and yet only the newspapers know of the tremendous feat, and they simply spoke of it casually as "extra heavy traffic."

The modern appetite for the events of the day grows keener every year, says the Albany *Knickerbocker Press*. The telegraphic slave is annually summoned to more exacting service. But no reader of the daily paper experiences amazement at the multiplying prodigies in the publication of the news. He is not even aware of the prodigies' occurrence. A Japanese censor prohibits the telegraph from talking, but it hoodwinks him and talks. An earthquake breaks the Pacific Cable, but the wireless flings the news through the air. Every moment the telegraph is everlastingly "on the job."

It is estimated that 2,600 papers in the United States daily receive telegraphic service. At least 400 dailies divide between them 1,000,000 words of telegraphed news, in addition to the report furnished by the collecting agencies. An average day sends 1,190,000 words over the wires in the United States, and the cables raise the daily average to more than 2,000,000 words. A startling or widely interesting occurrence raises this average by tens of thousands of words. A full third of the total in twenty-four hours may come from a single town, if it is Chicago holding some national nominating convention or San Francisco in earthquake and flames.

The telegraph's voice rivals light in speed. When Hoxsey, the aviator, fell to death at Los Angeles, Cal., New York knew it before the doomed man had plunged down 1,000 feet, and while men tore madly across the field twenty lines were sending the terrible news all over the United States. "Speed? More speed! Still more speed!" is the cry. The telegrapher is keyed to super-human efficiency. He must possess instinctive capacity for swift sureness. Sometimes the loss of a single second is intolerable. When the contests occur between league champions of baseball for the world's championships, newspaper rivalry enforces a competition where lost seconds mean lost prestige and lost money.

Growth of the Telegraph.

Prior to Cyrus W. Field's advocacy of an Atlantic cable, one across the British Channel was the most that science had compassed, says P. T. McGrath, in the *Review of Reviews*, and Field was regarded as outstepping all bounds of reason when he launched his larger project. His initial venture failed practically, though succeeding theoretically, and it was not until 1866 that regular transatlantic cabling was really begun effectively. Yet we find that the commercial use of telegraph, by land and sea, has grown so rapidly in the fifty years since

then that there are now 1,764 corporation and government cables, with a length altogether of 204,527 nautical miles, while on land there are 5,044,200 miles of telegraph lines, over which land lines 1,400,000 telegrams and over which cables 36,000 messages are sent daily, an annual total of 478,320,000 telegrams and 14,140,000 cablegrams. Nor is there any apparent relaxing of activity in these directions. New telegraph lines are being built daily, and the factories of Europe are constantly employed, producing these electric nerves, by means of which to bring into direct and responsible contact with the great centers of the world its most remote regions. The telephone is a close connection of the telegraph, and although little over thirty years have elapsed since the first experiment was made by Dr. Alexander Graham Bell, which proved the possibilities of electrical transmission of speech, the telephone has now become an almost indispensable factor, not alone to commercial, but also to domestic existence.

Report of Industrial Relations Committee.

The second section of the summary of the report of Basil M. Manly, director of Research and Investigation of the United States Commission on Industrial Relations, was made public in Chicago, August 24, as was the full text of the "Supplemental Findings and Recommendations" by Commissioners John B. Lennon and James O'Connell.

In effect the report states that industrial unrest is caused by low wages, and that low wages are due to the lack of strong labor organizations. The report recommends that the Government takes over the telegraph and telephone lines, and when the employees are transferred to the federal service a special commission be created to establish salary ratings and other working conditions on a proper basis.

AN HONEST MESSENGER.—G. E. Huggins, a messenger for the Western Union Telegraph Company at Memphis, Tenn., recently found about \$125 in cash and several checks on the street in that city. One of the checks was on a bank near where the valuables were found. Huggins took the money and checks to the bank, telling the cashier where he had found them. A little later the man who had lost them came into the bank and reported his loss. The money was restored to the owner, who hunted up the messenger and gave him \$2.00 as a reward for his honesty. The manager of the Memphis office had a photograph taken of Huggins and sent a copy to headquarters at New York. One of the Memphis papers also reproduced the photograph in connection with the story of the incident, and the other city papers took due notice of it.

DESERVING A SEVERE PUNISHMENT.—Frank Spaulding handed in a message at a branch office in Louisville, Ky., and because the operator, Miss Letta B. Underwood, could not decipher his scrawled handwriting he emptied a bottle of ink over her. He was arrested and placed in jail.

The Telephone in Wireless Telegraphy.*

By far the greater proportion of the reception of wireless messages is carried out with the aid of the telephone.

Although there are several schemes for the automatic reception of signals, some of which have been proved by practical trials to be well adapted for the purpose, they are all more complicated and, for the most part, require stronger signals than a telephone.

Moreover, there is an interval of time between the actual reception of a message and when it is read and dealt with at the receiving station. For large stations dealing with a large amount of traffic this interval is not detrimental, but for small ones, such as ship or field stations, where a large proportion of the traffic necessitates an immediate reply, the telephonic method of reception has an additional advantage above the greater part of the apparatus in use.

The resistance of the telephone coils in the usual patterns varies from sixty to 4,000 ohms per head, according to the particular circuit with which the instrument is to be used.

For a carborundum crystal or Fleming valve detector the telephones are of 8,000 ohms for the two heads in series; lower resistance crystals work best with telephones also of less resistance, and the magnetic detector is arranged for use with telephones of 120 to 180 ohms.

For a telephone to be sensitive it is essential for the diaphragm to be as close as possible without touching the magnets, and in some patterns a fitting is provided by which this distance can be adjusted.

A very sensitive form of telephone is that due to Mr. S. G. Brown. In this a stiff steel reed is fitted near the poles of the magnets so as to be acted on by them in the same way as the ferrotype diaphragm in the ordinary pattern.

A thin aluminum, cone-shaped diaphragm is screwed to the reed at its centre, the rim being held by a thin paper ring fixed to the rim of the receiver case. An adjustment is provided for altering the distance of the reed from the poles, by which the sensitivity can be adjusted.

When telephones are in constant use a certain amount of moisture condenses on the diaphragm, and some will find its way into the case. To prevent this from rusting the magnets or spoiling the insulation of the windings they are sometimes embedded in wax, leaving only the pole faces projecting.

In place of high-resistance telephones a telephone transformer and low-resistance telephones are often used.

By proper design the combination can be made more sensitive than the equivalent high-resistance telephones. The transformer is constructed by winding the high-resistance coil round a core of iron wire, and winding the low resistance coil outside. The whole should be embedded in wax.

Careful tuning of the various circuits to the wave-length of the signals received is necessary.

*From *The Wireless World*.

In the telephone circuit the current due to the signals is in the form of impulses, all of one sign (*i. e.*, not alternating), the frequency being that of the spark at the transmitting station. These impulses, although not alternating, require the circuits through which they pass to be tuned to their frequency just like alternating currents. Since the telephones and telephone transformer are highly inductive circuits, condensers must be connected in parallel with them to tune them for the best results.

Where a telephone transformer is used a condenser of the proper capacity should be connected across each winding. The values of the capacities can be worked out if the inductances of the various parts are known, but a simpler way is to connect a variable condenser across the terminals of the instrument and note when the signals are best. The condensers must be of low dielectric loss or the note heard will to a certain extent have a muffled tone.

Although the best results will be obtained if these condensers are adjusted exactly to the note of the signals, this would entail, in a receiver for general use, a large variable condenser on the low-resistance side (where the inductance is small) and a correspondingly smaller one on the high-resistance side, and these would complicate the receiver. For practical purposes an average value of the capacity is selected, and fixed condensers of this value connected to the windings.

By a careful adjustment of this note tuning, however, interference from stations having a different spark note from that of the one required can be greatly reduced.

In receiving signals by the ordinary headgear telephones it is to be noted that the metal cases are either directly connected to the observer's body or form a condenser with it. They also form a condenser with the coils carrying the signals.

Similarly the observer's body is connected with the earth either directly or by a capacity.

A certain fraction of the signal current flowing through the coils will pass through this system of condensers to earth.

It is sometimes noted that, particularly when receiving signals from a local buzzer circuit or nearby transmitting set, on touching some parts of the receiver signals are increased in strength. This is due to a modification of the capacity current referred to, which causes the current in the coils to be increased. Interfering sounds from local alternating current leads are similarly increased by earthing certain parts of the instrument with the fingers. Hence there is an additional necessity for keeping the receiver and all its accessories, such as connecting leads, batteries, etc., well insulated and arranged to have a minimum capacity to earth.

PRESS-THE-BUTTON TELEGRAPHY.—The series of articles by Mr. Donald Murray, printed in the *Telegraph and Telephone Journal*, of London, England, under the head "Press-the-Button Telegraphy," has been reprinted in pamphlet form. The story of the development of the Murray system of printing telegraphy makes very interesting reading.

The Telegraph in Turkey.

BY SAIM SALIM, OTTOMAN GOVERNMENT TELEGRAPH STUDENT, NEW YORK.

In Turkey, as well as the other European countries, the post and telegraph business is owned and managed by governments. In Constantinople, the main post and telegraph offices are managed by ministers of traffic, especially appointed by the administration. The main office is a very large building and is famous for its architectural beauty. In the very large cities, such as Constantinople, the post and telegraph service is in charge of a chief manager, but in the ordinary size cities a manager is sufficient to carry on the business. The small villages and towns are under the supervision of a chief employe.

In the main office in Constantinople two hundred operators and four hundred clerks are employed, the operators each working twenty-four hours straight and resting for the next forty-eight hours, and the clerks work nine and a half hours per day. Friday is the Turkish holiday on which day no clerks work. Besides the head manager the main office is supervised by different employes who hold positions as chief operators, supervisors, etc.

The Turkish post and telegraph employes are classed in four divisions. The first division is composed of those who have wide knowledge and hold responsible positions, such as engineers, chief managers, etc. In order that they may become first-class employes, these men must study in any of the universities of Europe or otherwise obtain an education so that they may qualify for a first-class test in telegraphy. Their salaries average from one hundred to one hundred and fifty dollars per month.

The second class of employes are men who have an honorable record for long service, but it is not necessary that they be educated to the extent of the first-class men. The highest position a second-class man can reach is sub-manager or inspector of an office. The wages for the second class men are from fifty to ninety dollars per month. The employes of the second class are good telegraph operators and they also know more than one language.

The third class consists of all the telegraph operators and the office clerks. They are paid on an average of twenty-five to sixty dollars per month. In Turkey everything is much cheaper than in the United States and a man receiving twenty-five dollars per month can live comfortably, even if he has a family to support. Many of the third class men speak the French language, thus enabling them to communicate with French offices.

The fourth class of employes is composed of office boys or any other kind of office aides, below the grade of telegraph operators and clerks. They receive from twelve to fifteen dollars per month.

Two telegraph codes are used in Turkey, one the private Turkish code, and the other the continental code. The continental code is used only when especially needed and it is employed for interior as well as foreign business. The Turkish Government

transmits and receives messages in all languages. Most of the messages received from foreign countries are in French. The rules that govern the telegraph system are based on those adopted by the telegraph conferences, whose headquarters are at Berne, Switzerland.

The Turkish private code is very much like the continental code. The alphabet is as follows:

---	A	---	TI
----	B	-----	ZI
-----	P	-----	AIN
---	T	---	GAIN
----	C	----	F
-----	DJ	---	K
----	H	-----	Q
---	D	----	L
----	ZELL	---	M
---	R	---	N
-----	ZE	----	V
---	S	-----	E
-----	SH	-----	LA
----	X	---	I
---	DAT	---	O

TURKISH TELEGRAPH ALPHABET.

Most of the apparatus used in Turkey is of the Morse type, although some French instruments are used. There are no automatic machines, and all the messages are received by sound. The messages are either "official" or "unofficial." The "official" messages are government messages and are handled free, but the "unofficial" messages, comprising the public business, are paid for by the public. Messages can be sent and delivered at any time of the day and night. Unofficial business is rushed so that messages are delivered within one hour at the most. Urgent messages are charged three times more than the ordinary messages and are delivered within fifteen or twenty minutes.

The Turkish letter-carriers or messengers are divided into two classes. The men of the first class speak several languages, such as Turkish, Arabic, Greek, Armenian, etc. Their wages are from fifteen to thirty dollars per month. The second class men are assistants to the first class and they receive practically the same wages. The letter-carriers, or messengers, are supplied by the Turkish Government with two uniforms, two pair of shoes and two hats every two years. One outfit is for winter and the other for summer.

In order to repair the wires in case of storm or accident, the government employs "wire repair men." They are paid about the same as the letter-carriers and are also supplied with uniforms, shoes, tools, etc.

The telegraph post-office has its own factory in Constantinople where all apparatus for its own use is manufactured.

Every two years a general examination takes place for the benefit of all the government employes. If an applicant passes the examination, he will be advanced to the next higher grade. His salary will be raised according to the percentage he receives in the test. In case of the death of an employe after

he has been in the government service over ten years a pension is paid to his nearest relative. A government physician is at the service of employes when needed.

In Constantinople there are about eighty branch post-telegraph offices and mail boxes are distributed about the city from which the mail is collected four times a day. The main office collects the mail from the branch offices by automobiles. Letters are delivered to the homes four times a day.

The government employs post-telegraph inspectors. Their duty is to see that everything is done correctly and that the rules of the government are not infringed.

The post-telegraph offices are kept very clean and strangers are forbidden to enter them. No employe is permitted to work while intoxicated, but cigarette and cigar smoking is allowed during hours of work. All government employes must be attentive to duty; if they are indolent or do not report promptly for

The business meeting will be held in the morning of October 13, and the afternoon will be spent in an electric stage drive to points of interest. In the evening there will be a banquet at the hotel. On October 14 the members will be free to go wherever they please. After the banquet there will be an exhibition of civil war telegraph pictures which will be of particular interest. Tickets for the banquet will be \$1.50 each and for the stage ride, fifty cents. Mr. David Homer Bates, 658 Broadway, New York, is secretary of the society and he will be glad to give further information.

Picnic of Omaha Western Union Electrical Club.

The first annual picnic of the Western Union Electrical Club of Omaha, Neb., took place Sunday, August 15, at Elmwood Park. It was one of the most successful of the many social affairs held by the club since its organization some six months ago.



PICNIC OF WESTERN UNION ELECTRICAL CLUB, OMAHA, NEB.

work, they are laid off. All post-telegraph employes are strictly forbidden to accept any gifts of money or "tips" of any kind from the public. All employes have an hour for lunch and receive vacations of three weeks to a month each year. No female operators are employed, but after the 1908 revolution about twenty females were employed who do only clerical work in the main post office, also in main office telephone department. Their work is highly appreciated by the government.

The telephone was introduced in Turkey about seven years ago, therefore it is not used very much by the public as yet, but is frequently employed by the government offices and other official places. The switchboards of the main office are operated by about ten women and twenty men.

REUNION OF MILITARY TELEGRAPHERS.—The annual reunion of the Society of the United States Military Telegraph Corps will be held at the Broadway Central Hotel, New York, October 13 and 14.

Over one hundred were in the party, which was made up of the members, their families and their friends, and the outing was enjoyed to the utmost.

A baseball game between the married men and the single men of the club was one of the afternoon features and resulted in the defeat of the former by a score of 4 to 2. It was an exciting battle all the way through.

After the ball game the party enjoyed an excellent picnic dinner. The ladies distinguished themselves by the able manner in which they assisted in the preparations and the serving of the dinner.

The programme of events for the ladies had to be cancelled on account of rain.

The club is making excellent progress in an educational and social way and much good is already evidenced by the prevailing co-operation and goodwill. Each and every member is working for the betterment of the service and all are looking forward to the many social affairs planned for 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. Issues over one year old, 50 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, SEPTEMBER 1, 1915.

The Telegraph in Turkey.

We in America know little or nothing of how the telegraph service is conducted in many foreign countries, particularly in Oriental lands. The extent of our knowledge is confined principally to pictures we come across occasionally, showing a few bespectacled middle-aged men with long whiskers seated at kitchen tables doing nothing.

We publish an interesting and illuminating article on another page of this issue about the Turkish telegraph system, with special reference to the Constantinople office. It is written by an Ottoman telegraph official who is at present in this country studying modern telegraph methods, and while it is general in character it throws considerable light on Turkish telegraph practice.

There are several points in the story that will impress the American telegrapher as rather odd, the most striking, perhaps, being the rule of working twenty-four continuously, and then resting forty-eight hours. This method of dividing time is probably best suited to the Turkish character and habits, and no doubt is based on good reason. Averaged up, however, it is equivalent to our eight-hour workday.

The Turkish telegraph code, which is presented in the article, will be regarded with interest. It contains thirty characters—not including numerals—which are for the most part the same as the

English, and of the same continental Morse make-up.

Some lessons in government ownership and control are derivable from the story. Government business is handled free, and for immediate or "rush" service the public is charged three times the ordinary tolls for messages. This practice is at variance with that obtaining in this country where all regular business (deferred service excepted, of course) is immediate. Contrary to the popular notion as to the Turkish mind and methods, it is evident that the Turkish Government telegraph service is conducted along orderly and scientific lines. The practice of holding periodical examinations for promotions shows that the Ottomans are not behind other governments in this respect. It is interesting to note, also, that the pension principle is practiced in Turkey, and that long and faithful service is rewarded as it is in many Christian countries.

Censoring Message Addresses.

The railroad telegraph superintendents are more or less censoring their telegraph messages and it is quite as important that the commercial companies should to some permissible extent do the same with theirs. It is well known that many of the addresses on private messages are needlessly long. Take, for instance, such an address as "James Adams & Co., 615 Main Street, Northeast Corner of Sycamore,"—followed by the name of the city or town and state to which the message is destined. In this case there are at least four unnecessary words, yet it is the duty of the operator to send them all; the rules of the company require it. Thousands of messages to this particular concern may pass through the company's hands and everyone knows perfectly well where the firm's place of business is, but notwithstanding this fact the transmission of the occasional long address is kept up.

The example cited is only one of thousands that are occurring every day. If the censoring were done at the receiving counter much benefit would result to the companies and without disadvantage to the customer who would in most every case acquiesce in the receiving clerk's suggestion that the unnecessary words be omitted. After a message is accepted over the counter no one has any more right to omit any part of it than he has to add to it; the censoring therefore should begin by the clerk at the receiving counter.

In England and some other countries the addresses of firms are represented by one cipher word, and a charge is made by the government for the use of this cipher. A similar plan, minus the additional charge feature, might be adopted in this country with marked saving to the companies. It would be more economical for them to send one word than to send half a dozen or more. The companies could well afford to maintain an address code service covering the names of thousands of firms and the code need not exceed seventy-five three-letter words in its construction. Such code words would become so familiar to the operators that there need never be a mistake in their transmission.

The foregoing is offered merely as a suggestion as to the possibilities of shortening needlessly long addresses, and the code idea seems to point the way out of the difficulty. The telegraph companies recognize the burden placed upon them, and no doubt would be glad to adopt any method that would save them considerable time and expense in handling messages. The telephone has reduced the practice of time economy to a science and all unnecessary words are omitted in the telephone business conversation, especially over long distance lines.

The Texas Storm.

The hurricane and floods at Galveston, Tex., and vicinity August 16, did great damage to telegraph and telephone property and lines. The damage at Houston and other places within a radius of 50 miles from Galveston was also great. In the Western Union office at Galveston the water rose to six inches above the counter and all of the equipment in the operating department was submerged.

Emergency equipment was installed and communication re-established in three or four days. The lines in Galveston, being underground, were not destroyed, neither was the cable connecting the city to the main land. The damage to the lines was on the main land. The Mackay Telegraph and Cable Company's cable across the bay was carried away and the city was isolated for several days. The telephone company soon restored communication. Wireless was the only means of reaching the city for a time.

The Western Union operators stuck to their wires until the water came up above the instruments, then they all retreated to the upper floors. Several of the Western Union men rescued six persons from a building across the street which seemed in danger of collapsing.

QUESTIONS TO BE ANSWERED.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What would be the effect of a defective compensating ground coil.

Under what circumstances is it advisable to change a wire from one quadruplex set to another?

What would be the general effect of a dirty or improper contact point at the tongue of a transmitter?

What would be the effect on the battery of a loose connection at the binding post of the "leak" coil?

What is the method employed to measure at the home station the strength of a distant quadruplex battery?

If the proportions of the electromotive force at the distant station are correct, what should be the relative strengths of the long and short ends of the battery, and what should be the strength of the short-end current?

Do trolley and electric light currents have any effect on grounded telegraph wires?

Would a metallic telegraph circuit be affected by trolley or electric light currents?

Would the proximity of trolley or electric light lines to a quadruplex circuit affect the operation of the latter?

If there is an inequality in the strength of quadruplex currents, how can it be determined if the disturbance is due to the presence of abnormal pressures from the outside?

Why does the leakage current from a trolley or electric light circuit affect telegraph wires?

When the difference of potential between two stations is constant and permanent, what remedy can be applied to neutralize the effects of the foreign current which causes the difference of potential?

How can the number of necessary cells of the neutralizing battery be determined?

What type of cell should be used for the neutralizing battery?

In the early days of the duplex and quadruplex, was one battery sufficient to work several lines or was it necessary to have a battery for each line?

Is there any saving of space in using electric generators as compared with chemical batteries?

Is it the practice to use one or two generators to supply current for the operation of duplex or quadruplex circuits?

Why are two machines used for this purpose?

What is the advantage of using two machines?

What poles of the generators are connected to the line?

In a "walking beam" type of polechanger, how is the polarity of the battery changed?

How are the long and short-ends produced in generator currents?

What is the "leak," and what is its purpose in a quadruplex set?

Where two or more circuits are fed by the same battery is their "joint" resistance less or greater than the resistance of the shortest wire of the group?

How can the joint resistance of two conductors be determined?

Trace the current from the generator when the transmitter is closed by the aid of Fig. 30.

(To be Continued)

MR. A. C. TERRY, district commercial superintendent, Western Union Telegraph Company, Pittsburgh, Pa., writes: "You did exactly right in renewing my subscription, and in order that there be no misunderstanding in the future you may accept this letter as a renewal for the next five years. Don't take the trouble to remind me of an annual expiration—just send me the bill. I am mighty glad that I can depend upon you to see that I do not miss a single number of my old friend."

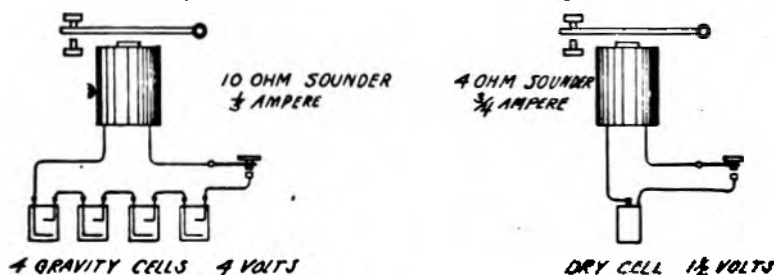
Simple Circuits.*

BY JOHN F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER, POSTAL TELEGRAPH-CABLE COMPANY.

(Copyrighted.)

For a sounder circuit we need a sounder and key, some wire and cells of battery. If we use a standard ten-ohm sounder about one-fifth of an ampere of current is required. We must also take into account the fact that battery cells have an

In this case we must take into account the resistance of the necessary wire between the terminal stations, the resistance of the instruments, and of the battery. Suppose the line wire to be number fourteen-gauge iron, measuring about fifty ohms per mile and that the line is two miles in length. With two ten-ohm sounders in circuit we will have 120 ohms, plus the battery resistance. As the battery required will evidently be in the neighborhood of forty cells, we will estimate its resistance as 100 ohms, making the total resistance of the circuit 220



(12)

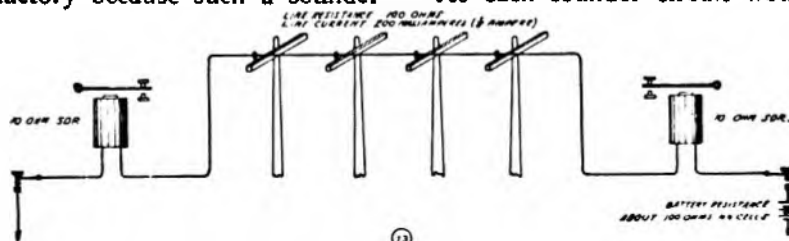
FIG. 1—DIAGRAM OF SOUNDER CIRCUITS

internal resistance to the flow of current. This amounts to about two and a half ohms per cell in gravity cells, but is a small fraction of an ohm only in dry cells. If we estimate the total resistance of the sounder, battery and wire to be used as twenty ohms we will see that, as voltage equals current multiplied by resistance, four volts will be required. In practice, however, this number would be necessary only where many sounders are in use, and a large volume of sound is needed. Three gravity cells give enough voltage where but one sounder is used. For portable or home practice use a sounder having about four ohms resistance and operating on about three-quarters of an ampere of current will be more satisfactory because such a sounder

ohms. This will require $220 \text{ ohms} \times 1/5 \text{ ampere}$, or 44 cells.

In practice, however, a circuit of this resistance would be set up with relays operating on about forty milliamperes of current. The relays would have a resistance of about 150 ohms. This would make the line and relay resistance 400 ohms. Estimating the battery required at about twenty cells, with fifty ohms resistance, the total circuit would measure 450 ohms, which, multiplied by forty milliamperes ($40/1000$), would give eighteen volts required to properly operate the relays. These relays, in turn, would control sounders, the points of the relays acting as keys in the sounder circuits.

As each sounder circuit would have three cells



(13)

FIG. 2—DIAGRAM OF SHORT LINE CIRCUIT

can be used with but one cell of dry battery, which gives about one and a half volts. A standard dry cell costs about one-third as much as a standard gravity cell.

Dry cells are, however, suitable for intermittent use only, so that the side lever or switch should be removed from the key in order that the circuit will normally stand open. Gravity battery, on the other hand, deteriorates when left on open circuit and gives its best results on closed circuits.

To set up a short line between two points two four or ten-ohm sounders and keys in series may be used, the battery being grounded and located at one terminal.

of battery, the total battery needed with this arrangement would be eighteen plus six, or twenty-four cells, as against forty-four cells if the sounders were directly operated. It will be seen why relays and sounders are used instead of directly operated sounders upon long circuits.

In addition to the economy effected by using sensitive relays, this arrangement gives uniform sounder action, because the tone of the sounder is not affected by variations in the line current. The range of adjustment to meet varying line currents due to weather changes, leakage, etc., is also much greater where relays are employed because of the lower ratio that changes in the line resistance bear to the total resistance of the circuit.

*From Postal Telegraph.

Telephone Relays, Drops and Signals.*

Relays, drops, and signals are devices essential to the successful operation of a telephone system. While they are hidden away in the central office equipment, it is the faithful performance of their functions which makes possible telephone service as we know it to-day. There are two general types of telephone systems in use in this country.

1. The central battery system, which is generally to be found in the larger cities. In this system the subscriber has but to remove the receiver

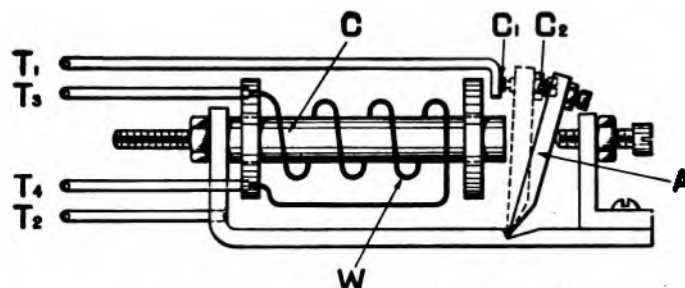


FIG. 1.—COMMON FORM OF TELEPHONE RELAY.

from the hook in order to secure the attention of an operator.

2. The magneto or local battery system, which is used extensively in smaller cities, towns and rural districts. In this system, in order to call the attention of the operator, it is necessary to turn the crank of the generator. In both systems, however, the service is obtained by means of relays, drops or signals.

In a common battery system, the instant a subscriber takes his receiver from the hook, a relay is operated in the central office, which notifies the operator, by lighting a small lamp, that the subscriber is calling. In a local battery system, when a subscriber turns the crank at his generator, the current generated operates a drop or signal at the central office, which notifies the operator that a connection is desired. Relays are equally important in the operation of the telegraph. Each time a telegraph operator closes his key in sending a telegraph message, the current passing through the contact of the key operates a relay or relays con-

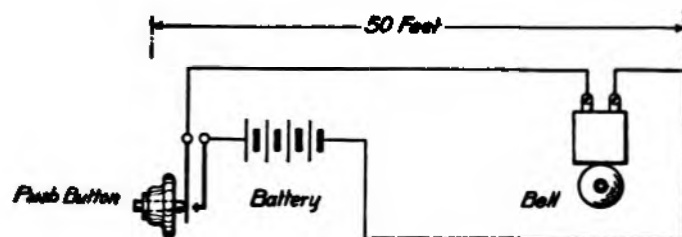


FIG. 2.—SIMPLE BELL CIRCUIT.

nected into the line. Drops and signals are also used to a limited extent in telegraph work.

A telegraph or telephone relay is essentially an electric switch or key. The function of a switch or key is to open or close contacts in an electric circuit. Switches are ordinarily operated by hand. In a relay, an electromagnet is provided which performs this operation.

A common form of telephone relay is shown diagrammatically in Fig. 1. $T-3$ and $T-4$ are the terminals of the insulated wire winding W of the electromagnet. A is the armature, C is the core, and $T-1$ and $T-2$ are the contact terminals which are normally insulated from each other. When current is passed through the winding W , the core C is magnetized and attracts the armature A , causing it to move to the position shown by the dotted lines. This brings the contact points $C-1$ and $C-2$ together, making electrical contact, and completing a circuit between the terminals $T-1$ and $T-2$. When the current through the winding W is broken, the armature A falls back to its normal position, and opens the contacts $C-1$ and $C-2$. To illustrate the use of a relay, we may take for example an ordinary door bell, operated with a push button, which is in fact a particular kind of switch or key. Fig. 2 shows such a circuit, consisting of a push button, a battery, and a door bell, so connected that when the contacts of the push button are closed, the bell will respond. While this arrangement is satisfactory for short distances it would require too large a battery or a wire too big in diameter and therefore costly if the distance became several miles. Inasmuch as it requires less energy to close contacts than to ring the bell sufficiently loud for ordinary purposes, it is preferable to operate a relay over the long dis-

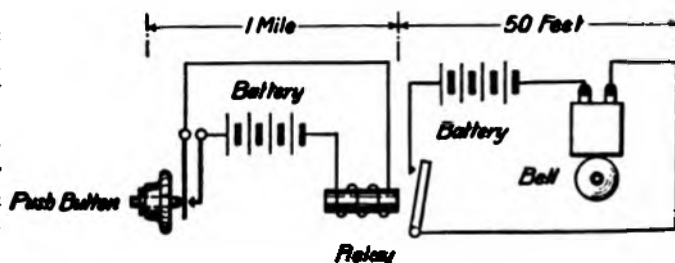


FIG. 3.—BELL CIRCUIT WITH RELAY.

tance and have it in turn operate a bell circuit over the remaining few feet. Fig. 3 shows such arrangement, in which it may be seen that the action of pushing the button causes the relay to operate at the further end, and this closes the circuit of the bell and battery, and causes the bell to ring. The action of closing the push button contacts is thus "relayed" or passed along to another circuit. This is the origin of the term "relay" as used by the telephone engineer.

There are a great many types of relays, which serve numerous purposes. Fig. 4-A shows two relays, each with one pair of contacts. One is shown with a dustproof shell, the cover of which is removed. Fig. 4-B shows a type of relay having three sets of contact springs. When this relay is energized, the armature is pulled up, and hard rubber studs in the armature push the thin middle springs in each set against the three upper springs, which are then pushed out of engagement with the three lower springs; in other words, when the relay is operated by the current it closes three sets of contacts and then opens three and restores these when the current is interrupted and the relay armature returns to normal. Other relays are made up

*From *Western Electric News*.

with various combinations of contacts, which are either made or broken by the movement of their armatures.

Drops and signals are closely related to the relay. They have electromagnets with armatures, but

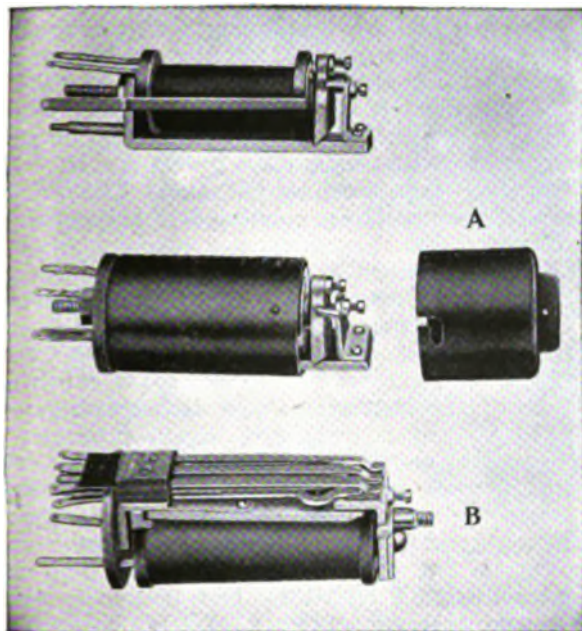


FIG. 4.—RELAYS.

the armatures instead of being utilized to make contact, as in the case of a relay, are employed to give some visual signal to the operator. Fig. 5 shows standard drop. To the pivoted armature in the rear is attached an arm with a latch on the end, which normally holds a shutter in a nearly vertical position as shown at A. When the armature is at-

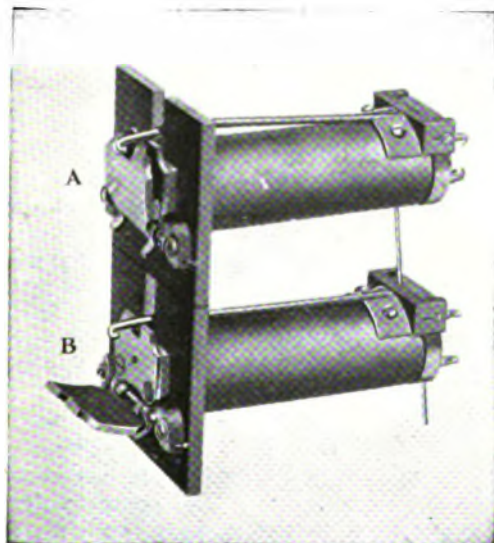


FIG. 5.—STANDARD DROP.

tracted, however, if only for an instant, as from a pulse of current obtained by a quick turn of the handle of a generator, the latch is lifted and the shutter falls by gravity into the position shown at B. This serves as a signal to the operator. The

shutter remains down until the operator restores it by hand.

In the case of common battery operation a continuous flow of current is available, and for this reason the drop is replaced by a signal, one type of which is shown in Fig. 6. In this type of signal the current draws up an armature to which is attached a target. As long as the current flows this target is exposed, as shown in the illustration.

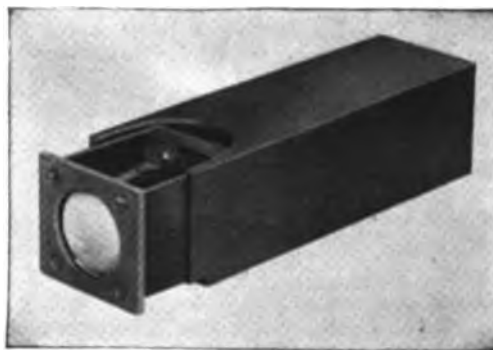


FIG. 6.—TARGET SIGNALS.

Upon interruption of current the armature returns to normal and this causes the target to be removed from sight. It will thus be seen that the signal is self restoring, whereas the drop must be reset. Fig. 6 shows the cover on, but slightly pushed back. A close inspection will partly show a set of contact springs which are operated whenever the armature is drawn up. Drops are in some cases likewise equipped with contact springs. The functions performed by drops and signals are therefore very much the same.

A Resourceful Lineman.

The foreman of construction in an Arkansas town a few days ago, after the flood had prostrated all telegraph lines, was instructed to restore communication at all hazards and without an instant's delay. The foreman was resourceful. He chartered a life boat and started down the stream, which covered the roadway and fields. In the course of a short time he discovered that he was getting out of sight of land. He therefore returned and obtained a mariner's compass. He started out again, this time towing a raft of telegraph poles, ranging from twenty to thirty feet in length. He took soundings at the first place he thought would be just about right to drive into the ground one of the poles. To his surprise he found fifty-three feet of water. He then proceeded further and in a short time he discovered that he was out of sight of land. An inland lake two hundred miles in extent had been formed by the flood waters. Under these conditions the foreman, not to be dismayed, returned to headquarters and sent an urgent message ordering one hundred miles of submarine cable and a cable steamer to be sent by rail to lay the cable.

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Telewriting.

Prof. Dr. A. Korn gave a lecture before the Elektrotechnischer Verein of Berlin, Germany, in which he reviewed his work of long-distance transmission of photographs and pictures. There are two methods of transmission, he said, the selenium method and the telautographic method. The selenium method is based on the sensitiveness to light of selenium, in which the selenium changes its electrical resistance with the change of light. A photograph in the form of a transparent film is wound on a glass cylinder and the light of a Nernst lamp is concentrated on one point in the photograph with the aid of a good lens. The light passes through the film and the glass cylinder and is then thrown on a selenium cell, which thus receives more or less light, depending on the transparency of the elements of the photograph struck by the pencil of light. If the current of a constant battery is passed through the selenium cell, finally reaching a receiving station at some distant point, the intensity of the incoming current will correspond to the shadings of tones of the photograph in question. The transmitting cylinder rotates uniformly and at every revolution moves slightly in the direction of the cylinder axis, so that the detailed elements of the original photograph, detail by detail, line by line, are touched and with the help of the currents reaching the receiving station, the picture is composed again in the receiver in form of a photograph. The disadvantage of the selenium method lies in the weakness of the line currents, which are at most a milliampere. Consequently disturbances on neighboring lines have a great influence on the transmission.

The telautographic method of transmission of pictures, which has been known for about seventy years, is based on the following principle: The drawing is transferred to a metal foil by means of an "ink" which does not conduct electricity, and this foil is wound around a rotating cylinder. While the cylinder is in rotation, a fine metal point is in contact with it. This metal point, similar to the needle in a phonograph, moves with each cylinder rotation slightly in the direction of the cylinder axis. Thus the metal point touches every point in the entire foil, moving in a direction similar to a fine screw thread, and every time that the point reaches a conducting spot in the foil, a current is transmitted to the distant receiving station, while on the other hand the current is interrupted when the metal point is on a non-conducting part of the foil, i.e., on a section of the picture or writing. With the aid of current impulses reaching the receiving station, the picture can be reproduced in the receiver. Within the last few years detailed pictures have been transferred with great success between Berlin and Paris, Paris and Monte Carlo, Paris and London, London and Manchester, indeed even between Berlin and Monte Carlo. The results have been far more successful than those obtained with the selenium system. The telautographic method can work with stronger currents, ten to twenty milliamperes, which is one reason why it has been preferred within recent times to the selenium method.

The telautographic method has a disadvantage,

though, in that a considerable number of signs per second must be sent over the wires in order to obtain sufficient speed of transmission. For this reason it is not applicable for transmission on long lengths of cable. The lecturer therefore took up the original problem again to make the selenium method practical by reinforcing the transmission currents. In this new process the weak currents obtained from the selenium method are not sent directly into the line but first into a peculiar relay. The latter consists of a sensitive moving-coil galvanometer, whose needle plays over a contact field, without, however, touching the same. The contact field and the needle are connected to an apparatus for production of high-frequency currents, and the arrangement is such that the high-frequency currents pass from the needle of the instrument to the contact in the contact field corresponding to the position of the galvanometer needle, and are then transmitted by this contact to a special spark gap lying outside of the instrument. To each spark gap a parallel voltage is connected, which generates a high-tension current arc at the spark gap, but only when the weak Tesla sparks appear. Consequently in every position of the galvanometer needle, corresponding to every tone of the picture, we have only one certain arc, a definite high-tension current circuit is closed, and with these high-tension currents we can do whatever we please. We can either send a portion of these high-tension currents into the wires, or else these currents may be used to prepare a perforated strip, which then represents the picture and by means of which the picture can now be transmitted with the required speed of transmission over the wires. Finally, it would be possible with the help of the high-tension currents accompanying these tones to produce letter telegrams which are transmitted like regular telegrams and are used at the receiving station to reproduce the picture.

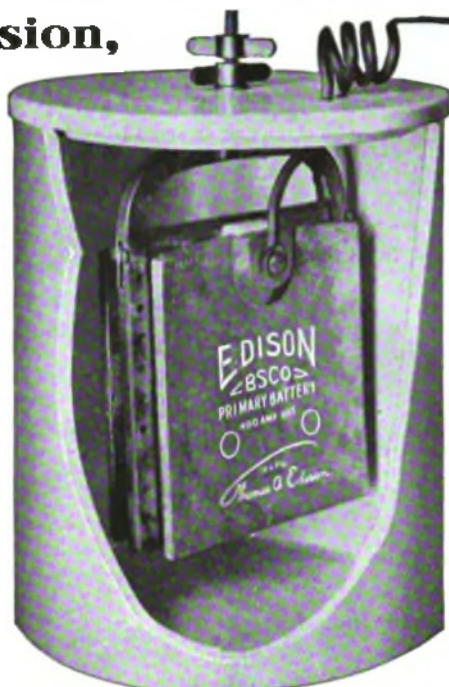
ADVISE POSTMASTERS TO STUDY TELEGRAPHY.—At the recent meeting in Kokomo, Ind., of third and fourth class postmasters in that state, the retiring president, John T. Clapp, in an address advised the postmasters to study telegraphy, predicting that within a short time correspondence will be done by telegraph to a great extent. He said that the post-office department is working on the telepost idea and that it was sure to come within a short time. His prediction was that in a few years all telegraph wires would be owned by the government and operated through the post-office department.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. 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.

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MR. WILLIAM HENRY CANNIFF, president of the New York, Chicago and St. Louis Railroad Company, Cleveland, Ohio, was an operator at Trenton, Mich., many years ago, for the old Michigan Southern and Northern Indiana Railroad (now a part of the Lake Shore and Michigan Southern). He has worked his way up from that position to that of president of the road first named. His progress affords an excellent object-lesson to those in the telegraph and railroad fields who have fallen victims to the belief that there is no room for them at the top.

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THE RAILROAD.

MR. C. W. BRADLEY, superintendent of telegraph of the Chesapeake and Ohio Railroad Company, Richmond, Va., has been absent from his office in New England on his vacation, part of which was spent in New Milford, Conn. He called on friends in New York on his way home.

RAILWAY SIGNAL ASSOCIATION.—The proceedings of the second stated meeting of the Railway Signal Association, held in New York, May 26 and 27, have been issued. The book has 500 pages and contains many diagrams and charts. Mr. C. C. Rosenberg, Bethlehem, Pa., is secretary.

LEHIGH VALLEY TELEPHONES.—"Telephone to the man you want in the Lehigh Valley Railroad" is the title of a leaflet which the Lehigh Valley Railroad Company has just issued for the convenience of those doing business over the telephone with its offices in New York. The general executive offices, the freight, the passenger and the baggage departments, all have their separate telephones converging at the central office. The leaflets are being sent to shippers.

Telegraph Typewriters on Seaboard Air Line.

Duplexed telegraph typewriters of the American Telegraph-Typewriter Company's make have been installed on a through iron circuit of the Seaboard Air Line between Norfolk, Va., and Jacksonville, Fla., a distance of 657 miles, with a regular Morse duplex repeater at Savannah, Ga. The machines are rendering satisfactory service and Mr. W. F. Williams, superintendent of telegraph of that road states that they meet all requirements.

Storage Battery Insulation.

BY JOS. J. GRAF, ENGINEER TELEGRAPH, TELEPHONE AND WIRELESS, DELAWARE LACKAWANNA & WESTERN RAILROAD, SCRANTON, PA.

When the Lackawanna Railroad Company adopted telephone dispatching we used dry cells for calling current. This method was not entirely satisfactory and storage cells were substituted, using a small one-ampere-hour size. Current values from 80 to 240 volts were required at different points on the system and good results were obtained until the cells developed leakage or creeping, as it is frequently termed, which resulted in failures and breaking up of plates.

Various methods of bedding to remedy this trouble were resorted to without, however, obtaining the desired insulation. In one instance we placed each cell on a double petticoat insulator. This bank broke down in three months.

On account of the small size of the cells and their close coupling the formation of gas crust on the surface could not be avoided and frequent taking down and renewal of the bed was necessary. The situation became so serious that six months ago we had about determined to return to dry cells feeling that of the two methods the latter was perhaps better and certainly less expensive.

In consideration of the necessary explanation of scrapping so large an item of expense, I gave the matter much thought and it finally occurred to me that perhaps if the cells were placed in oil the difficulty might be overcome. I constructed a tank two inches high and large enough to hold all the cells of one of the banks, and provided a drain valve in one corner. After setting the cells therein, I poured in one-half inch of transil oil. This oil is used in high-tension transformers and circuit breakers.

The initial installation has been in service six months. The tank during the entire period has been purposely grounded and using 250 volts for test we are unable to get a kick on the meter. The drain valve was provided for the purpose of draining off the oil if it should develop a current leak but we have had no occasion to use it.

The oil creeps up the surface of the jars just far enough to prevent the gas crust, maintaining them in a perfectly clean and transparent condition. So far the oil has shown no tendency to reach the solution. This method of setting up is much less expensive than ordinary insulating racks.

Committee Work of the Association of Railway Telegraph Superintendents.

The object of the Association of Railway Telegraph Superintendents is the advancement of the efficiency of the telegraph, telephone and other electrical departments of the railroad service, and in order to keep up to date, render such assistance to members and associates as may be needed, and advance progress. Special committees are appointed each year to investigate, gather statistics, and report such matters as will, in their judgment, be best for the safe, economical and efficient advancement of the telegraph, telephone, and other matters which are handled by the telegraph departments of railroads.

These committees consult the Western Union Telegraph Company, the Postal Telegraph-Cable Company, the American Telephone and Telegraph Company, manufacturers, and other associations, to gain the advantage of the experience and practices now in vogue, and to advise and recommend as to the best methods for future development.

In line with this policy Mr. E. C. Keenan, president of the association, has appointed ten special committees, some of which are subdivided, as shown in the following. The personnel of these committees indicates that the work for the ensuing year is in good hands, and the data they will obtain and reports they will make at the next annual meeting will undoubtedly be interesting and instructive.

This association has been in existence since 1882. It has done excellent work for the advancement of the telegraph and telephone in railroad work. The minutes of the Rochester meeting of last June which are now being issued, indicate the value and character of the work done. Judging from the plans which are being made to cover the work to be done during the ensuing year it appears that the

association is surely keeping up to its previous excellent record.

Following is a list of the special committees and sub-committees:

**NO. 1—CONSTRUCTION AND MAINTENANCE
(OUTSIDE PLANT).**

G. A. Cellar, chairman; E. A. Burkitt, E. A. Chenery, R. E. Chetwood, M. H. Clapp, E. W. Day, G. A. Dornberg, J. McMillan, J. J. Ross and L. S. Wells.

Sub-committees—(a) *Pole Lines*—G. A. Cellar, chairman; R. E. Chetwood, M. H. Clapp, J. McMillan, J. J. Ross.

(b) *Underground Conduits*—L. S. Wells, chairman, E. W. Day, G. A. Dornberg.

(c) *Wires and Cables*—E. A. Chenery, chairman; E. A. Burkitt, G. A. Dornberg.

(d) *Wire Crossings*—G. A. Cellar, chairman; L. S. Wells, R. E. Chetwood.

(e) *Transposition Systems and Phantoms*—M. H. Clapp, chairman; E. A. Burkitt, E. W. Day, G. A. Dornberg.

(f) *Terminal Construction*—J. J. Ross, chairman; E. A. Chenery, E. W. Day, J. McMillan.

**NO. 2—CONSTRUCTION AND MAINTENANCE
(INSIDE PLANT).**

M. H. Clapp, chairman; J. P. Church, R. F. Finley, W. Marshall, J. F. Skirrow, F. T. Wilbur, G. A. Worst, A. Wray, M. B. Wyrick.

Sub-committees—(a) *Telegraph*—W. Marshall, chairman; R. F. Finley, J. F. Skirrow, F. T. Wilbur, M. B. Wyrick.

(b) *Telephone*—M. H. Clapp, chairman; J. P. Church, R. F. Finley, C. A. Worst, A. Wray.

(c) *Battery*—C. A. Worst, chairman; R. F. Finley, J. F. Skirrow, F. T. Wilbur, M. B. Wyrick.

NO. 3—WIRE CHIEF EQUIPMENT AND ROUTINE.

E. A. Chenery, chairman; M. B. Overly, G. R. Stewart, H. D. Teed, H. A. Vaughan.

NO. 4—PROTECTION AGAINST ELECTROLYSIS.

Wm. Bennett, chairman; W. J. Camp, R. F. Hosford, J. C. Johnson, L. A. Lee, J. W. Young.

**NO. 5—PROTECTION AGAINST LIGHTNING AND
HIGH TENSION CIRCUITS.**

J. F. Caskey, chairman; W. E. Harkness, I. C. Forshee, W. M. Gould, V. T. Kissinger, N. E. Smith.

NO. 6—TELEPHONE DEVELOPMENT.

F. F. Riefel, chairman; G. K. Heyer, E. E. Dildine, L. M. Jones, C. S. Rhoads.

NO. 7—RAILROAD MESSAGE TRAFFIC.

W. H. Hall, chairman; F. E. Bentley, W. L. Connelly, C. H. Hubbell, W. H. Potter.

NO. 8—UTILITY OF WIRES.

H. D. Teed, chairman; E. P. Griffith, Thos. Rodger, A. B. Taylor, F. H. Van Etten.

**NO. 9—WIRELESS TELEGRAPH AND TELEPHONE
DEVELOPMENT.**

L. B. Foley, chairman; J. F. Caskey, R. H. Corson, W. J. Kelly, David Sarnoff.

NO. 10—PLACES FOR ANNUAL MEETING.

L. A. Lee, chairman; B. A. Kaiser, W. F. Williams, S. L. Van Akin.

Mr. C. W. Pearson, the well known old time and military telegrapher of New York, writes: "I thank you for renewing my subscription. My family enjoys reading the AGE and very often I have to wait until it has passed around before I can get hold of it."

"Your notice in a previous issue of the renewal of the subscription of my old comrade S. L. Robinson, recalls to me the old days of the civil war. Dear old Steve! We shared the same tent on the picket lines outside of Memphis; cooked our own rations, and when he went out on a raid with major-general A. J. Smith, I relieved him at general Washburn's headquarters, he having been shot on this raid and I taken prisoner. After I was released and granted a short furlough and Steve was sent home to recuperate, we again met in New Orleans, where we were both ordered to proceed to Ft. Gaines, Ala., at the mouth of Mobile Bay. We embarked on a steamer with a regiment of colored soldiers, but encountered a very severe storm and instead of landing at Ft. Gaines were driven down to Pensacola, Fla. After getting rid of the colored regiment we returned to Ft. Gaines, but operator G. R. Penn at that point said he could not keep us as there was nothing to eat, so we went across to Ft. Morgan, where we found fairly good quarters with operator B. H. Upham, but on short rations. Upham was tired of living on short rations so I took charge and Steve remained until the advance on Mobile. After the capture of Mobile, Steve was ordered to Shreveport, La., and I to report to major-general B. F. Grierson at Columbus, Miss., as cipher operator. I never came across Steve again until the military reunion at Detroit in 1913, forty-eight years afterwards. That was a happy reunion for Steve and myself."

MAUDE CLARK HOUGH, wife of Mr. I. D. Hough, division wire chief, Western Union Telegraph Company, Dallas, Tex., is the author of a collection of poems which she has just issued in booklet form. Considerable poetic merit is reflected in the verses. The title of the book is "Occasional Verses."

Copies may be obtained at 25 cents each by addressing Maude Clark Hough, 1715 Corsicana street, Dallas, Tex.

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Telegraph and Telephone Age

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THIS WORK COVERS the entire field of a practical telegraph course, and the subjects are treated with a conviction and simplicity wholly free from entangling technicalities, such as to render the volume highly instructive, of delight and absorbing interest.

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MUNICIPAL ELECTRICIANS.

Cincinnati Convention of Municipal Electricians.

The International Association of Municipal Electricians held its twentieth annual convention in Cincinnati, Ohio, at the Gibson Hotel, August, 24, 25, 26 and 27.

Among the papers read and discussed were the following: "Police Patrol and Fire Alarm Records," by Price I. Patton; "Lightning Protecting Apparatus for Fire and Police Telegraph Circuits," by L. S. Brach; "The Fallacy of Placing Fire and Police Alarm Wires in Telephone Cables," by C. E. Convers; "Discussion of Standards of Fire Alarm Installations," by F. A. Raymond; "The Advisability of Using Concentric Wiring in This Country," by R. A. Smith; "Fire Alarm Systems for Industrial Plants," by Albert J. Cross; "The Scope and Present Status of the National Electrical Safety Code," by W. J. Canada; "Practical Cable Maintenance Methods," with demonstration, by O. F. Tallman; "Storage Batteries for Fire Alarm Purposes," "The Work of the Bureau of Standards, Including Some Account of the Co-operation of the Bureau with Municipalities in Securing Electrolysis Mitigation and Improving Electrical Service and Meter Accuracy," by Dr. E. B. Rosa; "Uniform Electrical Standards," by Dr. John Price Jackson; "The Importance of the Superintendent of Fire and Police Telegraph to His Municipality," by W. H. Flandreau.

MAHLON SPEICHER, superintendent of the fire alarm telegraph system of Jersey City, N. J., died in Middletown, N. Y., August 18. He was connected with the fire alarm system since 1884, and became superintendent in 1904.

The San Francisco Tournament, Held August 27 and 28.

The telegraph championship tournament, for which extensive preparations have been made during the past year, took place in the Moose Auditorium, San Francisco, August 27 and 28. Following are the results, as received by telegraph, details being reserved for a later issue:

Railroad operators: Class A. Sending forty ordinary railroad messages. Won by R. C. Bartley, Pennsylvania Railroad, Philadelphia; R. H. Redmond, Southern Pacific, Watsonville, Cal., second. Class B. Receiving forty ordinary railroad messages. Won by G. W. Smith, Pennsylvania Railroad, Philadelphia; J. W. Lyons, Southern Pacific, Los Angeles, Cal., second.

Wireless contest: Sending and receiving twenty ordinary wireless messages. Won by A. E. Gerhart, Marconi Wireless Telegraph Company of America, San Francisco, Cal., over J. F. McKinnon, Federal Telegraph Company, Los Angeles, Cal.

Press contest: Class A. Sending 1,500 words press, using Phillips' code. Won by T. S. Brickhouse, of E. F. Hutton & Co., San Francisco; A. G. Tebbs, Los Angeles, Cal., second. Class B. Receiving 1,500 words press under same conditions as class A. Won by T. S. Brickhouse, San Fran-

cisco; C. V. Barfield, Associated Press, San Francisco, second.

Commercial men's contest: Class A. Sending sixty ordinary commercial messages. Won by T. S. Brickhouse, San Francisco; H. C. Emrich, second. Class B. Receiving sixty ordinary commercial messages. Won by H. E. Barfield, of E. F. Hutton & Co., San Francisco; C. V. Barfield, second. Mr. Brickhouse sent to the receivers.

Railroad men's machine and hand contest (sending only). Won by R. C. Bartley, of Philadelphia.

Commercial men's machine and hand contest (sending only). Won by C. V. Barfield, using a Martin vibroplex.

The championship event was won by T. S. Brickhouse, H. C. Emrich, second.

The Responsibility and Importance to the Public of the Office of Municipal Electrician or Superintendent of Fire and Police Telegraph.*

BY W. H. FLANDREAU, CITY ELECTRICIAN,
MOUNT VERNON, N. Y.

There are no individuals engaged by city authorities upon whom rests more responsibility than the men in charge of the public fire alarm and police signal systems.

Upon these men depends very largely the safety of the public in keeping down losses of life and property by fire, and in maintaining the efficiency of the public service.

It is well understood that the failure of the fire alarm system to work at all or to send a wrong signal will at any time cause a fire loss to be much greater, and on many occasions would cause it to be a very serious calamity.

When the average citizen becomes a member of the town council or city government, he very often fails to appreciate the importance of intelligent and faithful care as an essential factor in the satisfactory operation of the fire alarm telegraph, and from mistaken motives of economy will frequently vote to refuse necessary appropriations to maintain an up-to-date and efficient fire alarm, and a suitable salary to hold an experienced man.

I have known, on change of political control in a large town, of the removal of a competent fire chief of ten years or more successful experience both as chief and fire alarm superintendent, and the appointment in his place of a man who all his life had been a journeyman blacksmith, and knew absolutely nothing about a fire alarm telegraph or any other branch of electrical work.

In my twenty years of experience as superintendent of fire alarms I have never known of a taxpayer making any objection to an appropriation for fire or police equipment and I firmly believe that it is the duty of the members of this association to work to the end that the men employed in this important line of municipal work receive more recognition from the office holders and citizens in general.

*Extracts from paper read at Convention of International Association of Municipal Electricians, Cincinnati, Ohio, August 24-27.

OBITUARY.

M. H. McCONAHA, aged forty-five years, a former operator for the Western Union and Postal Telegraph-Cable companies, died at Norwood station, near Independence, Mo., July 25.

H. A. HEDGER, a telegrapher in the Comstock bonanza days, and an old resident of San Francisco, Cal., died in that city July 19. He was born in England and built up a large mining business in the West.

COL. C. A. CONVERSE, aged sixty-eight years, a former telegrapher, and an executive of the Baldwin Locomotive Works in Philadelphia, Pa., died in Burlington, Vt., August 5. He made his way through college by working during vacation time as a telegraph operator, stenographer and newspaper reporter.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Miss Margaret Bryan, stenographer to chief operator J. B. Rex, has returned from a vacation spent at Allerton on the south shore of Massachusetts Bay.

Supervisor Howard A. Smith was recently called away by the death of his father at Bangor, Me., but is again on duty. He carried with him the warmly expressed sympathy of all his associates.

NEW YORK POSTAL.

Mr. J. J. Whalen, manager of the general operating department, is again at his desk after a trip of several months inspecting the various company offices. He was given a hearty welcome by the members of the staff on his return.

NEW YORK WESTERN UNION.

Mr. W. E. Stimpson, assistant chief operator of the general operating department, while on his vacation will visit Chicago and Denver.

Miss Lynn, in charge of the Cincinnati Telephone Bureau, was a recent visitor at this office.

Mr. L. C. Boochever, of the division traffic superintendent's office, has returned from Georgia, where he spent a pleasant vacation.

Premium circuits have been established at the following branch offices: 172 Fifth avenue, 1398 Broadway, 821 Sixth avenue and the Grand Central Railroad terminal branches.

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.

Misses Dorothy Glaser, Pearl Tickell, F. Bischoff and R. A. Seiferd are in charge of the training of the multiplex operators.

Mr. Harry Saxe, of the Worcester, Mass., office was among the recent New York visitors who paid their respects to headquarters.

Charles D. Williams, of the Commercial News Department, who died some time ago, had been employed in our service for almost fifty years. He was identified with many benefit associations, including the Odd Fellows, Woodman and the Royal Arcanum, and was instrumental in pushing the interests of these associations in telegraph circles.

PHILADELPHIA POSTAL.

Among recent visitors were Mr. J. J. Whalen, manager New York operating department, and Mr. R. J. Reid, of the tariff department, New York.

General foreman J. R. Gorsuch is enjoying a well-earned vacation. Night chief operator J. A. McNichol has returned from his vacation.

Mr. Feder has been sent to Mt. Gretna to look after our interests at the rifle range.

The sympathy of the force was extended to Mr. Richard C. Toft, whose wife died recently.

LOS ANGELES WESTERN UNION.

Mr. C. J. Covher has been appointed assistant chief operator in charge of the automatic department and is assisted by G. G. Burke, traffic supervisor, days; M. G. Henry, night supervisor; J. L. Lyons, J. G. Halsey, W. E. Low and F. H. Willison, equipment supervisors.

T. J. McDonald has been appointed late night wire chief, vice R. I. Roloson, who has been placed in charge of the city wire traffic.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 18 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 80c. 20 to 25, Full Grade, \$1.25; Half Grade, 95c. 25 to 30, Full Grade, \$1.50; Half Grade, 1.10. 30 to 35, Full Grade, \$1.75; Half Grade, 1.35. 35 to 40, Full Grade, \$2.00; Half Grade, 1.60. 40 to 45, Full Grade, \$2.25; Half Grade, 1.85. 45 to 50, Full Grade, \$2.50; Half Grade, 2.10. 50 to 55, Full Grade, \$2.75; Half Grade, 2.35. 55 to 60, Full Grade, \$3.00; Half Grade, 2.60. 60 to 65, Full Grade, \$3.25; Half Grade, 2.85. 65 to 70, Full Grade, \$3.50; Half Grade, 3.10. 70 to 75, Full Grade, \$3.75; Half Grade, 3.35. 75 to 80, Full Grade, \$4.00; Half Grade, 3.60. 80 to 85, Full Grade, \$4.25; Half Grade, 3.85. 85 to 90, Full Grade, \$4.50; Half Grade, 4.10. 90 to 95, Full Grade, \$4.75; Half Grade, 4.35. 95 to 100, Full Grade, \$5.00; Half Grade, 4.60.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 18.

NEW YORK, SEPTEMBER 16, 1915.

Thirty-third Year.

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Auxiliary Telegraph Apparatus.

In large telegraph offices there are many auxiliary instruments and devices that are little heard of in smaller offices but which form an important part of the equipment. They all contribute toward increasing the efficiency of the plant and the attainment of results quickly.

It will be interesting to name a few of these instruments and other accessories and describe their special uses.

ANNUNCIATORS.—These call-indicating devices are employed in large offices quite generally where bell or buzzer calls are received from a number of desks. The operation of a drop displays an indicator, consisting of a white tag with suitable marking. The apparatus is enclosed in a metal case which contains gravity drops, a double gong bell and a manual resetting mechanism. The resistance of each drop and bell is three ohms, and three to five dry cells are usually required for the operation of the entire annunciator. The annunciators are made with two to nine drops.

AMMETERS.—There are two types of ammeters in general use, one for direct current and one for alternating current. The round pattern instruments are for switchboard connection, and range from 5 to 300 amperes. The Weston, model 267, direct current instrument is used on motor-generator and main power panels.

ASBESTOS BLANKETS.—These blankets are used for extinguishing incipient fires. They smother the fire by preventing the air from reaching it. They are furnished with a metal tube and hook for hanging. Other fire-extinguishing devices used in tele-

graph offices are metal tubes containing dry chemicals, which are scattered over the flames; chemical (fluid) fire extinguishers, which are familiar objects in factories, shops, and many public places, such as railway cars, etc. To operate these they are turned upside down, which causes the chemicals to combine. Pails of sand and of water are also kept handy.

BZZZER.—This instrument is for general use where an audible signal other than a bell is required to operate on primary battery. There are two sizes, the 200-ohm and the 800-ohm buzzer. The latter is for use on either twenty-six or fifty-two-volt circuits.

COMPOSITE SET.—This is a portable apparatus for equipping a telephone circuit for simultaneous telephony and telegraphy giving one telephone and two telegraph circuits.

DATING AND TIMING STAMPS.—Used for dating and timing messages. Electrically operated, on 110 or 220 volts, direct current.

EXTENSION BELLS.—Used in connection with switchboard telephone sets.

HYDROMETERS.—For measuring the specific gravity of gravity battery and storage battery electrolyte. This instrument consists of a hollow sealed glass tube or float, weighted at the lower end with lead shot. The stem is provided with two graduated scales. The scales are Baumé 10° to 40° and specific gravity 1075 to 1375. The hydrometer used in testing storage battery differs from the foregoing only in the scales.

LAMPS.—Incandescent lamps are employed for a variety of purposes besides illumination, as follows: Signal lamps used in concentration units, for indicating the wire on which the attention of an operator is desired; for telephone switchboard signaling; pilot lamp for concentration units; for resistance on switchboards, repeater and operating tables; on repeater tables and other places where it is desired to signal attendants by visual means.

LISTENING STICK.—This is a simple device to enable the attendant of duplex, quadruplex and repeater sets to ascertain whether the apparatus under his care is working properly. It is employed chiefly in noisy locations and is especially valuable where fine adjustments preclude a ready determination of the character of the signals being passed through the repeating points. Its utility depends wholly on the transmission of sound through the material of which it is made, and not upon electricity in any way. It is a stick of close grained wood, mahogany usually, 18 inches long and $\frac{5}{8}$ of an inch in diameter. One end is placed against the instrument under examination and the other end between the teeth or against the side of the head. The sound of the vibrating armature lever, however faint it may be, is conveyed to the organs of hearing through the bones of the head.

One make is provided with a hollow ear piece set at an angle of 45 degrees at one end of the rod, for direct application to the ear.

MIL-AMMETERS.—For use in bridge type duplex and quadruplex sets and on loop switchboards. A differential mil-ammeter is used on differential type duplex and quadruplex sets.

WHEATSTONE DIFFERENTIAL GALVANOMETER.—Used in the Barclay printer, Wheatstone, Creed and other automatic systems.

CHEMICAL AND MERCURY ARC-RECTIFIERS.—Used for the purpose of converting alternating current into direct current, for the operation of tickers and synchronizing time service clocks. Mercury arc rectifiers are also used to convert alternating current into direct current, for charging storage batteries.

Telegraph and Telephone Patents.

ISSUED AUGUST 17.

1,150,007. Electrical Impulse Transmitter. To W. Aitken, London, Eng.

1,150,009. Telephone Set. To W. P. Andrick, Jamaica, N. Y.

1,150,054. Telephone System. To H. W. Munsell, Indianapolis, Ind.

1,150,110. Automatic Signal Operator. To E. R. Gill, Yonkers, N. Y.

1,150,111. Coherer. To E. R. Gill, Yonkers, N. Y.

1,150,239. Combined Automatic Burglar and Fire-Alarm System and Telephone Service. To E. Asmusen, Brooklyn, N. Y.

1,150,266. Telephone Transmitter. To W. Harrison, Brooklyn, N. Y.

1,150,267. Apparatus for Transmitting Sounds. To W. Harrison, Brooklyn, N. Y.

1,150,272. Method of Telegraphic Transmission. To C. Kinsley, Chicago, Ill.

1,150,326. Electromagnetic Recording Apparatus for Telegraph Circuits. To A. H. Annand, Buenos Aires, Argentina.

1,150,395. Telegraphic Transmission. To C. Schou, Holte, Denmark.

1,150,413. Illuminating Attachment for Telephones. To J. Berry and D. T. Odineal, Lexington, Va.

1,150,765. Telegraphic Tape Perforator. To O. and H. Hoenack, Arlington, N. J.

ISSUED AUGUST 24.

1,151,098. Radiotelegraphic Plant. To E. Girardeau, Paris, France.

1,151,497. Mounting for Relays or the Like. To E. A. Reinke, Rochester, N. Y.

1,151,541. Calling Device for Automatic Telephone Exchanges. To A. E. Keith, Hinsdale and J. and C. J. Erickson, Chicago, Ill.

1,151,542. Automatic Telephone Exchange System. To A. E. Keith and T. G. Martin, Chicago, Ill.

1,151,543. Telephone Exchange Trunking System. To A. E. Keith, Chicago, Ill.

1,151,544. Non-Interfering Extension Party-Line Telephone System. To T. G. Martin, Chicago.

1,151,545. Lock-Out for Extension or Party-Line Telephones. To T. G. Martin and J. Erickson, Chicago, Ill.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on September 13:

American Telephone and Telegraph Co.	122 $\frac{3}{4}$
Mackay Companies	75 $\frac{1}{2}$
Mackay Companies, preferred	66 $\frac{1}{2}$
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	3 $\frac{3}{4}$
Western Union Telegraph Co.	76 $\frac{1}{2}$

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent. interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charge on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. C. S. RHOADS, JR., formerly in charge of the selector department of the Hall Switch and Signal Company, New York, has resigned to devote the next year to the study of alternating current, theory and apparatus at Purdue University, Lafayette, Ind.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. EDWARD REYNOLDS, vice-president and general manager, spent a few days last week, at Shelter Island, N. Y.

MR. HARVEY D. REYNOLDS, superintendent, Buffalo, N. Y., was a recent executive office visitor.

MR. C. F. LEONARD, superintendent, New York, visited the Wilkesbarre, Pa., and other offices in that vicinity last week. He is now taking a week's rest.

MR. G. W. RIBBLE, superintendent, Atlanta, Ga., spent a couple of days of his vacation in New York last week and called at the executive offices.

MR. M. M. DAVIS, electrical engineer of this company, New York, has returned after a two week's visit to his old home at Chatham, Mass.

MR. J. HARGRAVE, superintendent Mackay-Telegraph-Cable Company, Dallas, Tex., announces the following appointments of managers in his district

during August: Drew Shell, at Greenville, Tex., vice J. C. Benson; Upton Caul at McKinney, Tex., vice Drew Shell, transferred; A. L. Cobb at Hot Springs, Ark., vice Morris Schwartz, resigned.

MR. GEORGE M. EITEMILLER, the well-known old-time telegrapher, who has been confined to his home in Detroit, Mich., with rheumatism since June, has gone to Kansas City, Mo., where he will reside with his son. Mr. Eitemiller is one of the few remaining brilliant telegraphers that connect the telegraphs of the sixties with those of the present day.

MR. LLOYD STODDARD, an employe of the Postal Telegraph-Cable Company, enjoys the distinction of having fallen from a railroad trestle 115 feet high, near Everett, Wash., with the result that he was only slightly jarred.

MR. R. M. BROWNLOW, manager of a branch office in San Francisco, Cal., has submitted an interesting suggestion in connection with the use of the clock code. This code seems to be very ingenious and of great benefit in facilitating the deciphering of filing time on messages coming from the different time zones. The filing time in Cleveland, for instance, where Eastern time is used, differs one hour from the time in Cincinnati, where Central time prevails, and the same conditions exist as between Toledo and Detroit.

ANOTHER REDUCTION FOR LEASED PRESS WIRES.—A further reduction in rates for leased wires for press service at night is announced by vice-president C. C. Adams. The new rate is \$2.50 per mile a year.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MESSRS. BELVIDERE BROOKS and A. R. Brewer, vice-presidents; W. H. Baker, secretary; J. C. Willever, general commercial manager, E. Y. Gallaher, comptroller, and G. M. Yorke, general superintendent of plant, have resumed their respective duties after their annual holidays.

MR. C. H. MURPHY, of the time service, New York, is visiting in Cincinnati, Chicago, and other places in the Middle West.

THE FOLLOWING CHANGES in the organization of the legal department of this company, effective September 15, are announced: Mr. George H. Fearons is appointed counsel, Mr. Albert T. Benedict is appointed general attorney and Mr. Francis Raymond Stark is appointed assistant general attorney.

INCREASE IN DIVIDEND RATE.—At the meeting of the board of directors, held September 8, a quarterly dividend of $1\frac{1}{4}$ per cent was declared payable October 15 to stockholders of record September 20. This is an increase in the dividend rate from four to five per cent.

CONFERENCE.—A conference was held in Nashville, Tenn., August 20, at which were present Mr. J. R. Terhune, district commercial superintendent, and the managers of twenty-five middle Tennessee offices. Luncheon was served at the Maxwell House.

JOHN W. and EDWARD A. CASPER, both of the office of division traffic superintendent, B. P. Hancock at Dallas, Tex., were visitors recently in New York where they spent two weeks with their father, Mr. Louis Casper, of Mr. W. N. Fashbaugh's office, looking over the various telegraph plants and obtaining information to facilitate their own work in the Gulf Division.

MR. W. S. OWENSBY, chief clerk to the district plant superintendent, at Los Angeles, Cal., has been advanced to the position of chief clerk to the division plant superintendent at San Francisco.

MR. C. H. SIMPSON.—The friends of Mr. C. H. Simpson, manager of the Springfield, Mass., office will be pleased to learn that he has resumed the management of the office after an absence of nine months caused by illness. During four of the months he was confined to his bed. On his return to the office the employes and his business friends presented him with several floral tributes.

NEW OFFICE AT LOUISVILLE.—A new office is to be established by this company in Louisville, Ky. It will be located in a new \$50,000 building erected especially for the company's use.

TELEGRAPH IN KANSAS CITY FORTY YEARS AGO.—The Kansas City *Times* of August 3 printed some abstracts from its issue of August 3, 1875—forty years ago—in which a complimentary reference was made to the facilities of the Western Union Telegraph Company at that time, and Col. R. C. Clowry, who was then assistant superintendent, is given credit for the many improvements made in the service. M. D. Wood was the local manager of the office.

G. E. Palmer, Chief Operator, New York.

Mr. George E. Palmer, chief operator of the general operating department, New York, whose



G. E. PALMER

appointment was announced in our September 1 issue, was born in Woodside, Utah, October 17, 1884, and entered the telegraph service as messenger at Flagstaff, Ariz., in 1892. He worked in and around telegraph offices when not at school until

September, 1903, when he obtained employment at Reno, Nev., as bookkeeper. In July, 1904, he went to Sodaville, Nev., as operator and bookkeeper, becoming manager of the office early in 1905. In September, the same year, he was appointed manager at Elko, Nev., and later resigned to accept the position of operator and ticket agent for the Southern Pacific Railway. Two or three months after he re-entered the Western Union service as operator at Reno, resigning six months later to accept the position of manager for the California and Oregon Telegraph Company, at Susanville, Cal., going afterward to Lakeview, Ore. In 1907 he again became manager for the Western Union at Elko, Nev., and in August of the same year was appointed late night chief operator at Reno, and afterward night chief operator. In 1909 he was transferred to San Francisco as operator and was advanced to the position of traffic supervisor in the automatic department two months later. In the early part of 1910 he was made printer chief at San Francisco, and in the following year was appointed district equipment supervisor, with headquarters at Los Angeles. In 1912 he received the appointment of division traffic supervisor, with headquarters in San Francisco, and on January 1, 1913, was made chief operator at the same point. In February, 1914, he was transferred to New York, becoming division traffic engineer, from which position he has just been advanced to that of chief operator of the main office.

His education was obtained at the Northern Arizona Normal School at Flagstaff, Ariz., and the University of Nevada, at Reno, Nev. His father, J. E. Palmer, was a well-known telegraph manager and now resides in Pittsburgh, Pa.

THE CABLE.

MR. G. G. WARD, vice-president and general manager of the Commercial Cable Company, New York, has returned from his trip of inspection of the San Francisco, Nova Scotia and Newfoundland stations of the company. He left New York May 22 for San Francisco, going by way of the Panama Canal.

MR. F. B. GERRARD, superintendent Commercial Cable Company, New York, has returned from a two weeks' visit in Nova Scotia.

MR. J. F. FRASER, superintendent of the Western Union cable station at Canso, N. S., has retired from active service.

USE OF CODES TO ITALY.—On and after September 15 authorized codes may be used to Italy, except the towns of Ancona, Barletta, Brindisi, Porto Corsini, Taranto and Venice.

CABLE INTERRUPTED BY EARTHQUAKE.—The duplicate cable of the Central and South American Telegraph Company between San Juan del Sur, Nicaragua, and Salina Cruz, Mexico, has been interrupted as a result of an earthquake. The number one cable between these two points, however, remains in good working order. The three cables in the Gulf of Mexico, belonging to the Mexican Telegraph Company, have been repaired, restoring

communication between Galveston, Tex., and Mexico. These three cables were interrupted as a result of the recent fierce hurricane.

ALTERNATING CURRENT FOR CABLE TELEGRAPHY.—Lieut.-Colonel George O. Squier of the United States Army, presented a paper at the meeting of the Physical Society of London, June 25, entitled "On an Unbroken Alternating Current for Cable Telegraphy." The object of the paper was to propose a new angle of view in the method of transmission of signals in the submarine telegraph cable, and describe some apparatus for operating on the general principles involved. The paper is printed in full in the *Journal of the Franklin Institute* for September.

RETIREMENT OF J. C. SHAW.—Mr. J. C. Shaw, familiarly known as "Jerry" Shaw, one of the best known cable men in Boston, retired on September 1, after forty-one years of continuous service with the Direct United States Cable Company, and the Western Union Telegraph Company. He commenced his career as a telegrapher with the British post office telegraph service in 1870, in his native town, Sunderland, England. Shortly afterwards he was transferred to Newcastle-on-Tyne where he remained until June, 1874, when he resigned to join the forces of the Direct Cable Company, which company had been organized as an opposition to the Anglo-American Telegraph Company. September of the same year found him stationed at Rye Beach, N. H., as a member of the original staff. At the present time there are eight members of the original staff alive, including Mr. G. G. Ward, vice-president and general manager of the Commercial Cable Company, and Mr. George Clapperton, traffic manager of the same company, New York. In 1888 Mr. Shaw was transferred to Boston, Mass., as clerk-in-charge (manager), which position he filled to the satisfaction of the company and patrons until the office was closed, July, 1914, by the Western Union, which had leased the direct Cable Company in 1912. Since the closing of the office Mr. Shaw has been connected with the cable department at the Western Union office at 109 State street, Boston.

"Jerry" was well and favorably known to practically every cable patron in Boston. In addition he is widely known throughout the cable world.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to September 13, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obok and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Cayenne-Salinas, August 20; Salina Cruz-San Juan del Sur, September 6; Nagasaki-Tamsui, September 11.

If you are not a subscriber to TELEGRAPH AND TELEPHONE AGE it is your duty to become one. It costs only \$2.00 a year.

CANADIAN NOTES.

SIR W. C. VAN HORNE, aged seventy-three years, chairman of the board of governors of the Canadian Pacific Railway, and a former telegrapher, died in Montreal, Que., September 11. He was born in Joliet, Ill., and entered the railway service at the age of fourteen years. He studied telegraphy and became an operator and worked as such on various railroads. He was superintendent of telegraph on the Chicago and Alton Railroad for three years. From this position he rose rapidly in railroad management, finally becoming president of the Canadian Pacific. On his retirement from the active duties of that office in 1889, he was made chairman of the board, which position he held at the time of his death.

MR. A. P. LINNELL, chief assistant to Mr. A. B. Smith, manager of telegraphs, Grand Trunk and Grand Trunk Pacific Railways, Montreal, has been granted extended leave of absence, due to his having enlisted in the Third Universities Company (Reinforcements Princess Patricia Light Infantry) Canadian Expeditionary Force, and has sailed for England preparatory to going to the front. Mr. Linnell was for some years private secretary to the commercial and traffic superintendent, Grand Trunk Pacific Telegraph Company, Winnipeg. Subsequently, in order to gain additional experience, he was transferred to the construction side of the telegraph business as an ordinary groundman, reaching ultimately a position as foreman in charge of one of the telegraph outfits building lines through the Rocky Mountains. In January, 1913, he was transferred to Montreal, to assume the position he has just temporarily vacated. On leaving, Mr. Linnell was presented with a handsome wrist watch by his staff.

LARGE TELEGRAPH MONEY ORDER.—Twenty-thousand dollars was sent by telegraph on September 1 by the treasurer of the Manitoba branch of the Canadian Red Cross Society, at Winnipeg, to the head office at Toronto, Ont.

THE TELEPHONE.

MESSRS. U. N. BETHELL, president New York Telephone Company, and C. H. Wilson, general manager long distance lines department, American Telephone and Telegraph Company, have returned to their offices after a few weeks' rest.

TELEPHONE REGISTRATION BUREAU.—The New York Telephone Company is considering a proposition to establish a telephone registration bureau in New York city, the object of which is to provide a means of registration for transients who wish to record their temporary addresses and whereabouts.

THE CHINESE TELEPHONE EXCHANGE in San Francisco is under the management of Loo Kum Shu, who employs four Chinese girls, wearing their native costume and speaking perfect English. The exchange has 10,000 subscribers. Fully 80 per cent. of them cannot read or write, and the girls have to remember the names and numbers of the Chinamen, so that they can connect them when their countrymen call them. They do it, without a mistake, in nine Chinese dialects.

Women Telephone Operators in Turkey.

Evidence of the growth of modern ideas in Turkey is seen in the increasing freedom of women telephone operators in Constantinople. The authorities have even gone so far as to allow them to abandon the regulation Turkish headdress and wear a cap that does not interfere with the telephone headpiece.

There was great opposition at the start to the idea of the Turkish women violating any of their ancient traditions by entering the telephone offices and thus coming in contact with the public. It is said, however, that this feeling has nearly died away, although recently, when the telephone operators attempted to hold an outdoor picnic, the old-time prejudice cropped out and the policemen spoiled the whole affair by forcing the women to sit with their backs to the men.

The employment of women in the Turkish telegraph and telephone service was referred to in the article on "The Telegraph in Turkey," published in our September 1 issue.

The Telephone Pioneers' Convention.

The special train conveying the members of the Telephone Pioneers of America and their families and friends left the Grand Central station, New York, at 12:50 p. m., Tuesday, September 14, for San Francisco, Cal., where the fifth annual convention of that organization will be held September 21, 22 and 23. The train is due at San Francisco at 8:50 p. m., Monday, September 20. Stops will be made at Chicago, Denver, Col.; Colorado Springs, Col., and Salt Lake City, Utah., at which places the party will have opportunity to visit points of interest.

Following is the programme of the convention:

TUESDAY, SEPTEMBER 21.

10:30 A. M.—Business meeting in the Rose Room in the St. Francis Hotel.

2:30 P. M.—Addresses.

7:00 P. M.—Banquet in the Colonial Room, St. Francis.

WEDNESDAY, SEPTEMBER 22.

Trip to Mt. Tamalpais, leaving the St. Francis at 9 A. M., and returning to San Francisco at 6:35 P. M.

THURSDAY, SEPTEMBER 23.

Reunion at Panama-Pacific Exposition and demonstration of transcontinental telephony. The exercises will include the presentation of a plaque to the Telephone Pioneers of America by the officials of the exposition, and visits to the principal features on the grounds.

On September 26 a trip will be made to Los Angeles, where a two-days' stop will be made, and on September 29-30, there will be a trip to the San Diego fair, where there will be a stop of one day. On October 1 the Pioneers will return to Los Angeles, and it will be optional then to return East by direct route to Salt Lake and Chicago, or on the Pioneers' special, by way of the Grand Canyon, where one day will be devoted to sight-seeing. The

trip will occupy twenty-three days from New York and eastern points.

The general committee of arrangements consists of G. E. McFarland, president Pacific Telephone and Telegraph Company, San Francisco; A. S. Hibbard, American Telephone and Telegraph Company; Chicago, and Gerard Swope, vice-president Western Electric Company, New York.

The officers of the Telephone Pioneers of America are Theo. N. Vail, president; T. D. Lockwood, A. S. Hibbard, T. B. Doolittle and G. E. McFarland, vice-presidents; R. H. Starrett, secretary, and G. D. Milne, treasurer.

Owing to the distance Mr. Theo. N. Vail, president of the Pioneers, will not be present at the San Francisco convention.

PREVIOUS CONVENTIONS OF TELEPHONE PIONEERS.

The first (organization) meeting of the Telephone Pioneers of America was held in Boston, Mass., November 2 and 3, 1911; the second meeting, New York, November 14 and 15, 1912; third, Chicago, October 16 and 17, 1913; fourth, Richmond, Va., October 29 and 30, 1914.

Review of Principal Articles in Contemporary Telephone Publications.

PRINCIPLES IN TRANSMITTER AND RECEIVER INVENTIONS, is the title of an interesting article by A. P. Connor in *Telephony* for September 4. The author gives a resume of the many different types of transmitters and receivers which have been patented, and states the principles involved in their operation. He discusses the present instruments of the carbon electro-magnetic types and states that the thermo-electric types are now of interest. The article is illustrated with eleven diagrams showing as many different types of transmitters and receivers.

TESTING DUPLEX CABLE FOR LOADING.—Mr. W. N. Furthmann is the author of an article in *Telephony* for September 4, entitled "Design, Construction, Testing of Duplex Cable for Loading." He points out the problems encountered in design and construction of quadded cables for loaded circuits. Uniformity in material, he says, is as essential as manufacturing. Some construction requirements are set forth, and the capacity unbalance test is referred to.

UNCLE SAM'S ARTILLERY COLLEGE IN THE POCONOS, is the subject of an article by Louis Smithling in the *Telephone News* for September. It describes the instruction camps for civilians, citizen soldier and regulars at different points. As in war itself the telephone plays an important part in the mimic warfare of these military training schools. The article is well illustrated by reproductions of photographs.

THE WIRES THAT LEAD TO VICTORY.—An interesting story is printed in the September number of the *The Transmitter* of the uses of the telegraph and the telephone by the French army in the war. It is a translation from the French by Jeanne Odette Martin, and shows the difficulties and dangers of

maintaining communication during hostilities. The article is illustrated by photographic views.

THE TELEPHONE'S USE IN MODERN WARFARE.—The *Western Electric News* for September prints an interesting article on the use of the telephone in modern warfare. It describes in some detail how military telephone lines are built and the apparatus used in army work. The article is well and appropriately illustrated.

RADIO-TELEGRAPHY.

MISS T. N. BROWN, private secretary to vice-president and general manager E. J. Nally of the Marconi Wireless Telegraph Company of America, will spend the next month at her home in Chicago.

MR. J. DE ALMONTE, of the Marconi Wireless Telegraph Company of America, New York, is in South America in the interests of the company and will be absent several weeks.

WIRELESS OPERATOR FREED.—J. Maisch of New York, wireless operator on the Norwegian steamer "Seattle" and a native-born American citizen, who had been held in custody since the "Seattle" was captured near the Falkland Islands on March 14 has been released in London as the result of representations made in his behalf by the American Embassy.

WIRELESS IN HONGKONG.—The port of Hongkong, China, now has a wireless telegraph service with ships and coast stations within a radius of 500 to 700 miles in daytime and 1,300 miles and over at night in that part of the world. The service is in charge of the post-office department of the colonial government, and the Hongkong post office handles the local business.

RESTRICTING BUSINESS FROM TUCKERTON STATION.—Announcement was made September 1 that no new business except government messages would be received at the wireless station at Tuckerton, N. J., until further notice. It was recommended that messages for Germany be filed at the Sayville, L. I., station. It is stated that the reason for this order was that atmospheric conditions were poor.

THE MARCONI WIRELESS TELEGRAPH COMPANY, Limited, London, England, is now accepting radio telegrams between Great Britain and Ireland and Bermuda, Jamaica, British Guiana, and several other West Indian points at two shillings and two pence (about fifty-two cents American money), for full rate messages, and half of this rate for deferred plain language telegrams. The same rates apply to messages in both directions.

POWERFUL RADIO PLANT AT PITTSBURGH.—The Carnegie Institute of Technology, Pittsburgh, Pa., is installing a powerful radio plant in the tower of Machinery Hall. It will have a very wide operating range, embracing Honolulu and eastern Germany. The station is being installed for the use of the student radio club, an organization of electrical students. The equipment of the new station consists of a 10-kilowatt motor-generator set of the latest type, and an audion detector.

WIRELESS YEAR BOOK.—The Year Book of Wireless Telegraphy and Telephony for 1915, recently

issued by the Marconi Publishing Corporation, New York, contains a vast fund of information about progress in the wireless field in the year. The book is 6 x 8½ inches in size, and contains 1,000 pages. It forms a complete work of reference on wireless subjects, and includes a large map showing wireless stations throughout the world.

Among the features of the book are the wireless laws and regulations of the various countries; lists of land and ship stations; the radio-telegraphic convention, a record of the development of wireless telegraphy, etc. The volume includes several interesting and valuable articles on radio subjects by leading investigators and authors, and contains several pages of biographical sketches of prominent workers in the wireless field. There is also plenty of useful data for engineers and students.

The book is bound in strong cloth covers, and will be as useful to the wire telegraph man as to the wireless man. The price is \$1.50 per copy.

For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

OBITUARY.

T. A. PIELOW, aged sixty years, a telegraph operator at Hood River, Ore., died at that place August 25.

C. B. HUFF, aged fifty-seven years, a former telegrapher, died at Long Branch, N. J., August 26. He was at one time an operator for the New York Sun.

JOSEPH G. EVERSMAAN, aged sixty-five years, an old-time operator, and for the past twenty-five years a live stock reporter in Cincinnati, Ohio, died in that city September 1.

WILLIAM STUMP, aged seventy-seven years, a member of the secret service telegraphers under "Stonewall" Jackson in the civil war, died at Ashville, Pa., August 25. He worked for many years for the Western Union Telegraph Company and the Baltimore and Ohio Railroad.

WILBUR A. PEASE, aged seventy-six years, a well-known old-time New York telegrapher, who retired from active telegraph service twenty years ago, died at his home in Brooklyn, on September 6. Mr. Pease was for many years a member of the 195 Broadway main office staff and was well known to the older members of the profession. Many of his old office associates attended the funeral services. Mr. Pease was a native of Connecticut and had devoted his entire life until his retirement to the telegraph service.

A. H. COPELAND, aged eighty-five years, an old-time commercial and railway operator, died in Milwaukee, Wis., August 14. While working as an operator at Middlebury, Vt., [where he was born] in the winter of 1852, a train on the Rutland and Burlington Railroad was greatly delayed and Mr. Copeland, learning of its whereabouts, made arrangements by telegraph for the train to wait at a certain station. Train dispatching by telegraph was then unknown, except on the Erie Railroad, where it had been in operation for about a year. The conductor of the train hesitated and wanted proofs of the genuineness of the order. He was

finally convinced and proceeded with his train. Deceased worked as railroad operator and agent at Chenoa, Ill., for many years and stood high in the community. Funeral services were held at Chenoa.

Death of C. A. Boynton.

Charles A. Boynton, aged seventy-nine years, a veteran of the Associated Press, one of the best known American newspaper men for over forty years, died at his home in Washington, D. C., September 5. He had not been in active service since 1909, but had been in fair health until a few weeks ago. Then he fell ill and failed steadily. The funeral was held in Washington, September 7.

Mr. Boynton was born in West Stockbridge, Mass., and was the son of the Rev. Charles B. Boynton. After a good education he entered the service of the Western Associated Press in 1870 and never left the newspaper profession. He went to Washington first as correspondent of the Western Associated Press, and became the first superintendent of the Southern division of the Associated Press, a post which he filled until 1909, afterward continuing his connection with the organization in an advisory capacity.

During his many years of work in Washington Mr. Boynton won the personal friendship of several presidents and a score of cabinet members. During the Spanish war and the Portsmouth peace conference and during many noteworthy sessions of congress and political campaigns hundreds of thousands of American newspaper readers received their intelligence from the national capital through despatches which bore the imprint of Mr. Boynton's work.

He leaves a widow, a daughter and a son, Charles Hudson Boynton, a New York broker. The late General Henry V. Boynton was his brother.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. Although the book has been greatly enlarged the price remains the same—\$1.00 per copy. For sale by TELEPHONE AND TELEGRAPH AGE, 253 Broadway, New York.

The Barclay Printing Telegraph System.

A new edition of "The Barclay Printing Telegraph System," written by Mr. William Finn, the well-known telegraph engineer, has been published and is now obtainable. This book gives a very complete description of the Barclay system, and has been reproduced to meet the constant call for information on the subject. It is well illustrated and is printed in clear type on finely finished paper. Every telegrapher should be familiar with the system. The price of the book is only fifty cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

MUNICIPAL ELECTRICIANS.

Convention of International Association of Municipal Electricians.

In our issue dated September 1, we made a brief reference to the twentieth annual convention of the International Association of Municipal Electricians, which was held at the Gibson Hotel, Cincinnati, Ohio, August 24 to 27. Further details are now at hand.

On the evening of August 24 an informal reception was held in the ballroom of the hotel. Mayor Spiegel of Cincinnati welcomed the delegates and dwelt upon the marvelous strides made in the electrical field during the last quarter of a century. The address was responded to by Dr. C. P. Steinmetz, of Schenectady, N. Y.

The first paper read at the morning session of Wednesday, August 25, was that of R. A. Smith, city electrician of Norfolk, Va., on "The Advisability of Using Concentric Wiring in This Country," and was discussed at considerable length, after which Mr. A. J. Cross, of the Gamewell Fire Alarm Telegraph Company, New York, presented a paper entitled "Fire Alarm Systems for Industrial Plants." The fire alarm telegraph system, he said, is to the community, in a sense, what the scouting aeroplane is to a modern army—the means whereby intelligence as to the existence of danger is quickly and accurately conveyed to the fighting organization. The nearer a fire-alarm system approaches an area which may be subject to fire, the greater its value becomes, and if its benefits can be made more quickly and universally available great good will be accomplished and the heavy annual toll of fire loss be largely reduced.

Mr. G. F. Gray, of Schenectady, N. Y., read a paper on "Vacuum Arresters," and one by Mr. H. M. Beck, representative of the Electric Storage Battery Company, Chicago, on "Storage Batteries for Fire Alarm Purposes," was read by a member.

Mr. W. J. Canada, electrical engineer, Bureau of Standards, Washington, D. C., made an address on "The Scope and Present Status of the National Electrical Safety Code," and was followed by Mr. O. F. Tallman, of St. Louis, Mo., with a paper on "Practical Cable Maintenance Methods."

At the session of August 26, Dr. C. P. Steinmetz, in discussing one of the papers, said that municipalities in this country were becoming more and more efficient, and would soon be as efficient as privately conducted enterprises, but until that time arrives municipal production of electricity is not advisable.

Dr. E. B. Rosa, of the Bureau of Standards, Washington, in discussing the work of the bureau, said that not enough money was appropriated for the purpose. He suggested that the members of the association ask their congressmen to vote for larger appropriations.

After a paper on "Uniform Electrical Standards," by Hon. J. P. Jackson, commissioner of labor and industry of Pennsylvania, Mr. W. H. Flandreau, president of the association, read his paper on "The Importance of the Superintendent of Fire and

Police Telegraph to His Municipality," from which some extracts were printed in our September 1 issue.

The paper of Mr. Price I. Patton, assistant manager of the Electrical Bureau, Philadelphia, on "Police Patrol and Fire Alarm Records," described the method of keeping records in the Philadelphia service. A card index is employed. He exhibited samples of the cards.

The following officers were elected: W. H. Flandreau, president (re-elected); C. P. Steinmetz, first vice-president (re-elected); H. T. Brooks, second vice-president; C. E. Converse, third vice-president (re-elected); L. S. Bosley, fourth vice-president; Clarence R. George, secretary (re-elected), and C. E. Diehl, treasurer (re-elected).

Baltimore, Md., was selected as the place for the meeting of 1916.

There was plenty of entertainment for the members and their families and friends. On the evening of August 25 a banquet was held at the Zoological Gardens, and August 26 a beefsteak dinner at Chester Park. The ladies were taken on tours to points of interest about the city.

There were several exhibits of apparatus. The Gamewell Fire Alarm Telegraph Company, represented by C. F. Maulin of the Chicago office and O. P. Crocker, general agent, showed six-circuit automatic storage-battery switchboard, new type Peerless positive non-interfering high-tension current-resisting fire-alarm boxes; also new types of punch registers, time stamps, police signal apparatus and various devices for calling patrolmen who are patrolling their beats.

The Western Electric Company, represented by J. Nolloth, of the Cincinnati office, and G. M. Crammond, showed a line of P. B. X. boards, and police and mine sets. Also a standard line of common battery sets and lead-covered insulated telephone cable.

MR. W. E. HARKNESS, an electrical engineer of New York, whose advertisement appears in another page of this publication and whose services are available for those desiring a competent electrical engineer, has just finished inspecting the fire alarm telegraph and police systems in Passaic, N. J.

PEORIA, ILL., FIRE ALARM AND POLICE SYSTEM.—The fire alarm and police signaling system in Peoria, Ill., includes 97 boxes, all spring-actuated, trigger-pull and non-interfering. The apparatus at headquarters is of the automatic type. Mr. W. E. Wolgamott is city electrician.

HANDY POCKET DICTIONARY.—The Excelsior Webster Dictionary is a very handy little book, vest pocket size. It has a margin index which greatly facilitates the finding of a word, and it contains much information of a general and practical character besides. Every one should have a copy either in the pocket or on the desk, where it can be instantly referred to. Price, 50 cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Instructions for the Installation and Maintenance of Caustic Soda Cells.

BY W. E. HARKNESS, NEW YORK.

Owing to the interest being taken in the use of caustic soda cells for the operation of telephone and selector equipment at railway way stations, some general rules covering installation and maintenance may be of interest.

When the cells, or renewal parts, are received they should be checked to see that the following parts are on hand for a complete cell: 1, Jar of the proper size, material and shape; 2, can of caustic soda; 3, copper oxide element; 4, zinc element; 5, bottle of oil.

INSTALLATION.

When ready to set up the cells remove all packing material from the jars and assembled element and the spacing paper or corks from between the zincs and the copper oxide.

Care must be taken in handling the jars to prevent breakage. Cracked jars must not be used nor must porcelain jars in which the glazing is cracked or has become rough either inside or out. Cracked jars can be detected by the sound which they emit when tapped.

When assembling the battery the jars should be set on wood or some other non-conductor of heat to prevent breakage from the heat generated by the combination of the caustic soda and water. They should not be set on stone, concrete, or metal, during assembly.

The zincs should be examined to see that none is cracked or broken or set too close to the copper-oxide plate.

The connecting wires on the zinc should be firmly attached and all exposed metal, including the end of the wire, should be completely tinned to prevent local action. The insulation on this wire should not be cracked or stripped.

The copper-oxide plates or containers should be examined to see that they are not cracked or broken. If found defective they should not be used unless all the parts are firmly held in place so that they are not liable to become loose after the cell is placed in service.

The copper oxide plate should be of a brick red color when ready to use. If it is not the proper color before being placed in service the cell must be short circuited for a period not to exceed three minutes. It should not be exposed to the air until the cell is to be assembled for service.

Thoroughly clean and rinse the jars and fill with clean, soft or distilled water to the height recommended by the manufacturers.

The cans of caustic soda should be examined and if any are found punctured their contents should not be used. Dissolve the contents of one can of soda in each jar, dropping it in a little at a time, stirring it constantly with a piece of clean wood until all of the soda is dissolved.

Do not dump the entire contents of the can into the jar at one time as it is apt to break the jar due to the heat generated by the rapid combination of

the soda and the water, as well as causing the soda to cake in the bottom of the jar.

Permit the solution to stand and cool until it reaches a temperature of about 90 degrees Fahr. before inserting the elements. This temperature may be roughly determined by placing the back of the hand against the jar and if it can be held there without discomfort it is safe to proceed.

Never place the elements in the hot solution unless otherwise specified by the manufacturers.

Care should be taken not to spill the solution on the hands or face, as it will burn the skin. It will also attack metal and fabrics.

The empty soda cans should be destroyed and put where they cannot be reached by persons not familiar with their contents. A good plan is to bury them. If this cannot be done holes should be punched in them to prevent them being used.

The elements should be securely fastened to the cover and the wire from the zinc passed through the hole in the cover provided for this purpose and the element, attached to the cover, placed in the solution.

The cover should be moved to one side to admit the neck of the bottle of oil and let the oil run into the jar. The oil should never be poured into the cell until the elements have been placed in position.

The cells are now ready to be connected in the circuit.

ATTENTION DURING THE LIFE OF THE CELL.

The caustic soda cells should be inspected as is found necessary. The heavier the service the more frequent the inspection. In the class of service under consideration cells of the usual size will last for several years so that the inspections need not be very frequent. The cells should be inspected more frequently near the end of the life of the cells to prevent failure.

When glass jars are used the condition of the zinc plate is a good indicator of the amount of life left in the cell, as the zinc is eaten through at the thin part of the plate near the end of its life. This can be observed without removing the elements from the jars.

When practicable the cells should be located in a clean, light place to facilitate installation, inspection and renewal.

If porcelain jars are used, the cover with the elements attached may be lifted up for inspection. This draws the elements through the oil but this is not objectionable after the elements have been in service.

RENEWING CELLS.

When cells are exhausted and are to be renewed, remove the centre binding post or nuts and washers above the top of the cover, clean and set aside for use with the new element.

Remove the exhausted elements and place them in the box from which the new elements have been removed.

Pour the old solution into a hole dug in the ground. It must not be poured where it will run outside of the right of way, into running water or

on metal such as pipes, wires, etc., or on vegetation.

Clean the jars thoroughly with a stiff brush or clean waste and a small amount of sand.

The water used for cleaning jars must not be used for setting up cells.

After the jars have been cleaned proceed as when setting up new cells.

GENERAL.

When renewing the entire battery at a station a set of dry cells may be substituted while the renewals are being made.

The exhausted elements have a junk value and should be sent to some central point until a sufficient amount has been collected to warrant shipping to the manufacturer.

The exhausted elements should be stored in some place sheltered from rain or moisture and removed from inflammable material; if left in a damp or wet condition they develop a great deal of heat and may cause combustion unless the foregoing precautions are taken.

Renewal parts should be stored in a clean, dry place.

Early Telegraph Tariffs.

BY B. B. ADAMS, NEW YORK.

If you are interested in the day of small things, take a look at the tariff of one of the telegraph companies doing business between Boston and New York about fifty-five or sixty years ago, which I send you herewith. My uncle, Sanford Adams, was the operator at West Brookfield, Mass., in those days, and this tariff was found recently among his papers. He died several years ago. He was clerk in the freight office at West Brookfield from about 1852 to 1868 and when the telegraph line was put through, he naturally was the person to be called upon to learn the new and magic art. He learned first on the House printer; and I believe there was up to that time a line on the north side of the railroad, operated by the company which used the House instrument, while another company, with a line on the south side of the railway, used Morse. At one time the company using the House instrument (or its successor, the Hughes) had an office at West Brookfield but not at the next town, Warren, while the Morse line had an office at Warren but none at West Brookfield. Subsequently the two companies were consolidated; and there was weeping and gnashing of teeth among the operators on the printer when they were required to abandon the House and learn the Morse. Afterwards, of course, they learned to love the Morse, as does everyone who appreciates its beauties and its simplicities.

This tariff, you will see, is rather simple when compared with the hundred-page books which are now required. This, evidently, was made by the clerk from the superintendent's office who opened the office at West Brookfield. It is written on the back of one of the waybill blanks of the Western Railroad, which was then the name of the present

Boston and Albany. The rate to Albany, you will see, was higher than that to New York, although the distance is about the same. Presumably there was more competition in the direction of New York. "Chatham 4 C" means Chatham Four

Tariffs

To N. York 31-3

<i>Boston 75-2.3</i>	<i>Chatham 25-3</i>
<i>Haverhill 75-3</i>	<i>Westfield 75-3</i>
<i>Springfield 75-3</i>	<i>Shelburne 75-3</i>
<i>Andover 75-3</i>	<i>St. Albans 75-3</i>
<i>Keene 25-3</i>	<i>Bridport 25-3</i>
<i>Manchester 30-3</i>	<i>Concord 30-3</i>
<i>Amherst 40-4</i>	<i>Windsor 25-3</i>
<i>Albany 40-4</i>	<i>St. John's 25-3</i>
<i>Putnam 25-3</i>	<i>Madison 25-3</i>
<i>Chatham 25-3</i>	<i>Putnam 25-3</i>
<i>Windsor 40-4</i>	

*The first column denotes the fare for
the first ten miles the second column for
each additional mile.*

B. B. A.

PORTION OF TARIFF WITH EXPLANATORY NOTE.

Corners, now called Chatham. "C Factories" means Chester Factories, now called Chester.

I recall that as late as 1864, or 1865, offices of the American Telegraph Company, in Massachusetts, had tariff books filled out in ink. The names of the towns, if I remember correctly, were printed, but the figures were written. The towns were arranged, not alphabetically but geographically, beginning as Sackville, N. B., or whatever was the then eastern terminus of the company's line.

Wonders of the Telegraph.

Her soldier son in the Philippines had sent a cablegram, and Mrs. Blunderleigh's voice rang with pride when speaking of it to her impressed neighbors.

"Yes, they be wonderful things, the telegraphs," she said. "Just fancy, it's come from the Philippines—all the thousands of miles."

"And so quick, too," put in her best friend.

"Quick ain't the word for it," put in Mrs. Blunderleigh. "Why, when I got it the gum on the envelope wasn't dry!"—*Chicago News*.

PHILADELPHIA ELECTRICAL BUREAU.—The annual report of the Electrical Bureau of Philadelphia, Pa., for the year ending December 31, 1914, has just been issued. It is a pamphlet of 105 pages and is very complete in details and contains many illustrations. Mr. Clayton W. Pike is chief of the Bureau.

Warfare by "Radiomechanics."

The war departments of most of the European governments are besieged these days by inventors with devices for performing all sort of warlike exploits by what the layman would call wireless. The inventors do not call it wireless. They have a new word, "radiomechanics."

And by radiomechanics it is purposed to blow up the magazines of war ships and wipe whole fleets out of existence, to steer torpedoes in water, to drop torpedoes from airships and steer them to a goal on land, to blow up bridges and fortresses and in general to perpetrate on the enemy destruction and havoc on a scale of unprecedented vastness.

What has spurred the inventors to special efforts is the fact that they read of the work of inventors in the United States, who already are said to have achieved results which Europeans had not brought beyond the realm of their mental conceptions. The European press has given considerable space to these topics and the general public gradually has been led to suspect that the whole artificial structure amid which they live some morning may be shaken down around their heads.

The inventors are treated not merely with patience, but are even encouraged to go as far as they may with their projected engines of destruction.

To obtain a rational opinion on the question, the *Petit Parisien* asked for a statement from Professor Branly. Professor Branly, who is a Catholic priest, is known to scientists and students throughout the world. He is one of the men to whom much of the success of wireless telegraphy is due.

"It is possible to produce at a distance mechanical effort of any kind, but it is always necessary that the object to be affected be provided with apparatus receptive of electric waves. It would consequently be possible by means of radiomechanics to blow up at a distance a bridge or a fortress if the object to be destroyed were previously equipped for the purpose; that is, if it were fitted with a special apparatus. The consequent difficulties that supervene it would be superfluous to enumerate.

"As for operating from a distance torpedoes or submarines or dirigibles, which without crew or pilot should execute a work of destruction, that also would be possible. So far it has not been done in this war. It is obvious that an unexpected electric spark of atmospheric origin or coming from the enemy's side might provoke the action at a most inopportune time and in a most undesirable manner.

"In the field radiotelegraphy has proved itself most serviceable, as all know. The Germans make ample use of it. Their headquarters is thus united to Antwerp, to Brussels and to Lille. Radiotelegraphy was of great service to the eleven German war ships which kept the sea for some months, doing a work of destruction. But it was also of service to the Allies for the discovery and destruction of those ships.

"As for the possibility of the enemy having on our territory hidden stations for radiomechanics, from which at a given time damage might be done.

From New York Herald.

I doubt the utility of such a project. It would be easy enough to hide the antennae, but it would be impossible to hide the motor."

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What is the method of altering the long and short-end current proportions in a quadruplex?

Referring to the old standard Western Union quadruplex, what style of pole-changer and No. 2 relay were used?

In what respects does the apparatus of the old standard quadruplex differ from the modern equipment?

What are the peculiar features of the Frier No. 2 relay?

Does this relay respond to changes in polarity of current or to increase and decrease in strength?

From what fact does it derive its name?

How many magnet coils are there on the Frier relay?

Does the armature become polarized, if so, what prevents the armature lever from remaining on the closing contact points?

Are the magnet coils of the Frier relay wound differently to those of other quadruplex relays?

How is the third, or armature, coil connected with the regular coils?

What part of the instrument becomes self-polarized, and how is self-polarization effected?

What is the effect of omitting the yoke connecting the two magnet cores? Does it improve the efficiency of the relay?

Is the induction increased or reduced by omitting the yoke?

What are the laws regarding the development of magnetism in the magnet cores and the development of induction?

To what is the efficiency of the Frier relay due?

Is it necessary to use condensers in connection with the Frier relay?

What are the peculiar features of the Morris duplex?

Is the Morris duplex available for long lines, and how is the battery disposed?

What advantage is gained by having the battery supply at one end only?

Why is a differential neutral relay employed at the home station in place of a single line relay, in the Morris duplex?

Is the Morris duplex operated on the polar or neutral side principle?

(To be Continued.)

Telegraph Athletes in 1881.

BY JAMES P. BRADT, NEW YORK.

Many happy memories were revived by the article in TELEGRAPH AND TELEPHONE AGE for August 16 about the athletic efforts of New York telegraphers in 1881. I pleasantly recall those contests in which I participated (and won a pair of medals), and the fun we had in our preliminary try-outs.

One of our early experiences was at a half-mile racing track in New Jersey where a few of us "dark horses" were to be put in condition. Our experience as walkers had been limited to those days in which carfare was hard to find; the distances had been short and on those few occasions there had been no hurry. We were not a little bit fit for a rush around a half mile track, but we were young and confident. One of the "dark horses," who is now the editor of TELEGRAPH AND TELEPHONE AGE, rushed around

E. A. Leslie	Ed. A. Leslie
H. Baldwin	J. A. Davis
J. Tierney	J. A. Davis
J. Monahan	J. A. Davis
J. A. Davis	J. A. Davis
D. B. Mitchell	E. M. Anson
J. O. E. Fenn	A. S. D.
N. Taylor	J. A. Davis
J. A. Davis	J. A. Davis
M. Labaugh	J. A. Davis
M. A. Brock	J. A. Davis
A. S. Thompson	J. A. Davis
J. A. Davis	J. A. Davis
E. F. Cummings	J. A. Davis
Thomas Branan	J. A. Davis
Martin Durvan	J. A. Davis
M. L. Haugh	J. A. Davis
A. J. Voyer	J. A. Davis

SIGNATURES OF WELL-KNOWN TELEGRAPHERS.

the track so violently at one of the preliminary trials that he was laid up for a week afterwards with strained muscles.

All except Mr. William Maver and Mr. Hugo Weise were groggy before the first lap was finished. Mr. Maver's experiences as captain of a large amateur athletic club in New York City had made him quite an athlete. Some of the "dark horses" abandoned the proposition, but a few of us continued to train and really made creditable records when the contests were decided on the old Manhattan Athletic grounds in New York—grounds on which stately buildings were erected so many years ago as to cause us to forget the days when Lon

Myers, Harry Armstrong and Halske made world's records in running and walking around that track.

Mr. Martin Durivan and Mr. David B. Mitchell were natural athletes. Mr. Mitchell was a sprinter and had a remarkably long stride. Had he taken up athletics seriously he would certainly have been among the leaders in the one hundred yard dash. Thomas Marrin also was a fine athlete in those days.

[Mr. Bradt is now general sales manager of the Columbia Graphophone Company. He has had a long and wide experience in this line of work since 1897. At that time he was identified with the old United Press service. Mr. Bradt was one of the brilliant New York telegraphers of his day and all old timers remember with pleasure his beautiful writing and his clear cut Morse. For some years Mr. Bradt represented the Columbia Graphophone Company in Germany, Russia, Austria and England and subsequently was the Canadian representative of the same interests. Accompanying this article is a reproduction of some of the signatures of the contributors to the athletic fund. The names of many famous operators are included in this interesting list. Most of these men have passed away, but their signatures will revive memories of thirty-four years ago—the days when the New York operators were closely bound together in one brotherhood.—Editor.]

Calculation of the Strength of Electrical Currents.

Probably the most accurate method for the determination of the value of the strength of an electrical current in absolute measure is by means of the Rayleigh current balance, in which the current to be measured is passed in series through two parallel circular coils of unequal radii, one of which is suspended from the beam of a balance. The distance between the planes of the coils is varied until the force of attraction between the two coils is a maximum, and the value of the force is obtained by adding weights to the other arm of the balance until its equilibrium is restored. Since the maximum force obtainable depends on the ratio of the radii of the coils alone, and not on their individual dimensions, it is only necessary to determine further the ratio of the radii of the coils, and this may be done with great accuracy by electrical means. No formula has been heretofore published for calculating at what distance the force becomes a maximum. To supply this lack there is derived in a paper just published by the Bureau of Standards, Department of Commerce, entitled "The Calculation of the Maximum Force Between Two Parallel, Coaxial, Circular Currents," a formula which gives the critical distance as a function of the ratio of the radii. The latter part of the paper is devoted to the development of methods for facilitating the calculations. The formulas are illustrated by numerical examples and tables.

OUR PATENT DEPARTMENT.—Four applications were recently received by our patent department for patents on useful ideas. All of the applications have been allowed.

Telegraph and Telephone Age

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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. Issues over one year old, 50 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, SEPTEMBER 16, 1915.

The San Francisco Tournament.

According to reports from San Francisco the telegraph tournament which was held in that city, August 27 and 28, was a success in spite of the many difficulties and discouragements that the management had to contend with during the preparatory period. The project was planned before the outbreak of the European war, and when hostilities began it soon became apparent that the financing would be much more difficult than it would have been in normal times. This difficulty however did not deter the managers from carrying the project through, and it was by reason of their energetic persistence that the affair made so good a showing.

This was only one of the difficulties to be met and overcome. Another was the distance from the large centers, and it is evident that this was a real one, from the fact that the representation of the craft was rather limited and confined principally to operators from the Pacific Coast cities. The winners, however, are entitled to all the honors they have gained, and we congratulate them for the excellence of their work.

It is a little early to finally pass upon the records as compared with those of former tournaments, for the reason that the matter used was different, and it will require an exhaustive analysis of the results

to determine whether the old records have been broken or not.

Tournaments, no doubt, tend to increase pride and interest in the profession, and should therefore be encouraged by all interests concerned. An important thing that should not be overlooked is that such contests should be held at some central or easily accessible point, thus making it possible for all sections of the country to be represented.

Need for a Good Cheap Battery.

There is an excellent opportunity for some one to find a substitute for the gravity battery. There is nothing against the battery itself, but the high cost of zinc, on account of the war, makes this type of battery an expensive source of current.

This fact was announced at the Rochester convention of the Association of Railway Telegraph Superintendents last June by a prominent telegraph engineer. He stated that his company had been experimenting to find a substitute for the gravity battery but, as yet, had not found anything satisfactory. Here is a chance for some bright mind to make a name and a fortune. The telegraph companies would welcome a battery that would answer their requirements at less cost than the present gravity battery.

Some Thoughts.

Have you something to do to-morrow, do it to-day.

One hour to-day is worth two to-morrow.

To-morrow never comes.

Debt is the worst poverty, and turns freemen into slaves.

Deeds are fruits, words are leaves.

A delay is better than disaster.

Deliberate slowly; execute promptly.

A man must make himself despicable before he is despised by others.

What one knows not how to do is difficult, what one knows how to do is not.

Nothing is difficult to a willing mind.

We are the authors of our own disasters.

Diligence is the mother of success.

There is more disputing about the shell than the kernel.

A good example is the best sermon.

False in one thing, false in all.

A man who would be truly happy should not study the enlarge his estate, but to contract his desires.

UNJUST TAXATION.—Seven towns have lately induced telegraph companies to establish independent offices, making all sorts of promises. When a company establishes itself and then finds that its receipts do not warrant the maintenance of an office at all, the town authorities pounce on the corporation with a tax ranging from \$200 to \$267 per year.

MORSE AND THE TELEGRAPH.—Mr. Frank Jewett Mather, jr., is the author of a story entitled "S. F. Morse and the Telegraph," in *The Nation* for August 26. It is the story of "the evolution of a great idea and the patient endeavor by which it became a practical achievement."

Telephone Codes for Telegrams.

In sending telegrams by telephone it is sometimes difficult to make out certain letters on the receiver on account of the similarity of sounds of other letters, and it has become the custom to fix the identity of such letters by pronouncing a familiar word the initial letter of which is the same as the one to be verified.

In order to facilitate the transmission of telegrams by telephone the Western Union Telegraph Company employs a standard code which gives satisfaction in practice, and cards containing the code are distributed among its patrons. By the general use of this code errors in transmission are avoided.

The code is as follows:

A for Adams.	N for Newark.
B for Boston.	O for Ocean.
C for Chicago.	P for Peter.
D for Denver.	Q for Queen.
E for Edward.	R for Robert.
F for Frank.	S for Sugar.
G for George.	T for Texas.
H for Henry.	U for Union.
I for Ida.	V for Violet.
J for Jersey.	W for Western.
K for King.	X for X-Ray.
L for Lincoln.	Y for Yale.
M for Mary.	Z for Zero.

In railroad train dispatching by telephone, the rules recommended by the American Railway Association require that in spelling proper names where letters have similar phonetic construction, the alphabet be scaled to avoid error. Thus: "D, B-C-D;" "T, R-S-T;" "B, A-B;" "P, N-O-P," etc.

The Postal Telegraph-Cable Company does not employ any standard code, but uses any word that will serve the purpose of identifying any particular letter.

Answers to Questions.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(23) Q. If, according to current report, they are using glass telegraph poles in Europe, what is the necessity of using glass insulators? V. A.

A. We do not know the extent to which glass poles are being used in Europe, but probably it is very limited, and we are not informed that glass or any other kind of insulators are used or are not used. Glass poles are not made for their insulating qualities particularly, but rather for their resistance to decay. The use of regular insulators would certainly add to the insulation of the line.

(24) Q. In your article in the September 1 issue, on page 405, headed "Simple Circuits," only the aerial line, sounder and battery resistance are taken into account. Is it the intention to disregard the resistance of the grounded side? A SUBSCRIBER.

A. Yes, the resistance of the ground return is considered as negligible.

(25) Q. When a cable ship is laying a cable or repairing one, is the work carried on at night as well as by day? J. M.

A. Yes. There is no cessation of work. This does not mean however that the same lot of men are required to work twenty-four or forty-eight hours on a stretch if need be. The rule of four hours on and four off applies to cable ships as well as to others. A series of interesting articles on cable laying and repairing was published in our issues beginning April 1, 1914.

Telegraph Oddities.

A telegraph office was recently re-signed and the painter introduced simplified spelling, making the word telegraph, telergaph.

A Mexican paper states that an operator in that country died from the effects of an overdose of "proprietary headache medicine."

A Colorado newspaper apologizes for the poor handwriting of the manager of the local telegraph office who, the paper asserts, injured his right hand with a hammer while repairing the sidewalk in front of his house. This accident compelled him to use his left hand in writing messages.

Because an operator sent "send me my socks and pins," for "send me my stocks and bonds," in a telegram from a California business man to his wife, the latter, regarding the request as being frivolous, brought suit for divorce. The operator says he was unable to decipher the handwriting.

An operator in the South claims to have a dog that barks the Morse alphabet. That is to say, the dog can talk by means of the Morse code of dots and spaces eliminating, of course, the dashes. The dog now can bark the word "Prize," and the owner hopes that it can be taught in time to bark words containing letters made up of dashes, as well as dots.

ICELAND TELEGRAPHS AND TELEPHONES.—We have received from Mr. Gisli J. Olafsson, manager of the Iceland telegraphs and telephones, Reykjavik, Iceland, a copy of a pamphlet containing statistical information on the telegraphs and telephones of that island for the year 1914.

It shows receipts from all sources for the year at 217,834.94 kr. (crown) and expenses, 91,519.46 kr., leaving a surplus of 126,315.48 kr. The number of taxed telephone conversations, interior service (time limit three minutes), 178,525, increase 27 per cent as compared with 1913; telephone receipts, 117,753.90 kr., an increase of 26 per cent; number of taxed telegrams (interior service), 32,079, increase 38 per cent; receipts for same, 40,730.30 kr., increase 41 per cent. Exterior service: Number of taxed telegrams sent from Iceland, 21,248, increase 5 per cent; receipts for same, 21,978.64 kr., increase 22 per cent; taxed telegrams received from foreign countries, 19,160, increase 21 per cent; receipts from same, 171,150.15 kr., increase 11 per cent.

Are you a subscriber to TELEGRAPH AND TELEPHONE AGE?

Telephone Troubles in the Tropics.

In a paper read recently before the Institution of Electrical Engineers, London, England, Mr. W. L. Preece gave an account of the many troubles experienced in tropical countries by telephone engineers.

The main troubles, he said, are due to the damp, and to the many natural effects caused by damp heat. In many places the humidity of the atmosphere varies between 80 and 90 per cent., and this damp heat produces a marvellous growth of vegetation, while insect life is as prolific as the vegetation, and sometimes even more trying.

Lightning has a virulence unknown here. Wild animals do their best in some places to increase the engineer's labors. For instance, in some parts it is not unusual to have a mile or two of lines wrecked by giraffes, elephants, or monkeys. The giraffes roaming over the wilds of East Africa come up against a telegraph or telephone line; they have not the sense to draw back and duck their heads under the line, but they push on and on, carrying wires and sometimes the poles with them.

The question of operators causes the traffic department considerable worry. In the majority of tropical places it is impossible to employ European operators; for such work the governments have to rely on half-caste girls or native men, neither of whom, with rare exceptions, have mental equipments comparable with those of European women. With the only available operators, sixty lines to a position is all that can be managed in some places, and eighty lines per position is generally quite as much as can be handled.

A common line trouble is caused by insects, some of which delight in making their homes between the petticoats of insulators. Some insulators are so covered with a spider's nest as to be itself invisible, the base of the nest being on the arm and the apex above the insulator. Oil insulators are useless. Mr. Guthrie Spain, the telegraph engineer of British Guiana, noticed the fact that insects will not enter glass insulators. Glass insulators are used in Cuba for this reason. Apparently these insects prefer a dark place for their home, which obviously is not the case when the insulators are made of glass.

Another widespread source of line trouble in the tropics is lightning. In many places thunderstorms are of almost daily occurrence throughout the greater part of the year. In certain towns a single storm will often result in fifty per cent. or more of the subscriber's telephone lines being grounded at the pole boxes, this being caused by the strong discharges through the protectors to earth, which carry so much carbon dust across the gap as to place the two carbon blocks in contact; so that practically after every storm a number of linemen had to be sent to all these boxes to clean the protectors.

This trouble can, however, be cured to a great extent by using the vacuum type of protector, in which the two carbon blocks are inserted in an exhausted glass tube, the opposite surfaces being serrated and fixed about 1/16 inch apart. These protectors are now used to a considerable extent in the Malay States, and are found to be quite satisfactory.

The Telegraph in the War.

An interesting account of how the English forces employ the telegraph in the war is given in a London paper.

The Royal engineers have been termed "the nerves of the army," and the description fits the actual situation. These men enable Paris and London, and the important towns in the north of France, to keep in touch with the general headquarters of the allied armies, no matter where those headquarters may be. An extensive network of communication wires radiates from the headquarters to various army corps headquarters, and again each army corps has its lines of communication with the divisions, which themselves have wires right up to the brigades. By this means in the space of a few minutes the war offices of London and Paris can be informed clearly as to what is going on.

With the varying changes in the fighting-line the headquarters of the various commanders are continually moving, and it is the Royal Engineers who enable them, no matter where they may be, to keep in direct telegraphic communication with the chief headquarters. The manner in which the telegraph wires and cables are laid is very interesting, and at times very exciting, for the enemy, needless to say, are on the qui vive to destroy the work of the telegraphers, who are continually being sniped at, and who in some cases require a powerful cavalry escort to protect them.

The work is mainly done by what is known as cable detachments, each of which consists of two cable-wagons, which usually work in conjunction with each other, one section laying the lines, while the other remains behind to reel up what the other has finished with.

Suppose a division is ordered to move to a more tactical position. The end of the cable is promptly connected with the permanent line, which communicates with the general headquarters, and the cable detachment move off on the trot across country, along roads, through villages, and past columns of troops to the new position which the brigade is to take up. The white and blue badge worn on the arm of the signal service clears the way.

Behind the wagon rides a horseman who, with the aid of a stick, deftly lays the cable in the hedges and ditches out of the way of danger from heavy transport and the feet of tramping infantry, while other horsemen make the lines safe by tying it back. On the front of the box at the fore part of the cable-wagon sits the telegrapher, who is constantly in communication with headquarters as the cable runs swiftly out.

Telegraphers and linemen are often left behind on duty in lonely spots and even in the trenches, close to the firing-line. "I leave it to your imagination," says one of them, "how difficult it is to concentrate one's mind on the signaling and receiving of important messages while the air is filled with the deafening noise of artillery, the screaming of bursting shells hour after hour, without cessation."

No telegrapher can afford to be without TELEGRAPH AND TELEPHONE AGE. Subscription price, \$2.00 per year.

The San Francisco Telegraph Tournament.

The San Francisco tournament has passed into history and those who have attended other tournaments say the conditions under which the operators did their work there were the most ideal of any they have ever attended. The records made are thought to equal if not exceed those previously established. The matter handled in each class was considerably in excess of that handled at previous tournaments and only by a close comparison with former records will this question be definitely settled. The matter sent in previous tournaments together with the records, was printed in TELEGRAPH AND TELEPHONE AGE, June 16.

The financial conditions of the country at large prevented the attendance of many who would otherwise have been present, but notwithstanding this fact the profession was well represented.

Sunday morning, August 29, the telegraph profession found itself the proud possessor of a new champion in the person of Thomas S. Brickhouse, of E. F. Hutton & Co., of San Francisco. Mr. Brickhouse needs no introduction to the telegraph fraternity. Although it was the first tournament in which he had been a participant, Mr. Brickhouse won every event in which he entered, by a wide margin, and when the final curtain had fallen, not only the judges, but every one present was unanimous in declaring that the best man had won.

Mr. Brickhouse's triumph is the result of clean and wholesome living, as well as close application to his chosen profession. The fact that he excels both as a sender and a receiver stamps him as being entirely worthy of the honor to which he is rightfully due and which all who know him are happy to concede to him.

In Mr. Brickhouse the profession has a champion of whom it can rightfully be proud. His exemplary habits, his strict application to duty, both past and present will, unquestionably be guiding lights to thousands of young, aspiring telegraphers who will seek to emulate him.

In commenting on the work done by Mr. Brickhouse, in the championship class we wish to call attention to the fact that after having sent at top speed for twenty-five minutes or more, he sent the 510 words spelled out in eleven minutes and eighteen seconds. This is an average of nearly forty-five words per minute.

In another part of this issue a photograph and biographical sketch of the new champion appears.

Herman C. Emrich, employed in E. F. Hutton & Company's San Francisco office, was a very close second for championship honors. Mr. Emrich's time in sending was only thirty-eight seconds behind the winner, and his work on the receiving side was worthy of commendation. Mr. Emrich is well known to the profession at large, having filled important positions with several leading brokers as well as press associations and commercial companies throughout the country. He is a native of Baltimore, Md., but has made his home in California for the past several years.

A. G. Tebbs, of the International News Service, Los Angeles, Cal., took second honors in the code

sending class, and in the championship class gave Mr. Emrich a hard run for second place. The quality of his Morse was favorably commented on by all present.

Mr. A. E. Gerhard, winner of the wireless class, and Herman E. Barfield, winner of the commercial message receiving class, were entrants in the championship class, and their work is also deserving of special mention.

Richard C. Bartley and George W. Smith, of the Pennsylvania Railroad, Philadelphia, were present and won both events in which they entered. Mr. Bartley easily demonstrated his superiority as a sender of railroad messages over all competitors, and Mr. Smith's work as a receiver stamped him as being one of the very fastest and best in the business. Mr. Bartley also showed that the hand is superior to the machine in the matter of speed and accuracy, in the railroad hand versus machine contest.

The Philadelphia boys are fine fellows and both made not only good impressions but left behind them a host of friends.

David J. Ellington, former world's champion, was present, but because of physical indisposition was unable to compete.

Veterans of former tournaments who were present were loud in their praise of the manner in which the contests were conducted, the wiring arrangements, the location of the judges, room, etc. All agreed that the events in this tournament afforded better opportunity for a practical demonstration of an operator's ability than in any previous tournament. The original idea of this tournament was adhered to throughout—viz: To demonstrate by speed, accuracy and commercial value the best all-round operator, as well as the best operator in each class.

The circuit on which all work was done was the equivalent of a circuit 675 miles in length, with the judges and the dictaphones at the distant end, and in a room separated by closed doors, there was no chance for the judges to know whose work they were passing on.

The contestants drew lots to see who should compete first, and the judges knew the contestant only by number.

All work was done on an open stage in front of the audience, and no one was allowed on the platform except the contestant during the time the contests were being held.

The dictaphone company made records of all contests, which were used by the judges in deciding points at issue. These records were invaluable and were consulted in many instances to settle important questions which arose. The dictaphone was used to supplant the Morsegraph used in former tournaments. The records of the winners of the different events are being preserved, in the hope that permanent records may be made from them. The use of dictagraphs in contests of this kind is unique, and it was demonstrated to the satisfaction of all that they are entirely practical.

The Piersen telegraph transmitter, manufactured by Edwin H. Piersen, of Topeka, Kan., was operated

for the benefit of those present, and the demonstration stamps it as being a machine to fill a long felt want. Mr. Piersen has spared no time or expense in perfecting a machine which will make every telegraph operator a perfect sender. Only in the keyboard arrangement does it resemble former transmitters of this type. Its storage chamber of seventy-one signals enables the operator to write ahead of the machine, correct any defects in his keyboard operation, and time his messages without interrupting the signals that pass out to the line. The machine is simple in construction, durable, and requires no electrical or mechanical knowledge to operate. It is also calculated to reduce by seventy-five per cent, the effort required to do a day's work.

The Western Electric Company furnished all the equipment used, and the Remington Typewriter Company furnished the typewriters.

Mr. Erickhouse in his receiving used a No. 6 Remington. Mr. Smith used a No. 10 Remington, and Mr. Barfield used a No. 2 Smith Premier.

A summary of the events follows:

RAILROAD MEN'S CONTEST.—Class A. Sending forty railroad messages. Won by Richard C. Bartley, of the Pennsylvania Railroad, Philadelphia, in twenty-eight minutes, thirteen seconds. Raymond H. Redmond, Southern Pacific, Watsonville, Cal., second, time, twenty-nine minutes, four seconds. A. S. Carver, Rock Island, Topeka, Kan., also entered. Judges: J. B. Bell, superintendent Southern Pacific, Sacramento, Cal.; H. B. Breckenfeld, traffic expert, Southern Pacific, San Francisco, and H. H. Cooper, superintendent Southern Pacific, Los Angeles, Cal. Mr. Redmond used a Simon cushion key in his work and is high in his praise of it. First prize \$75. Second prize \$25.

Class B. Receiving forty ordinary railroad messages. Won by George W. Smith, Pennsylvania Railroad, Philadelphia, Pa., in twenty-eight minutes, forty-nine seconds. J. F. Lyon, Southern Pacific Railroad, Los Angeles, Cal., second. Other entrants were A. S. Carver, Rock Island, Topeka, Kan., and F. E. Lamphere, Southern Pacific, San Francisco. Judges: Same as in class A. First prize \$65 and a Hamilton standard railroad watch; second prize \$25. R. C. Bartley, of Philadelphia, for the receivers.

WIRELESS MEN'S CONTEST.—Sending twenty wireless messages, using a high frequency buzzer. Won by A. E. Gerhard of the Marconi Wireless Telegraph Company, Marshalls, Cal., over J. F. McKinnon, Federal Telegraph Company, Los Angeles. Time, twelve minutes, four seconds. Judges: R. B. Wolverton, U. S. radio inspector, San Francisco; Ford Greaves, radio engineer U. S. Government, San Francisco, and H. B. Segur, Marconi Wireless Telegraph Company, San Francisco. Prize to winner \$50.

PRESS CONTEST.—Class A. Sending 1,500 words, using Phillips' code. Won by T. S. Brickhouse, of E. F. Hutton and Company, San Francisco; time twenty-seven minutes, fifty-five seconds. A. G. Tebbs, International News Service, Los Angeles, second. Other entrants: J. I. Hilliard and H. C. Emrich, of E. F. Hutton and Company, and H. E. Barfield, of the Associated Press, San Francisco.

Judges: Guy Fisher, International News Service, San Francisco; G. R. Allen, division traffic chief Associated Press, San Francisco, and W. L. Bain, chief operator, United Press, San Francisco. First prize \$75; second prize \$25.

Class B. Receiving 1,500 words. Won by T. S. Brickhouse in thirty-one minutes; C. V. Barfield, second. Other entrants: A. G. Tebbs, H. E. Barfield, P. H. Joyner, H. C. Emrich, and P. Torre, of the Associated Press, San Francisco. First prize a No. 10 Remington typewriter, donated by the Remington Typewriter Company, and \$25. Judges: Same as class A.

COMMERCIAL MEN'S CONTEST.—Class A. Sending sixty commercial messages. Won by T. S. Brickhouse in twenty-eight minutes, twenty seconds. H. C. Emrich second in twenty-eight minutes, twenty-one and a half seconds. Other entrants: H. E. Barfield, J. I. Hilliard, A. J. Mackler, Postal Telegraph-Cable Company, San Francisco. Mr. Mackler was absent from the city and unable to compete. First prize \$75, second \$25. Judges: C. L. Lewis, superintendent Postal Telegraph-Cable Company, Los Angeles; V. V. Stevenson, division electrical engineer and division traffic superintendent, Postal Telegraph-Cable Company, and M. J. Wolinsky, Postal Telegraph-Cable Company, San Francisco.

Class B. Receiving sixty commercial messages. Won by H. E. Barfield, of the Associated Press, San Francisco, with C. V. Barfield second. Time twenty-eight minutes, forty-nine seconds. Other entrants: H. C. Emrich and P. H. Joyner. First prize \$60, second \$20.

RAILROAD MEN'S HAND VERSUS MACHINE SENDING CONTEST; SENDING FOR THIRTY MINUTES.—Won by Richard C. Bartley of the Pennsylvania Railroad, Philadelphia, sending forty-one and a half messages. R. H. Redmond of the Southern Pacific Railroad, Watsonville, Cal., second, sending forty and one-quarter messages. Prize to the winner \$50. Judges, same as in first event.

The Piersen transmitter, manufactured by Edwin H. Piersen of Topeka, Kan., handled forty-four and one-half railroad messages in the same time, beating the fastest sending record by 6.8 per cent. The machine was used in order to demonstrate its value.

COMMERCIAL MEN'S HAND VERSUS MACHINE SENDING; sending for thirty minutes. Won by C. V. Barfield, sending fifty-nine and one-half commercial messages in thirty minutes over H. E. Barfield. No other entrants. Prize to winner \$50. Judges: J. B. Coggins, manager Postal Telegraph-Cable Company, San Francisco; A. S. Ridgeway, Western Union Telegraph Company, Los Angeles, and M. J. Wolinsky, Postal Telegraph-Cable Company, San Francisco.

CHAMPIONSHIP EVENT.—Class A. Sending twenty commercial messages; ten railroad messages 500 words press (straight) and a certain amount of brokerage matter. Best time, made by Thomas S. Brickhouse in thirty-eight minutes, forty-nine and three-fifths seconds. H. C. Emrich second in thirty-nine minutes, twenty-seven seconds.

Class B. Receiving 1,000 words press coded,

twenty commercial messages, ten railroad messages and a certain amount of brokerage matter, sent by C. V. Barfield, using a Martin Vibroplex, in forty-four minutes, ten seconds. Thomas S. Brickhouse was declared the winner on points, having made the best time in the sending contest and his work on the receiving side being the equal of any of the other contestants. H. C. Emrich was declared second. Other entrants: H. E. Barfield, Associated Press, San Francisco; A. G. Tebbs, International News Service, Los Angeles, and A. E. Gerhard, Marconi Wireless Telegraph Company, Marshalls, Cal. Judges: W. L. Bain, United Press, San Francisco; C. W. Buthman, E. F. Hutton and Co., San Francisco; Wm. Ainsley, of E. F. Hutton and Company, San Jose, Cal.; Richard C. Bartley, Pennsylvania Railroad, Philadelphia; E. L. King, superintendent telegraph, Southern Pacific, San Francisco; C. H. Nichols, and M. J. Wolinsky, Postal Telegraph-Cable Co., San Francisco.

The idea of holding a telegraph tournament during the exposition originated with Mr. Elmer Cox, chief operator for the Postal Telegraph-Cable Company, San Francisco, and notwithstanding many discouragements and set backs, some arising from the conditions due to the war, he, with commendable persistence and determination, carried the enterprise to a successful termination.

While the success of the tournament was primarily due to Mr. Cox's efforts, much credit is also due to the other members of the committee.

Mr. F. G. Seymer, a former operator and now in the mercantile business in San Francisco, did a great deal of effective work toward making the tournament a success, and a vote of appreciation is due him for his aid and advice. While not officially on the committee he rendered invaluable service in the way of selecting and arranging the matter used in the various contests. Although now out of the service, Mr. Seymer's heart is still with the "boys."

T. S. Brickhouse, Winner of the Championship at the San Francisco Tournament.

Thomas S. Brickhouse was born in Kempsville, Va., July 30, 1884, the son of a Baptist minister. At the death of his mother in March, 1896, he was taken in charge by his uncle, James A. Egerton, then manager for the Western Union Telegraph Company in Raleigh, N. C., where his telegraph education was begun. In six months he was able to hold his own with the other beginners nearly always found around small offices. His youth precluded his taking a position as operator until May 1, 1898, when he was assigned to the task of sending an afternoon pony report at Raleigh. In 1900 his first appearance in fast company was signaled when the Associated Press operator at Raleigh was taken suddenly ill. Mr. Ernest W. Emery, then chief operator for the Associated Press at Washington, tried to persuade him to accept a position with the Associated Press, but his uncle mindful of the fact that he was but sixteen years of age, withheld his consent. From then on until November, 1902, Mr. Brickhouse continued as Western Union opera-

tor and Associated Press relief man at Raleigh. At this time he accepted a position with the Associated Press at Washington, and subsequently filled positions with the same company at various points throughout the Southern states. In the winter of 1904 Mr. Brickhouse accepted a position with the Associated Press in New York, where he remained until the following fall when he accepted a position in Wall Street. The lure of the press wires still held a fascination for him, and in the spring of



T. S. BRICKHOUSE

1906 he returned to the Associated Press at Washington.

Subsequent years found him in the employ of various press associations in the east and middle west.

In 1912, while in the employ of a broker in Chicago, Mr. Brickhouse had occasion to speak to a friend in Denver. Mr. R. E. Mulcahy, himself a former operator, and now the resident partner of E. F. Hutton and Company, in San Francisco, heard his sending and inquired who he was. Later when a vacancy occurred in the Hutton's San Francisco office, Mr. Mulcahy brought him to San Francisco, where he is at present employed.

Military Telegraphers' Reunion

The annual reunion of the Society of the United States Military Telegraph Corps will be held at the Broadway Central Hotel, New York, October 13 and 14. The business meeting will be held in the morning of October 13, and the afternoon will be spent in an electric stage drive to points of interest. In the evening there will be a banquet at the hotel. On October 14 the members will be free.

The secretary reports that the reunion will be very well attended. All military telegraphers in New York and vicinity will be present, and also many members of the Old Time Telegraphers and Historical Association, who are privileged to attend, and will be welcomed, particularly at the banquet on the evening of October 13. Those who expect to be present should send in their acceptances promptly to the secretary, Mr. David Homer Bates, 658 Broadway, New York.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



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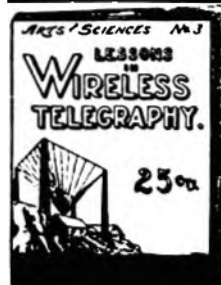
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maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

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BOOKS
for the
Experimenter
and
Student



Lessons in Wireless Telegraphy—A complete course in the design, theory and construction of wireless telegraphy, starting with magnetism and electricity and finished with wireless circuits and diagrams, laws, instruments, etc. The latest detectors, tuners, aerials and devices are described in detail. 80 pages. Price, postpaid, 25 Cents.

Amateur's Wireless Handy Book—A book every experimenter should own. Contains 80 pages of excellent information, including 2000 call letters of amateur, government, ship and commercial stations, 100 hook-ups and aerial designs, code charts, abbreviations, and pages to insert your own friends' call letters. The most complete and reliable data ever collected. Price, postpaid, 25 Cents.

Operation of Wireless Telegraph Apparatus—This book shows how to obtain the very highest efficiency from any station and how to comply with the law; how to tune, adjust detectors, spark gap, phones, etc. How to use test buzzers, variometers, condensers, transformers. How to tune various wave lengths and how to obtain sharp waves. Also describes how to make and use wave meters. If you want good results, here's your opportunity. Price, postpaid, 25 Cents.

Wireless Construction and Installation for Beginners—A practical handbook, giving detailed instructions for the design and construction of small wireless outfits. Pages also are devoted to theory and operation, code charts and hook-ups. A splendid book. 80 pages. Price, postpaid, 25 Cents.



For sale by
**Telegraph
and
Telephone
Age**
253 Broadway
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The American Telegraph- Typewriter Company,

81 PROSPECT STREET
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announces that prompt deliveries can now be made of their apparatus.

Of the old company, the name alone is retained;—the personnel of its organization has been entirely changed. The product is wholly different in design.

We have machines operating on the following types of circuits.

**Morse way-wires.
Differential duplex repeatered.
Bridged duplex.
Simplex telephone lines.
Private lines.**

The installation of our equipment in no case requires any change or rearrangement whatsoever in any single condition as found in the telegraph apparatus or wire to which it is to be connected. Multiplex circuits may be worked half printer and half Morse.

Correspondence Respectfully Solicited

A Significant Fact

Of the three Cables in the Trans-Isthmian Duct Line, one is a paper-lead telephone cable- the other two are **KERITE** (taped and braided)-the Panama Railroad's signal cable, and the Central and South American Telegraph Company's connection between its Atlantic and Pacific cables.

The severity of the conditions and the importance of the service, determined the selection of Kerite for these installations



KERITE INSULATED **COMPANY**
WIRE & CABLE
NEW YORK CHICAGO

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THE RAILROAD.

Telephone Dispatching.

BY JOS. J. GRAF, ENGINEER, TELEPHONE, TELEGRAPH AND WIRELESS, DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY, SCRANTON, PA.

Dispatchers using the telephone are much annoyed by the metallic sound of telegraph sounders which penetrates the way station transmitters, and they insist that the sounders be cut out or plugged during conversations.

This is entirely consistent. The telephone is usually on the same desk or table with the telegraph instruments. The tables act as an excellent sounding board, and the sounders crash over the line in such volume that the voice is scarcely audible.

This has in several ways developed annoying difficulties, one being a certain and sometimes serious element of delay in obtaining response to the bell because the operator invariably stops to plug or cut out the telegraph instruments before answering; and another is the inability to raise the way stations because the instruments are cut out. The latter condition has become so common that dispatchers are acting as exchanges for the message and city offices who call on them continuously to ring way stations and tell them to answer on telegraph wires. The most serious phase of the matter however develops when suddenly the telephone circuit fails. I have observed instances when the dispatcher, with the assistance of the message office and all other resources was unable to raise certain stations for hours and then only by having a train stop to instruct the operator to plug in.

In practically all of our way stations we employ jack boxes to permit one instrument being used on several lines. At first we had the familiar plug box, but on account of the difficulty experienced with inferior insulation in the jack and cut-outs, because the plugs were not kept clean, frequently becoming coated with grease by being handled by engineers or interlocking mechanics, we adopted the slide contact box manufactured by a well-known Chicago firm. This box is entirely satisfactory for the purpose for which it is intended and in trying to devise some way to overcome the sounder proposition, it occurred to me that the box as it was, represented an excellent solution. The box is constructed to accommodate six or eight lines; it is seldom that we require more than four. To connect with any line, it is only necessary to move a projecting lever to the notch marked with the line desired. I suggested to the manufacturer that by killing the first notch for telephone purposes and substituting a series of circuit breakers through which the sounders circuits could be closed, a remedy for the difficulty might be effected. A sample box has been provided and has been in service for some time and its operation is very satisfactory both to the dispatchers and operators. When the operator is not using the telephone, the lever of the jack box is in the dead notch and all sounders are

working, when he desires to use the telephone, regardless of line, he draws the lever to the line desired, and as soon as it leaves the dead notch, all sounders are automatically silenced.

MR. B. F. THOMPSON, telephone inspector, Baltimore and Ohio Railroad, Baltimore, Md., was a recent New York visitor.

CONFERENCE IN NEW YORK.—A conference between representatives of the plant and accounting departments of the Western Union Telegraph Company and the superintendents of telegraph of the New York Central Lines was held at 16 Dey street, New York, September 8 and 9. Matters pertaining to joint plant on the railways were discussed. Among those present were: E. C. Keenan, general superintendent of telegraph, New York Central Lines West, Chicago; and the following superintendents of telegraph, C. S. Rhoads, Cleveland, Cincinnati, Chicago and St. Louis, Indianapolis, Ind.; F. F. Riefel, New York Central, Cleveland, Ohio; A. B. Taylor, New York Central, New York; L. A. Lee, Pittsburgh and Lake Erie, Pittsburgh, Pa.; B. J. Schwendt, Toledo and Ohio Central, Columbus, Ohio; W. L. Connelly, Chicago, Indiana and Southern, Gibson, Ind., and J. J. Ross, Michigan Central, Detroit, Mich., and R. F. Finley, engineer, New York Central Lines, Chicago. The Western Union was represented by Messrs. R. E. Chetwood, plant engineer; M. C. Allen, division plant superintendent; J. J. Clunan, special agent; R. W. Whitehead, plant department, New York, and M. B. Wyrick, division plant superintendent, Chicago.

TO INCREASE DISPATCHING FACILITIES.—The Illinois Central and Atlanta and West Point Railroads are planning to install additional equipment to their telephone train dispatching facilities. The plans of the Illinois Central call for ten complete stations in addition to the fifty already in operation. The plans of the Atlanta and West Point Railroad call for thirteen complete stations, which will be added to the thirty now in operation. The equipment in both cases will be furnished by the Western Electric Company.

WOMEN RAILROAD TELEGRAPHERS IN PENNSYLVANIA.—Attorney-General Brown of Pennsylvania has given an opinion to the department of labor and industry to the effect that women may not be employed as railroad telegraphers and telephone operators more than six days a week, even though the work be very light. The language of the law on this point is very plain, he says.

REBUILDING TELEGRAPH LINE.—The Atchison, Topeka and Santa Fe Railroad is rebuilding its telegraph line between Topeka and Argentine, Kan. White cedar poles will be used. Mr. L. M. Jones is superintendent of telegraph with headquarters at Topeka.

WIRELESS TELEPHONES ON FREIGHT TRAINS.—The Lackawanna Railroad is experimenting with the wireless telephone with the idea of establishing communication between the caboose and the engines of long freight trains. Mr. L. B. Foley is superintendent of telegraph.

A Dream and a Rude Awakening.*

BY E. W. COLLINS, GENERAL SUPERINTENDENT, POSTAL
TELEGRAPH-CABLE COMPANY, CHICAGO, ILL.

When I was superintendent of the second district it was my custom to get acquainted with all employes in each office when making my inspection trips, and when I discovered a young man or woman of particularly pleasing address, personality and unusual keenness of intellect, I made an effort to learn all I could about them, their families, hopes, ambitions, and such information as I could secure was written in a little book I carried for that purpose. An additional notation was made that he or she would fit in nicely as manager, cashier, chief clerk or chief operator at such and such a place, and when a vacancy occurred I was rarely ever at a loss for proper material. The book was consulted, the strong and weak points of the various available persons were studied, and by the process of elimination a proper person was selected for the waiting position.

In one particular case, however, I had a prospective vacancy in a managerial position of importance, and none of the timber listed in my little book was entirely free from knots or defects of some sort, and after mentally scanning the entire territory it became quite evident that it would be necessary for me to invade some other district for the proper managerial talent. With this proposition in mind when en route from Cleveland to another city, I climbed into my berth and drifted into slumber. While in slumberland I saw in a branch manager in the city of my destination the very man I had been seeking for a month or more. He was in charge of the most important branch office in the city. He was a young man, perhaps twenty-seven years of age, tall and well built, eyes snappy and intellectual, face clean shaven, mouth rather large, but set off to advantage by red lips that spoke of rugged health, and with two rows of the most even and whitest teeth I ever saw. His dress left nothing to be desired. He was back of the counter, evidently inspecting the equipment, coaching and encouraging his force and getting ready for the day's business. He stepped up to the counter, bade me good morning, made some reference to the weather and business generally, passed to me some blanks, as if anticipating my requirements. I did not start to write, however, but instead mentally scanned the messengers, every one of whom was fully uniformed, hair combed, face and hands clean and shoes shined. The delivery clerk was performing his duties in a business-like manner, there being no unnecessary noise—no confusion—just business. The walls and ceiling of the office were scrupulously neat and clean, the clock was well located so that it could be seen by the two operators, the clerk and the customers without any unnecessary twisting of the neck or straining of the eyes. On the large wall space was a group of three appropriate pictures, one, that of the New York office building, with a good picture of president Mackay on one

side, and one of the general manager on the other.—all in line of vision and nicely grouped. The card, "The Employee is the Company," nicely framed, was on the wall near the counter gate, there were two chairs and a small writing desk equipped with clean blotters, ink stand and fresh pens. The windows were spotless, the signs, both inside and out, were shining, and the bicycle rack, carrying the customary 18x24 sign, showed evidence of having been recently touched up with black paint, which the manager stated was necessary to keep the frame from rust deterioration, and to paint it occasionally was little trouble, and cost less than ten cents for each painting.

After feasting my eyes on the refreshing and unusual appearance of the tangible property and office arrangement, I was invited to inspect the service, examine the books of accounts, records, etc., which I did with unbounded satisfaction. To my inquiry regarding a large manufacturing plant two blocks from the office, the manager informed me right off the reel that the plant was controlled by two brothers, who had recently moved from Cleveland; that he placed a call box for them before they began doing business, and their account had gradually increased until it amounted to \$200 per month.

Many other test questions were put to the manager, whose answers came promptly and intelligently, indicating that he was in close touch with everything in the territory covered by his office. He had a comparative record of the business received from every customer for a period of five years, and he made it a point to call on every one of them at least once a month, and many of them more frequently, even if he had no other excuse than to test the call box.

On his desk was the call circuit record, counter sheet and water copies of the previous day; and when I inquired what use he made of them he smilingly replied that he studied them as religiously as he did his Bible; they were his business barometers. He inspected the water copies to make sure that they were all perfect, typewriters in alignment and ribbons in good condition.

It was the best managed office I had seen anywhere, and after inquiring about the young manager's family, his hopes and ambitions, and learning that he was ready and willing to be called to a larger field, I congratulated him, and started for the main office, where I arranged for his transfer to the place I had been for so long endeavoring to fill.

Just in the happiest moment of my journey the hand of the Pullman porter reached into my berth and rudely shook me, at the same time saying: "This am yore station, boss. Yes, sah, it am shore six o'clock, and you all will have to hurry, sah, for this heah train pull out in fifteen minutes." I hastily dressed; and so vivid had been my dream that I hastened to the branch to ascertain what transformation had occurred since my last visit. It was still early in the morning, and I awaited the arrival of the ne plus ultra of all managerial timber, who, upon appearing, proved to be a diminutive chap wearing a sweater, smoking a cigarette, and having

*From Postal Telegraph.

a cap on the back of his head. Without looking at the signs, which were dirty; without glancing at his windows, on which some finger had traced in the dust, "Do you ever stop to consider that this window needs cleaning?" he opened his ill-smelling office, rolled up his sleeves, lit a fresh cigarette, went to the board, cut in his instruments, and soon thereafter the members of the force came in one by one, all being the very antithesis of what they were in my dream. President Mackay's picture was out of plumb, and the Postal building was leaning badly as if about to fall and crush him, while the general manager looked anything but dignified in the position in which he was placed. The floor was anything but immaculate, the messengers were not in uniform; one, attempting to emulate the example set by the manager, was smoking a cigarette; the delivery clerk was endeavoring to outdo the messengers in coarse conversation, while one of the operators was smoking. The manager could not, or did not, answer any of my test questions satisfactorily nor intelligently, and I felt it incumbent upon me to call him aside and tell him about my beautiful dream and rude awakening; how the pedestal upon which "balmy sleep" had placed him had been shattered by the rising sun. With the dream in mind, and reflecting upon existing office conditions, he was in the position of Robert W. Service, when in his efforts to devise a means whereby he could cremate the remains of his frozen chum, he came across a derelict jammed in the ice. "He looked at it, then he thought a bit." Then with quivering lips the manager said that it was he who had been dreaming, and through my talk he had been awakened to a realization of his weaknesses as a manager, attributing his failure to the fact that he had been placed in charge by the main office manager without proper coaching and left to work out his own salvation, making no complaints nor offering any helpful suggestions. I made no complaint, but the recital of my dream changed the whole outlook of the young manager, who immediately began cleaning house, and is now a successful and highly esteemed manager in another city, with several branch managers under his jurisdiction, all of whom have heard the dream story, and when for any reason laxity develops, all he has to do is to start the dream story.

Vest Pocket Electrical Dictionary.

Every operator and student should carry with him a copy of Weber's "Handy Electrical Dictionary" if he is anxious to make progress in his studies and avoid guesswork. 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. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Edition of Jones' Diagrams.

The popularity and value of Jones' Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students is evident from the great demand for the new edition of this unique book. This standard work has been revised and greatly enlarged and brought up to date, the new edition having been brought out December, 1914.

It is safe to state that so complete a work on practical telegraphy was never previously produced. It is authoritative, the assistance of the officials and engineers of the telegraph, wireless and other companies having been secured in the preparation of the descriptive matter and the illustrations.

Telegraph engineers, operators and students will find that a copy of this book will be indispensable. The descriptive matter is complete and covers the latest devices in practical use at the present time by the Western Union and the Postal Telegraph-Cable companies, including the new types of switchboards, the time service, the ticker system, the new duplexes and quadruplexes, wireless telegraphy, the selector, complete instruction for wire testing, etc., etc.

Some idea of the scope of the book may be obtained from the fact that there are sixty-four chapters, covering the following partial list of subjects.

Magnetism and electricity; the generator; electrical measurements; magnet windings; local batteries; sounders in multiple; self-induction of relays; Stearns duplex; polar duplex; gravity battery quadruplex; "bug catchers"; how to balance a quadruplex; care and handling of quadruplex apparatus; quadruplex faults and disturbances; Western Union old standard quadruplex; Morris duplex; bridge duplex; bridge quadruplex; loop switchboards; intermediate peg switchboards; new Western Union standard telephone jack switchboard; Skirrow Postal switchboard system; equipment of a modern telegraph office; arrangement of house and floor conductors; repeaters, showing diagrams of all makes; automatic duplex; office loop connections; combination set for duplex or single-line circuits; direct repeating relay for multiplex circuits; vibrating cable relay; the telephone; simultaneous telegraphy and telephony; wireless or radio-telegraphy; mercury vapor rectifier; polar relay; district call-box service; selector; Varley loop tests; conductivity measurement by the three-wire method; simple Morse circuit; storage battery and its application to telegraphy; time signal service; Postal Telegraph-Cable Company's improved multiplex apparatus; Postal high-potential leak duplex; Diehl bug-trap; wire testing; direct-current volt and ampere meters; specifications for installation and operation of the volt-mil-ammeter; specifications for installation and operation of the bridge testing set; automatic printing telegraph systems; protection of duplexes against alternating-current disturbances; ticker service; the telautograph, etc.

Many of the new illustrations were made expressly for this work from official drawings. The price of this book is \$2.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

INDUSTRIAL.

DISTANT CONTROL OF SWITCHES.—The General Railway Signal Company, Rochester, N. Y., has issued a bulletin descriptive of its system of distant control of switches in train operation.

THE WESTERN ELECTRIC COMPANY has moved into new and larger quarters in Portland, Ore. A brick and concrete building was erected and fitted out for its own use.

THE STENTOR ELECTRIC MANUFACTURING COMPANY, New York, has received an order for a five-position intercommunicating system from Sydney, Australia, and shipments of train dispatching equipment have recently made to Sydney and Melbourne, Australia.

A Telephone Book Worth Having.

"Electricity and Magnetism in Telephone Maintenance," by G. W. Cummings, is one of the most instructive books for telephone students. It gives a very thorough and correct explanation of electricity and magnetism as related to telephone practice, and when one has read and studied it he feels that he has learned a great deal about the fundamentals of the telephone, and that, easily, because the book is plainly written. It has chapters on current, pressure, resistance, magnetism, electromagnetic induction, capacity, batteries and circuit drawing. This work may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York. Price \$1.50.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Mr. Wm. E. Harvey, formerly manager at Hayward Place branch office, succeeds Mr. J. C. Shaw in the cable department at 109 State St., Mr. Arthur Cross being appointed manager at Hayward Place. Mr. Shaw has just retired from active service.

Mr. J. A. Elms, of the Boston repeater department, has returned from a week's vacation spent at Revere Beach.

Late night chief J. B. Colson has returned to duty after an illness of two months, much improved in health.

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.

Repeater chief M. C. Harrington is resting at Lake Sunapee, N. H.

Assistant chief operator O. H. Chambers is absent for a few days automobiling in the mountains.

Southern wire chief C. E. Perkins has returned from Bristol, R. I., where he has been resting.

Mr. S. B. Haig, division traffic superintendent, New York, spent September 1 and 2 in Boston on business.

NEW YORK WESTERN UNION.

Melville L. St. John, aged forty-seven years, a wire chief in the multiplex department, died in Brooklyn, August 13, from the effects of injuries received while taking athletic exercises.

Mr. T. M. Brennan, the dean of the office, is again at his desk after a two weeks' rest from the cares of his office.

Among the officials of the office who have returned from vacations are C. C. Lever and J. Morison.

Mr. R. C. Murray, assistant wire chief of the Philadelphia office, was among the recent New York visitors. Mr. Murray was accompanied by his wife.

PHILADELPHIA POSTAL.

Among recent visitors were J. H. Harrington, general traffic chief, Chicago, and S. L. Dickson, chief operator, Baltimore, Md.

Superintendent C. E. Bagley has been visiting Washington, Baltimore and Harrisburg on company business.

Manager J. H. Wilson accompanied by Mrs. Wilson, is enjoying a well-earned vacation at the seashore.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources	- - -	\$900,000
Surplus	- - -	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE
Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade
ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.25; Half Grade, 62c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$1.75; Half Grade, \$1.00. M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 19.

NEW YORK, OCTOBER 1, 1915.

Thirty-third Year.

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The Earth as a Conductor of Electricity.

One of the most important discoveries in the early development of the electric telegraph was that the earth might be used as part of a circuit for an electric current. This interesting fact was discovered by Professor K. A. Steinheil, of Munich, Bavaria, in 1837, while experimenting on the Nuremberg and Fuerther Railway in Germany, to ascertain if the rails could not be made use of as lines for the service of a telegraph. Professor Steinheil was at the time developing a system of telegraphy, and he immediately took advantage of his discovery and substituted the earth for one-half of the wire circuit, burying metal plates in the ground for the purpose and making the proper connections therewith.

The ground has never ceased to be an important consideration in connection with the telegraph and it is fortunate indeed that our earth can be so utilized. We thus obtain a half of a line built in the strongest manner possible, where wind and storms are powerless, free of cost. No one company or individual has ever dared to assume the exclusive right to use the earth as a return conductor; all are favored alike, and all use it, although, under present-day conditions, some use to the disadvantage of others, as we all know.

If the positive and negative poles of a battery are separately connected to the earth by means of wires and metal plates the current goes into the earth at the positive plate and comes out at the negative plate returning to the negative pole of the battery by way of the wire. The earth is being used in this way all the time by thousands of different interests all over the world.

How the earth performs the function of a wire for so many independent purposes, or even for one, is not known. The subject is frequently dismissed in discussion by the statement that the earth is a great reservoir of electricity, and that the current we put into it at one point can be taken out at a distant point. But this explanation is only in a degree satisfactory; there is still much to be explained. However, practical men know what the earth will do, and what may be expected of it under certain circumstances; why it does these things is a problem still to be solved.

The earth, like wire, possesses resistance. Its resistance varies greatly according to location, being relatively low between some points and relatively high between others. These variations are due principally to the nature of the soil itself. Some soil is damp or wet, and naturally electricity will be transferred through it with greater facility than through dry earth or sand. Again, some soils are impregnated with mineral substances, which decrease the resistance.

It is important to secure a good contact between the ground wire and the soil, and this is not always easy in dry localities. The resistance in ground wires may be reduced by enlarging the area of the ground plates, which gives a larger area of contact with the soil.

In cities and towns where there is water service the pipes are generally used as ground connections. Because of their great length under ground they provide a very large area of contact with the earth. These pipes are the equivalent of metal plates placed in the ground, but are, as a rule much better for practical purposes. Connection is made with them by wrapping the bare wire around the pipe several times, after taking the precaution of thoroughly cleaning and brightening the surfaces of both wire and pipe in order to secure good contact. Solder is then applied to the joint.

Wherever a good ground cannot be obtained by connecting to water pipes, or where more than one ground connection is desired it is modern practice to drive iron pipes into the ground to a depth of not less than six feet, leaving a few inches of pipe above the surface for connection with the wire. Where the soil around the pipe is not moist enough an excavation is made around the top of the pipe and partially filled with common rock salt. The excavation is then refilled with soil. The salt gradually dissolves and reduces the resistance of the surrounding earth. An improved form of ground connection, employing driven pipes, has lately been placed upon the market. It eliminates the annoyances incident to soldering wires to the pipes and insures a firm contact between them. The wire can easily be disconnected from the pipe for testing purposes.

The two most important requirements of a ground connection are low resistance and reliability.

Telegraph and Telephone Patents.

ISSUED SEPTEMBER 3.

1,151,546. Automatic Common-Battery Party-Line Telephone System. To T. G. Martin, Chicago, Ill.

1,151,547. Automatic Extension Telephone System. To T. G. Martin and F. Lubberger, Chicago, Ill.

1,151,683. Telephone System. To H. L. Harris, Elyria, Ohio.

1,151,867. Wireless-Controlled Steering Mechanism. To K. Dougan, Minneapolis, Minn.

1,152,018. Telegraph Circuit. To J. J. Ghegan, Newark, N. J.

1,152,059. Type-Printing Electric-Telegraph System. To W. S. Steljus, London, England.

1,152,336. Telephone Switch. To F. L. Myers, Dewitt, Ia.

ISSUED SEPTEMBER 7.

1,152,536. Telephone Receiver. To A. S. Moffat, Belmont, Mass.

1,152,627. Thermo Telephone or the Like. To B. Gwodz, Schoneiche, Germany.

1,152,632. Oscillating-Current Meter. To J. L. Hogan, jr., New York.

1,152,675. Electrical Oscillator. To F. K. Vreeland, Montclair, N. J.

1,152,877. Repeater for Telegraph Lines. To H. C. Cahill, Akron, Ohio.

1,153,029. Telephone Attachment. To J. H. W. Champion, Hermon, Cal.

ISSUED SEPTEMBER 14.

1,153,507. Combined Electroliner and Telephone Cover. To J. McIntosh, New York.

1,153,655. Telephone Cable. To K. W. Wagner, Berlin-Lankwitz, Germany.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on September 27:

American Telephone and Telegraph Co.	125½
Mackay Companies	76½
Mackay Companies, preferred	67½
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4¼
Western Union Telegraph Co.	77½

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more

shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock name the price at which purchases are to be made.]

PERSONAL.

MR. J. W. LAUGHLIN, of the United Fruit Company, with headquarters at Port Limon, Costa Rica, was a recent New York visitor. Mr. Laughlin is an old-time telegrapher and called on many of his former friends.

MR. B. B. ADAMS, associate editor of the *Railway Age Gazette*, New York, an old-time telegrapher, writes: "The article showing the autographs of New York operators in 1881 is the most interesting bit in the September 16 issue."

MR. Y. OKURA, Nihombashi, Tokyo, Japan, will hold an annual show of foreign periodicals in that city from the latter part of October through the month of November. This show will be coincident with the celebration of the Mikado's coronation.

DR. PETER COOPER HEWITT of New York, a member of the Naval Advisory Board, is the inventor of a telephone relay, an electric wave amplifier, and wireless telephone and telegraph apparatus. He is one of the leading scientific investigators of the times, and is well-known for his original research work.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

SUPERINTENDENT C. F. LEONARD is back at his desk after a vacation.

AMONG RECENT VISITORS at the executive offices were superintendent C. E. Bagley of Philadelphia, manager J. H. Wilson of Philadelphia and manager C. E. Diehl of Harrisburg, Pa.

MR. M. G. GRAVES, manager at Hammond, Ind., has been transferred to Pontiac, Mich., and W. H. Reese has been appointed in his place.

MR. GEORGE STEPHEN has been appointed manager of branch office at 21 North Seventh street, St. Louis, Mo., vice F. W. Hogue, resigned.

MR. F. W. MARTIN has been appointed manager at Monroe, Ind., vice E. G. Holland, resigned.

MR. A. W. RINEHART, manager, Pittsburgh, Pa., reports that in the past three years nineteen messengers have been promoted to the positions of operator, clerk, check clerk and lineman, and all of them are still in the service.

MR. G. F. FULLER, manager, Indianapolis, Ind., has resigned.

MR. W. H. KELLING, formerly of the Rockford, Ill., office has been appointed cashier, at Indianapolis, Ind.

MR. J. M. PRICE, manager, North American Telegraph Company, Waukesha, Wis., has resigned to accept a position in the purchasing department of the Waukesha Motor Company.

CUPID BUSY IN LOUISVILLE.—Five employees in the Louisville, Ky., office of this company have been married since July 14.

TELEPHONE SERVICE.—The necessary changes in the company's lines in the middle west to adapt them to telephone service are being made rapidly, and many stations in that territory will soon have long distance telephone service.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. G. W. E. ATKINS, vice-president, New York, has returned to his office after a two weeks' rest from official duties, during which time he took several automobile trips to points of interest.

MR. S. M. ENGLISH, general manager Gulf Division, Dallas, Tex., was a recent business visitor at headquarters.

MR. W. N. FASHBAUGH, general superintendent of traffic, New York, has returned from Denver, Col., where he spent a couple of weeks.

MR. F. W. LIENAU, assistant secretary of the company, New York, is taking a short rest.

MR. J. R. TERHUNE, district commercial manager, Nashville, Tenn., announces the following changes in his district: Mr. H. H. Kirkpatrick, manager at Chattanooga, Tenn., has resigned, and Mr. T. S. Bogan, manager at Lexington, has been transferred to Chattanooga; Mr. F. E. Frazier, manager at Bristol, Tenn., has been transferred to Lexington, and is succeeded by Mr. D. W. Munroe. Mr. W. B. Crane, of the division auditor's office, Atlanta, Ga., has been appointed traveling inspector of the fourth district, with headquarters at Nashville, Tenn. Independent offices have recently been opened at Sewanee, Tenn., Franklin, Tenn., and Franklin, Ky.

MR. FRANK R. VEALE, district commercial superintendent at Charlotte, N. C., is one of the youngest superintendents in the Western Union service. He was born in Norfolk, Va., in January, 1886. He entered the service of the Southern Bell Telephone and Telegraph Company, at Fort Monroe, Va., in August, 1899, going with the Western Union Telegraph Company as operator in January, 1902. He afterwards became manager of the Fort Monroe office, and later served as relief manager, wire chief, chief operator, division cable manager and assistant superintendent. He was appointed district commercial superintendent August 1 this year when the sixth district, over which he presides, was created, as announced in our August 1 issue.

MR. SIDNEY B. GIFFORD, former superintendent at Syracuse, N. Y., now retired, celebrated his seventy-ninth birthday September 9. He had been in the telegraph service for fifty-two years up to the time of his retirement in 1902.

MR. EVERETT HARVEY, of the plant engineer's staff, New York, was married recently to Miss Frances Hoffman, a former employe of the Buffalo, N. Y., office.

MR. PHILIP S. CAREY, for over twenty years manager at Providence, R. I., has been appointed special agent, with headquarters at the same point.

MISS M. O'BRIEN, for many years chief clerk in the office of the district commercial superintendent at Minneapolis, Minn., has been visiting in New York for several days. She called at the executive offices and received a very pleasant and cordial re-

ception from various officials some of whom she had never met but had known for many years through correspondence. Miss O'Brien has been in the service at Minneapolis since 1889 and for five years previous to that time in the district superintendent's office at St. Louis under Col. L. C. Baker. One of the highest officials of the company once made the statement that if Miss O'Brien was a man he would appoint her a superintendent. This is the best possible endorsement of this lady's ability and it was natural that the executive officials gave her a most cordial greeting.

MR. F. V. CLIFFORD, of the Boston, Mass., office has been appointed manager at Providence, R. I., vice P. S. Carey.

MR. O. M. SCREWS, of Dallas, Tex., has been appointed wire chief of the San Antonio, Tex., office of this company.

MISS M. A. FARRELL has returned to the Princeton, N. J., office as manager.

THADDEUS F. HOOPER, assistant cashier and money transfer clerk at New Orleans, La., was retired on pension September 1. He served in the military corps during the civil war.

E. S. RISON, aged sixty-seven years, an old-time New York operator, died August 30. Mr. Rison was a prominent member of the Western Union operating staff in the late seventies and in the eighties and was classed among the most skilful operators of those days. He was a quiet, unassuming gentleman and had many friends.

Western Union Bowling Association of New York.

At a meeting held on September 13 by representatives of the commercial general manager, accounting, plant, traffic, treasurer, metropolitan, legal and division auditor departments, The Western Union Bowling Association of New York was organized and the following officers elected to serve for the ensuing year: W. C. Merly, president; J. W. Connolly, vice-president; G. F. Butler, secretary; J. A. Dierks, treasurer. On September 27 a five-man tournament was opened at the Universal Bowling Academy, Brooklyn, N. Y., and games will be played every Monday night until May 1, 1916. Eighty players representing the departments named constitute the active membership of the organization and a large honorary membership roll is also being established, and includes the names of most of the local officials who are giving the enterprise their hearty support.

F. R. Stark, Assistant General Attorney, Western Union Telegraph Company.

Mr. Francis Raymond Stark, whose appointment as assistant general attorney of the Western Union Telegraph Company was announced in our September 16 issue, has been connected with the law department of that company as attorney, since May 9, 1899. He was born in New York, August 15, 1877.

THE CABLE.

NEW BUILDINGS AT BAY ROBERTS.—The Western Union Telegraph Company is erecting three additional dwelling houses at Bay Roberts, N. F., for the accommodation of the married men of its cable staff at that point.

CABLE CODES TO ITALY.—The codes authorized in cablegrams to Italy are A. B. C., fifth edition; Western Union; Lieber's; Bentley's (not including oil and mining supplements); Broomhall's (not including the rubber edition); Meyer's, thirty-ninth edition.

Rapid Cable Telegraphy and Intercontinental Telephony.

Mr. Béla Gáti, engineer-in-chief, post and telegraph, Budapest, Austria-Hungary, presented a paper before the Panama-Pacific convention of the American Institute of Electrical Engineers, September 17, entitled "Submarine Cable Rapid Telegraphy; Ocean and Intercontinental Telephony." Following are some of the main points of the paper: The speed of cable telegraphy is not satisfactory, the slow work making cabling very expensive. The direct-current impulses are lengthened on a long cable, because the cable vibrates with its own natural frequency, which is very low. The impulses of the direct current overflow, over a certain limit. Alternating currents do not suffer such overflowing. The oldest form of the alternating-current application is the inverse current. Another method for increasing the speed of the cabling is worked out by the various cable-relays; Gulstad's, Muirhead's, Heurtley's and S. G. Brown's relays are discussed. The attempts with the high-frequency system on ordinary cables are discussed. The theory of the resistance of the cable is given, and different cables are taken into the computation. The cable rapid telegraphy is solved by the inductive shunts with little resistance. The problem is nearly the same also for ocean telephony; the difference is, that for common telephony various frequencies must be transmitted without distortion. The ocean telephony with aid of high-frequency currents on improved cables is already a solved possibility.

For connecting continental circuits strong current microphones, more sensitive receivers, improved single-wire loaded circuits and telephone relays can be applied, which remove every limit of ocean and transcontinental telephony.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to September 27, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Cayenne-Salinas, August 20; Nagasaki-Tamsui, September 11.

CANADIAN NOTES.

MESSRS. JOHN McMILLAN, manager, Canadian Pacific Railway Company's Telegraph, Montreal, and **W. Marshall**, assistant manager, telegraphs, Western lines, Winnipeg, Man., recently made a tour of inspection in the west, going as far as Victoria, B. C.

MR. T. AHEARN, one of the leading citizens of Ottawa, Ont., and an old-time telegrapher, made the run from New York to Ottawa in an automobile recently in fifteen and a quarter hours. He brought a party of friends to New York, including two ladies. One of the ladies was suddenly called to return to Ottawa on account of the illness of a relative, but there being no train for Ottawa for several hours, Mr. Ahearn volunteered to take the lady back by automobile. He reached Ottawa about twelve hours before the first train from New York arrived. The distance between the two cities is 458 miles.

CANADIAN OPERATORS TO THE FRONT.—Many employes of the Canadian Pacific Railway Company's telegraph and the Great North Western Telegraph Company have recently obtained leaves of absence to enter over-sea service.

THE TELEPHONE.

MR. E. L. KENDRICK, of Cincinnati, Ohio, has been transferred to the Indianapolis, Ind., office of the American Telephone and Telegraph Company.

TELEPHONING IN FRENCH.—The French language is said to have been found much better adapted to long-distance telephoning than the English, and operators in Paris have succeeded in transmitting messages to London at the rate of 190 words a minute.

FOUND HIMSELF BY TELEPHONE.—A five-year old boy got lost in Philadelphia and a policeman took him to the City Hall. When asked if he knew where he lived he replied: "I know our telephone number and I guess I'd better call up mama." This was done and in a short time his mother had her baby in her arms.

Convention of Telephone Pioneers.

The fifth annual convention of the Telephone Pioneers of America was called to order in the Rose Room of the St. Francis Hotel, San Francisco, Cal., by vice-president T. D. Lockwood, at 10 a. m., September 21. There was a large attendance of pioneers and their families and friends.

At the morning session papers by Messrs. Henry W. Pope, former secretary of the Pioneers, and P. H. Hopkins, general manager of the Missouri and Kansas Telephone Company, Kansas City, Mo., were read by Mr. Lockwood.

The subject of Mr. Pope's paper was "A Retrospect of the Application of Electricity to Local Purposes Prior to the Telephone." He traced the development of various phases of local telegraphy,

intercommunicating and signaling service prior to the advent of the telephone:

He referred to the installation of telephones on the lines of the Holmes Burglar Alarm Company during the years 1877 and 1878. In 1877 a telephone was installed in the office of H. L. Roosevelt in New York. This is believed to have been the first telephone equipped with a hook device ever made and the first telephone installation in New York City. It led to the formation of the Roosevelt-Cheever Company which constructed a few lines and afterwards sold out to the Bell interests at approximately cost.

Much of the early success of the telephone, he said, was directly attributed to such district graduates as T. D. Lockwood, W. D. Sargent, John I. Sabin, G. F. Durant, John Cahill, W. E. Huntington, and many others who fill or have filled important positions in the telephone service.

The present officers of the association were re-elected, as follows: Theo N. Vail, president; T. D. Lockwood, A. S. Hibbard, T. B. Doolittle and G. E. McFarland, vice-presidents; R. H. Starrett, secretary, and G. D. Milne, treasurer.

In the evening a banquet was held in the Colonial Room of the St. Francis and on September 22 a trip was made to Mt. Tamalpais.

On September 23 the party assembled at the hotel and were escorted to the Panama-Pacific Exposition where there was a demonstration of trans-continental telephony. Mr. Theo. N. Vail, sent his greetings over the wire from his New York hotel as follows:

"Much as I regret not being able to be with you, it is largely compensated for by this demonstration of the efficiency and near-perfection of our telephone service.

"When voice can meet voice—spirit can meet spirit, regardless of distance or geographical boundaries, my voice and my spirit are with you today.

"That this could be so is due to the work of the Pioneers of the Bell System, first in the conception of the idea and then in carrying that idea to its practical completion.

"The world runs wild with ideas, some good, many bad, but the best is as nothing without it has behind it organization, co-ordination and co-operation, and that is what the Bell System is to the ideas of its individual members."

Messrs. U. N. Bethell and N. C. Kingsbury, vice-presidents of the American Telephone and Telegraph Company also spoke a few words from New York. In a later issue we will print a more complete account of the proceedings and entertainment.

The Automatic Switchboard Telephone System of Los Angeles, Cal.

Mr. W. Lee Campbell read a paper at the Panama-Pacific convention of the American Institute of Electrical Engineers, San Francisco, September 17, in which he described the present automatic switchboard telephone system in Los Angeles, Cal. The paper describes how the system, which began to give service with one manual switchboard

in the year 1902, has gradually been extended and transformed through several interesting stages of combined automatic and manual operation, until it now comprises fifteen automatic offices and a traffic distributor switchboard which serve a total of 60,000 subscribers' stations—the largest automatic switchboard system in the world.

The layout of central offices in the present plant is shown in contrast with the layout of offices in the Bell telephone plant of approximately the same size, operating in the same city.

The traffic distributor switchboard used for handling the outgoing calls from a large number of private branch exchange switchboards is the largest board of the kind in operation, includes thirty operators' positions and handles a heavy traffic. A general explanation is given of the equipment of the board, methods used in operating it and of the economies realized by means of it.

RADIO-TELEGRAPHY.

Transcontinental Wireless Telephony.

Secretary of the Navy Daniels announced the successful transmission on September 29 of wireless telephone messages from the United States naval radio station at Arlington, Va., to the naval radio station at Mare Island, Cal., a distance of about 2500 miles. After this demonstration Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, and Mr. U. N. Bethell, senior vice-president, at New York, talked with Mr. J. J. Carty, chief engineer of the company, at Mare Island. A regular wire circuit was used between New York and Arlington, where it was connected automatically with the wireless transmitter.

MR. P. C. RINGGOLD, secretary to superintendent T. M. Stevens, of the Marconi Wireless Telegraph Company of America, Baltimore, Md., has been transferred to New York as secretary to Mr. G. S. De Sousa, traffic manager.

INSTITUTE OF RADIO ENGINEERS.—The proceedings of the Institute of Radio Engineers, New York, dated September, have just been issued in pamphlet form.

STAVANGER STATION.—The construction of the trans-Atlantic radio telegraph station at Stavanger, Norway, which has been delayed by the war has been resumed by the Marconi Company. When completed Stavanger will exchange traffic with the Marconi station at Chatham, Mass.

SMALL PORTABLE WIRELESS OUTFIT.—Dr. H. Barringer Cox, of Bedford Hills, N. Y., has, it is stated, invented a wireless telegraph outfit which can be carried about and concealed on the person. He claims that it will find valuable use in the trenches at the seat of war. The antenna, for warfare use, consists of a wire run down one leg of the trousers and connected to a heel plate so as to secure a ground connection.

NAVY COMMERCIAL RADIO STATIONS.—The following naval coastal stations are now open to commercial business: Charleston, S. C.; St. Augustine, Pensacola and Key West, Fla.; Guantanamo

Bay, Cuba; San Juan, P. R.; Colon, Panama; Balboa, Isthmus Canal Zone; Tatoosh Island, Wash.; North Head, Wash.; Cape Blanco, Ore.; Eureka, Point Arguello and San Diego, Cal.; Guam; St. Paul, Pribilof Islands. Unalga, Dutch Harbor, Kodiak, Cordova and Sitka, Alaska; and Tutuila, Samoa. The ships of the navy are also open to commercial business for the convenience of the personnel on board and the public.

Marconi Company Acquires Poulsen Interests.

The *New York World* states that a London syndicate representing the Marconi wireless telegraph interests, has acquired the Poulsen wireless telegraph rights for Great Britain and in due course the Poulsen system will become a part of the Marconi organization.

The Poulsen system is a continuous wave system as distinguished from the spark system of the Marconi apparatus. It has long been recognized as one of the most efficient methods of transmitting wireless messages. The Poulsen has what is known as the "singing spark" which carries through interference in a remarkable manner. There has been much litigation abroad over what the Marconi Company claimed was infringement on its patents by the Poulsen Company. The Marconi tuning system has been used by the Poulsen Company for several years.

The Poulsen patents in the United States are controlled by the Federal Telegraph Company.

New Marconi Standard Radio Equipments.

A new type of commercial radio apparatus, the Marconi standard two-kilowatt 500-cycle panel set, the power being measured at the transformer primary terminals, has been designed by the Marconi Wireless Telegraph Company of America in order to meet the changing conditions in wireless.

The installation of the equipment is considerably simpler than any other type of set, all of the apparatus being mounted on the panel which occupies a minimum amount of space.

A noteworthy advantage of the new set is that its use makes more practical the transfer of operators from one vessel to another, changes which are frequently necessary.

The complete set consists of a transmitting and receiving apparatus and various switches and appliances for manipulating the equipment. The transmitter, which is of the panel type, has all of the regulating and manipulating appliances mounted on the front of the panel so that they are easily accessible. Means are provided so that three wave-lengths, 300 meters, 450 meters and 600 meters, can be transmitted, the change of wave-length being accomplished by throwing a switch to the desired position.

The quenched gap is cooled by an air blast delivered from the combined rotary gap and blower mounted on the end of the motor-generator.

The motor-generator is especially constructed to operate under conditions on shipboard. The motor will operate at full load with practically constant

speed on a voltage varying from 95 to 120. The generator is of the wound armature type, giving an open circuit voltage of approximately 350 and a working or load voltage of 140. The normal output of this machine is two kilowatts wattmeter measurement.

The transformer, which is of the closed core type, is enclosed in an iron case, the windings being completely immersed in a transformer oil. A protective spark gap is provided at the terminals of the secondary which permits a discharge to the case of the transformer when the potentials become excessive. The case of the transformer is grounded.

The aerial circuit consists of the antenna; the aerial inductance, which is varied by means of the handle on the front of the board; a loading inductance which permits contact to be made at any point; and another inductance called secondary. All of these elements are connected in series to the ground through the thermo junction of the radiation meter.

The receiving set is made up of a type 106 tuner with a crystal detector. The tuner consists essentially of a variable inductance which is placed in series with the antenna and the ground.

A one-half kilowatt set, which is similar in all essentials to the two kilowatt equipment, has also been designed by the Marconi Company. It is intended for use on smaller vessels and as an auxiliary set on large craft. As the generator, transformer and other appliances in the one-half kilowatt set are of such weight as to permit mounting on the panel frame work, the transmitting apparatus is made in a complete unit.

Over 100 coastwise steamers are now being equipped with the new two kilowatt panel sets.

COMMERCIAL RADIO SERVICE.—The United States Naval Radio Service has just issued a book of 216 pages on commercial radio traffic regulations. The book is intended as a manual for the information and guidance of all radio officers, electricians (radio), navy mail clerks and other authorized persons charged with the handling of commercial radio traffic. It is very complete and includes several tariff sheets, accounting forms and a map showing the location of the various naval radio stations. The price of this book is 50 cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

WIRELESS DETECTIVE.—In our issue for September 1 there was a brief reference to secret records made by Mr. Charles E. Appgar, of Westfield, N. J., of wireless communications between the Sayville, L. I., station and Germany, which led to the tightening of the censorship rules at that station. *The Wireless Age* for September prints a detailed account of this important work performed by Mr. Appgar for the government. Mr. Appgar, in a separate article, describes his apparatus and its operation. An interior view of his station and a diagram of the circuits are also shown.

MARCONI ENGLISH COMPANY.—The full report of the annual meeting of the English Marconi Company for the year ended December 31, 1914, is published in *The Wireless Age* for September.

CRYSTAL DETECTORS.—Since the coherer passed into the limbo of the obsolete, various forms of crystal detectors have been experimented with, and numerous forms are being made practical use of daily. But despite this the advent of crystal detectors and the fact that numerous investigations have been undertaken with regard to them, no clear theory has yet been formulated as to their precise action. The September issue of *The Wireless World* contains an important article in this direction, written by Bertram Hoyle under the title of "The Influence of Temperature and the Pressure on the Sensitivity of the Carborundum Crystal Detector." Mr. Hoyle is lucid in his method of description, unconventional in research and systematic in recording the results obtained.

CAPTAIN W. H. G. BULLARD, U. S. N., superintendent of the naval radio service is the subject of a biographical sketch in *The Wireless World* for September. A full page portrait of this gentleman forms the frontispiece.

THE DESTRUCTION of the German warship *Königsberg* is described in *The Wireless World* for September by the wireless operator of the "Trent," which was acting as a hospital ship at the time when the last of the German raiding cruisers was destroyed, in what was known in pre-war days as German East Africa. A couple of exceptionally interesting photographs depict typical views of river and village scenery in this part of the world.

Radio-Telegraphy.

Circular No. 1 on "Radiotelegraphy," revised May, 1915, by the chief signal officer of the U. S. Signal Corps, is one of the most practical publications ever issued on the subject. It has 128 pages and 88 illustrations. It covers the fundamental principles of wireless, circuits, apparatus, measurements, etc., all of which is made very clear. The price of this book is 40 cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Telegraph Athletes.

Much interest has been aroused among our readers by the articles which appeared in our August 16 and September 16 issues on the subject of athletics among New York telegraphers in 1881. The reproduction in our September 16 issue of the signatures of some of the participants in the games was most favorably received and many expressions of delight at seeing these names again after a lapse of so many years have been made.

Walking and running races are still favorite forms of amusement and exercise but new pastimes, in many respects better than the old, have come to the front. Golf is the most prominent of these, and it is becoming very popular with telegraph and telephone employees. Hundreds of these people indulge

to their heart's content on the public golf links in and around New York City.

We are frequently asked how individuals can best secure the privilege of indulging in this most healthful of all exercises. For their information we would state that it is only necessary to get a permit to play from the Commissioner of Parks. The cost of this permit which is good for twelve months is \$1.00. A good golf outfit can be secured at almost any price ranging from \$10.00 to \$15.00.

Reunion of the Society of the United States Military Telegraph Corps.

The reception committee, of which Mr. Charles A. Tinker is chairman, has arranged a programme of unusual interest, for the reunion of the Society of the United States Military Telegraph Corps which will be held at the Broadway Central Hotel, New York, October 13 and 14.

The following are some of the leading features of the programme:

Wednesday, October 13, 10:30 a. m.—Business meeting for members only.

2:30 p. m.—Stage ride for members and guests—Assemble at Broadway Central Hotel, 2 p. m.

6:30 p. m.—Banquet for members of the Society of the United States Military Telegraph Corps and Old Timers for men only. Five-minute speeches. Informal dress.

8:00 p. m.—Ladies reception. Light collation at 8:30 p. m.

9:30 p. m.—Exhibition of Civil War Scenes relating to the United States Military Telegraph Corps including war time and more recent pictures of prominent members of the corps.

Thursday.—Go as you please.

The exhibition of pictures on a screen after the banquet will include some rare historical documents, a few of which may be mentioned. For instance, on May 24, 1844, the first message sent over an electric wire was written by Annie Ellsworth, and consisted of the four words "What Hath God Wrought." The original of the tape on which this message was recorded is owned by Annie Ellsworth's daughter, Mrs. George Roswell Smith Inness, who has kindly consented to its use at the reunion and will herself be present on that occasion.

In 1846 Amos Kendall, postmaster general and vice-president of the Magnetic Telegraph Company, wrote to James D. Reid, appointing him superintendent of the Magnetic Company's line. Kendall's original autograph letter will appear on the screen.

Prof. Morse himself was the first government superintendent of telegraph. James D. Reid was the first commercial superintendent.

Mention might be made of a number of other historical telegraph documents but the secretary of the society prefers to keep them as a surprise to his comrades and guests at the banquet.

Acceptances have already been received from a number of officials from the Western Union, Postal and Marconi Wireless Telegraph companies, and in the order of nature it is unlikely that another occasion of equal interest to telegraphers can ever occur again.

Some of the Fundamental Laws and Effects of Electricity and Magnetism.

BY DONALD MCNICOL, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

Since the announcement of Ohm's law, in the year 1827, there have been noticed, from time to time, by scientists effects of the electric current and of magnetism, which in several instances have been regarded as of sufficient importance to warrant their generalization in the form of laws.

The purpose of this article is to explain, briefly, the more important of these not generally understood laws of electricity, including: Helmholtz's law, Lenz's law, Boyle's law, Poynting's law, the Peltier effect, the Seebeck effect, Kirchhoff's law, and Booscha's law.

HELMHOLTZ'S LAW.

It was discovered in the early days of electrical research that pulsatory currents of either polarity, or currents which alternate in polarity, do not have a value strictly in accordance with Ohm's law. Helmholtz, the great German physicist, interpreted Ohm's law in a form which takes into consideration the element of "time," and from this evolved a formula which gives the true current value in a circuit of any character at any given instant after an e.m.f. has been applied to it.

Where the interruptions in a direct-current circuit, or the alternations in an alternating-current circuit are less than 10 per second, a determination practically agreeing with Ohm's law is obtained; but if the time element is reduced or the value of L (inductance) increased, a point is soon reached where the simpler law would not give a true indication of the conditions obtaining in the circuit.

LENZ'S LAW.

In the year 1834, Lenz stated that "in all cases of electro-magnetic induction the induced currents have such a direction that their reaction tends to stop the motion which produces them." To understand what is meant by this, one has but to consider the case of a solenoid into the core space of which a bar magnet may be inserted and withdrawn at will. If the terminals of the solenoid be connected to a sufficiently sensitive galvanometer it may be observed that a momentary current flows through the winding of the solenoid while the magnet is being pushed into the coil, and that as the magnet is rapidly withdrawn a momentary current flows through the winding in the reverse direction to that which flowed when the magnet was inserted. The more rapidly the magnet is inserted and withdrawn the stronger will be the induced currents. When the magnet is inserted into the solenoid, the resulting induced current is in a direction which tends to magnetize the moving core (the permanent magnet) oppositely to that of its existing polarity. This current, therefore, is an inverse current, while the current induced by withdrawing the magnet is a direct current, tending to pull the magnet back into the coil.

This law has a quite general application in elec-

trical operations, and the example given is but one illustration of its effects.

BOYLE'S LAW.

While Boyle's law has not, directly, anything to do with electric circuits, being more often encountered in works dealing with pneumatics and gases; nevertheless, it is frequently referred to in connection with high-frequency electrical phenomena, and has especial significance in those operations employing partial vacua.

In its essence this law states that "the elasticity of the air is inversely proportional to its volume, that being inversely proportional to the pressure upon the air, both heat and pressure increasing the elasticity of a gas."

POYNTING'S LAW.

In deductions made from Maxwell's equations in 1883, professor Poynting concluded that "at any point in the magnetic field of conductors conveying currents the energy moves perpendicularly to the plane containing the lines of electric force and the lines of magnetic force, and the amount crossing a unit of area of this plane per second is equal to the product of the intensities of the two forces multiplied by the sine of the angle between them and divided by 12.5664."

This law has a very wide application in all problems relating to telephony, telegraphy, and electric power transmission.

THE SEEBECK EFFECT.

In the year 1822, Seebeck discovered that "if bars of two metals (bismuth and antimony) were soldered at their ends and the junctions brought to different temperatures, an electric current flowed round the circuit, flowing through the junction from bismuth to antimony." If the free ends of the two metals are connected in circuit with a sensitive galvanometer, it may be observed that the strength of current is proportional to the difference of temperature at the junction. Currents of electricity produced in this manner are commonly called thermo-electric currents, and the force producing them is called thermo-electromotive-force.

THE PELTIER EFFECT.

Peltier's discovery, made in 1834, has been stated in the following words: "If a current of electricity from a primary battery, or other source of direct-current, be sent through a junction of several metals, heat is absorbed at some junctions, and emitted at others; the emission and absorption being reversed by reversing the direction of the current; the quantities of these thermal actions being proportional to the current strength."

It is important not to confuse the phenomena of the Peltier effect with the ordinary heating of a metallic conductor offering resistance (the latter is sometimes called the Joule effect), as the cause of the heat in each case is quite different. An electric current passing through a thermo-couple in a direction from bismuth to antimony absorbs heat, thereby tending to lower the temperature of the junction; while, when the current flows in a direction from

antimony to bismuth the effect of the current is to produce heat, resulting in raising the temperature of the junction. It will be recalled by most students that the heating of a continuous metallic conductor takes place regardless of the direction of current through it, and that the heat produced is proportional to the square of the current flowing.

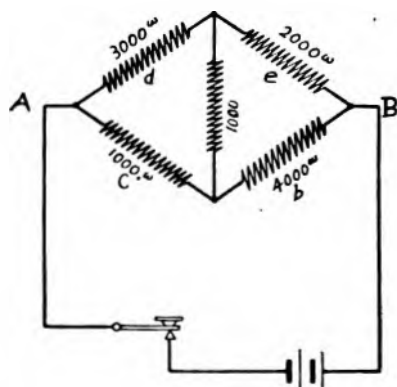
KIRCHOFF'S LAWS.

Kirchoff's laws are elaborations of the well-known laws of joint resistance, by the use of which it is possible to investigate the current in each branch of any net-work of linear conductors.

"In any branching net work of wires the algebraic sum of the currents in all the wires that meet in any point is zero."

"When there are several electromotive-forces acting at different points of a circuit, the total electromotive-force round the circuit is equal to the sum of the resistances of its separate parts multiplied each into the strength of the current that flows through it."

By means of algebraic equations, assigning arbitrary values to the potential of each junction, except two, at which stated potentials are applied from a source of e.m.f., all problems of divided circuits and networks may be solved by correctly interpreting these laws. For example, suppose it is desired to determine the resistance of the Wheatstone



DETERMINATION OF RESISTANCES BY WHEATSTONE BRIDGE.

bridge circuits between the points A and B (see illustration). In this problem, the application of the laws mentioned may be reduced to the formula:

$$R = \frac{e(b+c)(bd-ce)[c(b+e)+f(b+c)]}{b+e + (b+e)[f(b+c+d+e)+(b+e)(c+d)]}$$

which when reduced to figures, using the values shown in the various arms of the bridge, will give the answer: 2205.8823 ohms, or approximately

$$2205 \frac{15}{17} \text{ ohms.}$$

BOSSCHA'S LAWS.

Bosscha published the following corollaries from the laws of divided circuits, established by his predecessors. In general, they may be regarded as simplifications of Kirchoff's laws, and are stated as follows:

1st—If in any system of circuits containing any

electromotive-forces there is a conductor in which the current = 0, the currents in the remaining circuits are not altered, if the circuit of the conductor in question is taken away together with the electromotive-force which is contained in it.

2nd.—If the conductor in question contains no electromotive-force at all, then after it has been withdrawn we may connect the terminal points *m* and *n* directly with each other, without changing by this means the remaining currents. If, on the contrary, it contains an electromotive-force, the points can only be joined again by inserting between them the equivalent electromotive-force.

3rd.—In a system of linear conductors there are two wires, *a* and *b*, in which an electromotive-force in *a* produces no current at *b*, then the wire *a* may be divided without changing the intensity at *b*, and likewise, without altering the intensity at *a*, the wire *b* may be divided.

New Book.

ELECTRICAL MEASUREMENTS AND METER TESTING. By D. P. Moreton. 328 pages; 191 illustrations; pocket size. Published by Frederick J. Drake & Co., Chicago, Ill. Price, \$1.00.

This is an excellent book on the subject of measurements and testing and is written in plain English for the student and the practical man. The fundamental theory is clearly presented, practical applications are shown, and numerous examples and their solutions are given. The illustrations, which are all carefully explained, form one of the most valuable features of the book. A copious index makes quick reference possible and adds much to its usefulness.

The following list of chapters shows the scope of the book:

I, Direct-Current Circuit; II, Magnetism, Electromagnetism and Electromagnetic Induction; III, Inductance and Its Measurement; IV, Capacity and Its Measurement; V, Alternating-Current Circuit; VI, Calculation and Measurement of Resistance; VII, Measurement of Current and Pressure; VIII, Construction and Operation of Wattmeters; IX, Construction and Operation of Watt-Hour Meters; X, Methods of Distributing Energy; XI, Calibration of Galvanometers, Ammeters, Voltmeters and Wattmeters; XII, Testing Watt-Hour Meters; XIII, Special Indicating and Recording Instruments; XIV, Appendix; XV, Index.

The mathematics employed are of the simplest kind, and, taken all-in-all, this book should meet with an instant demand as it brings together a great deal of information that hitherto has been scattered throughout various technical publications.

For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

BROOKLYN POLYTECHNIC INSTITUTE, college of engineering, has issued a pamphlet describing the evening technical courses for 1915-16. The courses embrace engineering, chemistry, physics, mathematics, drawing, history, economics and languages.

The Telephone in the German Army.

How the telephone is used in the gathering of reports from the German armies is described by Oswald F. Schuette in an article sent from Berlin to the *Chicago Daily News*.

If need be, the front trench at Nieuport can communicate with the front trench at Libau, says the writer, which is a great feat for military telephony. The general staff at the great headquarters of the German army in northern France is in instant touch with every trench on the long line. So is the general staff in Berlin.

How many million feet of wire were used to establish this system, how many hundred thousand poles, how many hundred thousand instruments, how many lives were lost installing them under the enemy's fire will some day be most important statistics. To-day they are secret.

There are regiments after regiments of men who do nothing except maintain these important connections, which really constitute the nerves of the army. For it is when telephone wires are under fire that they are most important, for that means that a battle is raging. So the connections must be repaired instantly, no matter what the danger. The repairers must be out there in the open behind the trenches, even though their comrades who are doing the real fighting have the shelter of their "diggings."

The German official report is given to the press at Berlin between two and three o'clock every afternoon. But the making of all this report begins somewhere about four o'clock, in the morning. Here is about the way it can be observed, if you have been lucky enough to get permission to stay over night in the first line of trenches:

"R-r-r-r-ing," shouts the telephone bell.

"Here, regiment ———," replies the operator.

"Here second battalion; good morning, please give me the exact time," says the battalion operator at the other end. For the "exact time" is important, in synchronizing—pretty good military word—operations.

"Just 4:35. Say, where is your morning report?"

"Coming as soon as the adjutant arrives."

A minute later the adjutant must have arrived, for the bell is at it again, this time to announce:

"Here, Battalion Adjutant Blank. Morning report."

The regimental adjutant gets on the telephone and the battalion officer tells what has happened in his ranks in the preceding twenty-four hours.

Then come the reports from the other battalions. These at hand, the regimental adjutant hurriedly briefs them into one of about eight lines and calls up the brigade headquarters. There the telephone central is far more complicated, with a regulation long-distance exchange outfit equipped to handle the big and important business that falls upon it.

It does not take the brigade adjutant, a busy captain who seems to enjoy the work, very long to receive the bulletins from all regimental headquarters. He makes a new report out of this material. About six o'clock he calls up the division headquarters. By seven o'clock, the corps headquarters has re-

ceived this report, with those of the other divisions, and by eight o'clock these have been summarized and transmitted to the "Armee-Ober-Kommando," the army headquarters in supreme command of this part of the front.

By 8:30 all of the various "A. O. K." adjutants have sent their reports by telephone to the great headquarters, and woe to the subordinate adjutant somewhere in this long chain whose delay in getting in his report has caused a general delay. It is not always easy to make a careful report when the enemy has been tearing up things all around you and a battle is still undecided. But the ironclad organization asserts itself and delays are few.

At the great headquarters the general staff has now been informed exactly of the status of the army on the entire front from the North sea to the Alps. Presently a similar report will be sent over from the eastern army at work in Austria and Russia. Then the highest officers of the army make up the official report to be made public.

When all this information has been boiled down to the allotted 200 or 300 words, the resulting report is sent to the general staff at Berlin, both by telephone and telegraph. There it is turned over to the Wolff Telegraph bureau, the government's official telegraphic agency for transmission to the newspapers.

Measuring Resistance in Earth to Electric Current.

Oil in sand or earth causes it to have a very high resistance to the flow of an electrical current; that is, speaking technically, to have a very high resistivity. Certain valuable ores in the earth cause it to have a very low resistivity. For any particular specimen of earth the resistivity varies with the moisture content. The damage to pipe systems on account of electrolysis by the return current of street railway systems depends, among other things, upon the resistivity of the earth around the pipes and near the tracks. There are, therefore, many reasons why knowledge concerning the resistivity of certain very limited portions of the earth is desired.

In a recent publication of the Bureau of Standards, Department of Commerce, a method for measuring earth resistivity which is free from some of the faults of methods which have previously been used is described. The method is particularly adapted to those cases in which it is important that the measurement be made without disturbing the earth, as is necessary where a sample is taken into the laboratory for measurement, and in those cases where the mean resistivity of a fairly large portion of earth, extending to a considerable depth, is investigated.

MR. FRED. G. WYMAN, manager Postal Telegraph-Cable Company, Binghamton, N. Y., in re-mitting to cover his subscription for another year, writes: "Kindly accept my thanks and appreciation for renewing subscription to the AGE. I do not want to miss a single number, and assure you every issue is read with great interest."

Dynamos and Motors.*

BY JOHN F. SKIRROW, ASSOCIATE ELECTRICAL ENGINEER, POSTAL TELEGRAPH-CABLE COMPANY, NEW YORK.

(Copyrighted.)

In my former article on batteries various kinds of battery used in telegraph service were described and their application for the purpose of furnishing current to telegraph circuits was explained. Where the number of cells of battery required is small—say, less than fifty cells—this method of furnishing current to operate wires is usually the most economical one, unless there happens to be electric light current of suitable voltage and kind available. To be usable for direct connection to grounded telegraph circuits electric light current must itself be grounded—that is, one pole of the dynamo at the power station must be connected to earth and the current must be "direct," that is, flowing in the same direction continuously, similar to the current that comes from the battery. Where such current is available it is frequently used to supply local and main telegraph circuits, a resistance coil being placed in each circuit to cut down the volume of current to the desired amperage.

Where a large number of battery cells would be

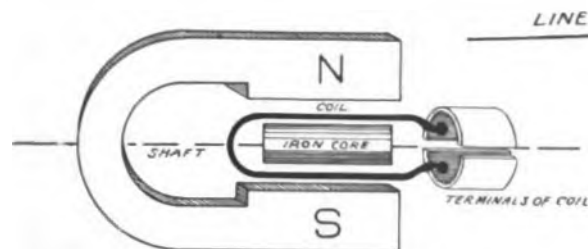


FIG. 1.—ILLUSTRATING PRINCIPLE OF COMMUTATION.

required to operate the telegraph circuits it is more economical to use electric light or power current, and if the kind and voltage of this current is not suitable for direct connection to telegraph circuits motor-dynamos, or, as they are usually called, "motor-generators," are used to transform the current to the desired voltage, etc.

Electric motors are machines which rotate a shaft when electric current is applied to the machine. Dynamos are machines which produce electric current when the shaft of the dynamo is rotated. These machines are practically the same in construction, so much so that in certain forms of them a motor can be used as a dynamo or vice versa. In practice, however, these machines are specially designed for the use to which they are put so as to obtain maximum efficiency.

In the article on magnetism and magnets we saw how it was possible to make an electromagnet by winding insulated wire upon a piece of soft iron and how this electromagnet attracted other pieces of iron. The opposite poles of magnets attract each other; thus the south pole of one magnet will attract the north pole of another magnet. The like

poles of magnets repel each other, so that the north pole of one magnet would repel the north pole of another magnet. If we should suspend an electromagnet in front of another electromagnet so that it was free to turn, the suspended magnet would swing around until its opposite pole approached the other magnet. If the iron core of the suspended magnet is withdrawn from the helix of wire surrounding it we find that the helix with the current flowing around it, even without the iron core, has the properties of a magnet, though not to such a marked degree. The helix will, however, respond to the action of the magnet and will turn itself, so that what would be the north pole of the core, if there were one in it, will turn towards the south pole of

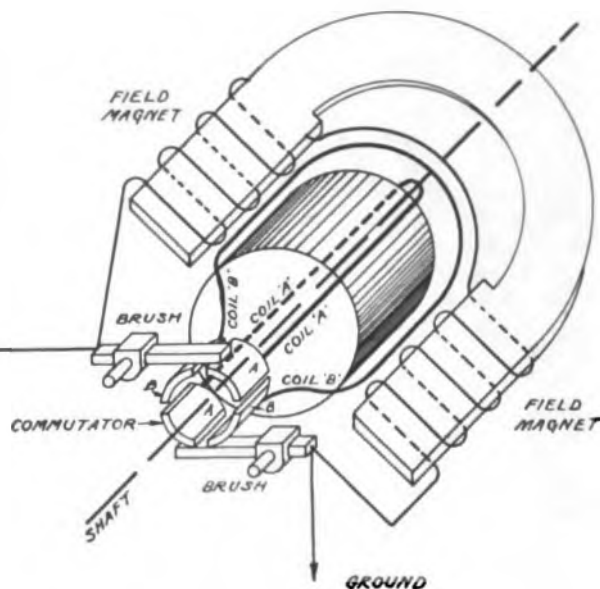


FIG. 2.—DIAGRAM SHOWING ELEMENTARY CONSTRUCTION.

the other magnet. This shows us how we can obtain motion of a coil of wire by the use of a magnet.

In an electric motor we wind a coil of wire around an iron core mounted on a shaft that is free to rotate. We connect the ends of the coil of wire to copper bars so arranged that they will rotate with the shaft. An electromagnet is arranged so that the coil of wire on the shaft is placed between its poles. If current from a battery or other source is now passed through the wire around the electromagnet and also through the wire around the core mounted on the shaft, the wire on the shaft will move, just as the helix in front of the magnet moved, and in so doing it will turn the shaft.

If a second coil of wire is mounted upon the same shaft, so that when the first coil moves the second coil comes into a position so that it will receive current and also be moved, the shaft will be rotated still further. It will readily be seen that by using a number of coils on the shaft, each one connecting to the current in turn, that the shaft will be made to rotate continuously.

The electromagnets used to attract the coils of wire are called the field magnets of a motor and the coils of wire mounted upon the rotating shaft are

* From Postal Telegraph.

known as the armature. The copper bars, to which the ends of the coils connect, are insulated from each other and form what is known as the commutator. The current used to operate the motor is connected to the wire of the field magnets and also to what are known as brushes. These brushes, made of carbon or copper, rest upon opposite sides of the commutator, so that one brush connects with one terminal bar of an armature coil and the other brush connects with the other terminal bar of the same armature coil at the same time. As the armature rotates the brushes connect with the terminals of each coil in turn, so that current is applied to each coil in rotation.

The shaft of the armature of a motor has a pulley or a gear placed upon it or is directly connected to other machinery for driving purposes.

As before stated, a dynamo is built like a motor, but in the case of a dynamo rotating the armature produces current which is picked up from the commutator by the brushes.

We have seen how passing a current through a wire around a piece of iron makes the iron a magnet so long as the current flows. If we take a magnet and insert and withdraw it from a spool of wire we find that a momentary current passes through the wire when the magnet is inserted and withdrawn. Similarly a coil of wire brought close to the pole of a magnet and then drawn away has a current "induced" in it. When the coil of wire in the armature of a dynamo is rotated so that it passes the poles of the field magnets of the dynamo a current passes through this armature coil and by the way of the commutator bars and brushes through whatever circuit may be connected to the brushes. As each coil of the armature is turned into position by the rotation of the armature a current is produced in it, and the continuous succession of currents, like drops of water from a faucet, form a stream of current in the circuit connected to the brushes.

The coils of the field magnets are connected to the brushes so that some of the current generated by the armature is used to produce magnetism in the field magnets.

This naturally raises the question as to how it is possible to make the dynamo generate current when the field magnets are not magnetized. The answer to this is that the kind of iron used in the field magnets does not lose all of its magnetism. There is a trace of it left and this is enough to produce weak currents, which build up just as soon as the armature begins to rotate.

The voltage produced by a dynamo will vary with the strength of the field magnets and with the number of turns in the armature coils and with the speed of rotation of the armature.

The smoothness of current produced depends largely upon the number of armature coils and the speed of rotation of the armature. The quantity of current produced is largely governed by the size of the wire used and the speed of rotation.

A motor generator is the combination of a motor and a dynamo. The shafts of the two machines are coupled together, so that when the motor shaft rotates it will turn the dynamo shaft. Thus, if the only current available is ungrounded 110 volts and

375 volts grounded is desired, the motor will be built to operate upon 110 volts and the dynamo to give out 375 volts. By the use of regulating rheostats, another name for boxes containing resistance coils which can be adjusted to give any resistance desired, the speed of the machines can be varied at will and their voltage thus controlled.

Items of General Interest.

Hundreds of telegraph poles are knocked down annually by automobiles. Mr. Henry Ford says that his make of machine climbs the poles without injuring them.

Telegraph operators have always been known as brass pounders. Now that printing telegraph systems are becoming numerous will they receive the cognomen of tape feeders?

A legislator recently in discussing some telegraph legislation remarked that the telegraph company admitted that it had "cheap" operators in all of its large offices. No doubt "chief" operators was meant.

We printed in the September 16 issue a cleverly written story by Mr. E. W. Collins, general superintendent of the Postal Telegraph-Cable Company of Chicago, under the title "A Rude Awakening." So far three managers have written us that they considered the story based on their respective offices. If this is true, we hope the managers will profit by the advice given.

It has always been the subject of a joke among telegraph jesters that a man is not qualified to hold the position of superintendent until he had invented a repeater. Recently an application from an expert for a position as superintendent stated that he was the inventor of two repeaters. Does this qualify him for the position?

A telegraph lineman was seen in the streets of New York recently with a pair of climbers strapped to his legs. He was evidently from the country and forgot to remove them. A number of boys followed the lineman, regarding him as a curiosity. One of the little fellows was heard to remark that the man was from the war and that the spurs were a new fangled scheme to spur the horses going into battle where the fighting was going on.

Since the third class postmasters in Indiana were urged at a recent convention to brush up their telegraphic knowledge and be prepared to take over the telegraph service when the government thinks the time is right for so doing, one of the postmasters wishes us to inform him when this momentous change will occur. He adds that "there are many shortcomings in the post office department and the telegraph will sort of tend to cover them up."

Any book published on telegraph, telephone, cable, radio and general electrical subjects can be obtained of TELEGRAPH AND TELEPHONE AGE, 253 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. Issues over one year old, 50 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, OCTOBER 1, 1915.

Reduction in Subscription Rates to Canada.

Beginning with the date of this issue of TELEGRAPH AND TELEPHONE AGE the charge for a subscription to any point in Canada will be the same as for the United States. The Canadian postage will be paid for by this publication, thus reducing the yearly subscription rate from \$2.50 to \$2.00, and the six-monthly rate from \$1.25 to \$1.00.

Gift-Making in England.

Sentiment among the telegraph profession in this country against promiscuous gift-making is somewhat pronounced, but in England, especially in London, it seems to be very much in fashion. A recent issue of a leading telegraph and telephone journal of London contains a list of changes in the London and provincial telephone staffs and it would appear that it must be a burdensome drain upon those remaining in harness to be called upon so frequently to contribute towards a fund to make a present to some retiring colleague. Those leaving the service are mostly women and the most frequent cause of retirement is marriage. All sorts of articles are presented to the departing ones, including initial signet rings, expanding watch bracelets, candlesticks, fish knives and forks, cutlery, coal cauldrons, etc. One man who was transferred from one town to another was the happy recipient of a silver wristlet watch and pipe.

Responsibility of Managers.

When a man is appointed manager of a telegraph office, large or small, he enters upon a duty that is fraught with possibilities. He becomes the representative of his company and stands between it and the public. As agent he has a definite policy to pursue. He is guided altogether by the company's rules, and would meet with few obstacles if the public were always reasonable, but all members of the community unfortunately are not. It is the unreasonable class that makes most of the trouble and to appease them is where the skill and ability of a manager is put to a test. It requires much patience and a perfect control of self to deal with an unreasonable person. It is part of a manager's duty to pour oil on the troubled waters while presenting the company's side with dignity and firmness.

On the other hand all managers have customers who are fair-minded and honest in their dealings and it is a pleasure to do business with them. If all men were alike and inclined to practice the golden rule the manager's lot would be a comparatively easy one, but where there is diversity of minds there is bound to be more or less friction. But under all circumstances the company depends upon the conciliatory attitude of its managers in dealing with the public.

Reunion of Military Telegraphers.

On the thirteenth and fourteenth day of this month the members of the Society of the United States Military Telegraph Corps will hold their annual reunion in New York, and those in attendance will be given an opportunity to view many places of interest in the city during their visit. In the secretary's call urging comrades to attend the reunion there is one passage that arrests the attention and starts one to reflecting. He says, "Not many more opportunities for our comrades to meet in reunion will occur, as the average age of the survivors of the United States Military Telegraph Corps approximates seventy-five years." Each and every one of these survivors of the great struggle helped to make a history that the world is proud of, and it will be a great pleasure to them to meet again and recount their war experiences. Last year's reunion was omitted on account of the unsettled conditions due to the war. This year the conditions are more favorable and it is hoped that there will be a large attendance.

THE INDUSTRIAL FINANCE CORPORATION, the anti-loanshark institution incorporated last year to aid in organizing companies throughout the United States to operate The Morris Plan of industrial loans and investments recently held, in New York, a two days' convention of the managers of such institutions. Delegates were present from many cities in the east, south and as far west as Denver, Col. Eleven companies have been organized by the corporation since June, 1914, and the twenty-five operating today have loaned over \$10,000,000 to more than 83,000 borrowers in sums averaging less than \$125.

Efficiency Engineering in the Telegraph Service.

Efficiency engineering in the telegraph service has become a very live subject during the past few years. It is one that concerns every person identified with the management or the operation of wires. Many telegraph managers make the subject a study and we invite all those who have any ideas bearing thereon to make their experiences and observations known through these columns for the benefit of their friends.

In the olden days the qualifications of a telegraph operator were attested to in a personal letter. Today his record of performance is the best recommendation that he could have. Efficiency engineering in this direction has made rapid progress. It has at the same time performed wonders in creating business and the managers are to be praised for the splendid work accomplished with their customers.

A chief operator must know what is the most important factor in the prompt transaction of the business of his office. Conditions in each large commercial center differ to a more or less extent and these conditions have to be met. It is the chief operator's ingenuity that makes actual conditions fit in with his method of handling the business most expeditiously and accurately. It is no small part that he plays in the daily commercial transactions of the nation. The public through the newspapers, depend upon him to provide adequate facilities for the transmission of press dispatches, and the business community expects, nay demands, prompt answers to its telegrams where answers are required. Explanations of shortcomings in the service do not avail in these days of progress. The individual must render the service or permit the appointment of someone who can do so on all occasions except, of course, when the elements have interposed insurmountable obstacles.

Managers and chief operators should always keep in close touch with the details of their respective departments and with each other. There are essentials in each day's work that must be faithfully carried out and it is important that each one in authority should keep the run of affairs in his department so that nothing may be overlooked that will facilitate the handling of business entrusted to the company. Through the daily papers each of the officials obtains a mental picture as to what has happened during the previous twenty-four hours. Many hints may be found in what has been read that will smooth the path of duty for the coming busy hours of the day. In these days system is studied and practiced and no one connected with a successful organization can escape its requirements if he would prosper. It is necessary in the management of all small and large business enterprises alike.

Many managers are natural diplomats and satisfactory adjusters of disputes. Other managers irritate their customers, and some of them have actually been known to provoke conditions which lead to legal proceedings. We know of one case where a law suit for damages amounting to several thousand dollars against his company was withdrawn when

the manager in a very diplomatic way stated that the suit would no doubt cause his dismissal from the service of the company as he was responsible for the acts of each of his operators, it being in his power to hire and discharge them.

How to canvass most effectually for telegraph business by those in charge of commercial departments is a problem that is not easy to solve. No two persons can be approached in the same manner. The canvasser has to study his man and learn just how to conduct and conclude a satisfactory interview with him.

(To be Continued)

The First Telegram.

Hidden away in the archives of the Tennessee Historical Society at Nashville, says the *Youth's Companion*, "is the account of the first actual message ever sent over a telegraph line. That despatch differs materially from the solemn message that passed over the wire between Washington and Baltimore in the year 1844. It illustrates well, however, the lack of seriousness with which Mr. Morse's invention was taken when he first offered it to the world.

According to the account preserved at Nashville, Robert L. Caruthers, of Lebanon, Tenn., was a member of congress in 1843, and a member of the committee to which was referred Mr. Morse's application for an appropriation to build a telegraph line from Washington to Baltimore. Most of the members of the committee looked upon Morse as a visionary and his proposal as impracticable.

On the last day of the session Morse went to the committee room and told them that he had stretched a wire to the top of the capitol and had a young man up there. If they would write a message he would send it up and the young man would bring them a copy of it. None of them believed it could be done. Judge Caruthers, however, pulled the envelope of a letter out of his pocket and wrote a message. Mr. Morse, who had his instrument with him, sat down and sent the message. In a few minutes the young man walked into the room with an exact copy of the message. The committee reported favorably and recommended the appropriation.

The bill passed just before the adjournment. Miss Annie Ellsworth, the daughter of the commissioner of patents, went to Mr. Morse's boarding house to inform him that the appropriation was made. He said to her, "My daughter, you shall send the first message that goes from Washington to Baltimore." That promise was fulfilled when she sent the famous message, "What hath God Wrought?"

Judge Caruthers was an ardent Whig, and in 1843 the Whigs were very angry with President Tyler, whom they accused of betraying the party. The message that Judge Caruthers sent from the committee room to the young man at the top of the capitol was, "Tyler deserves to be hanged."

Mr. W. B. Eddy of the New York Telephone Company, Albany, N. Y., writes: "It affords me great pleasure to enclose my check for renewal to TELEGRAPH AND TELEPHONE AGE which I rely upon to keep in touch with my many old friends."

A Suggestion for Improvement in Polar Relay Armatures.

BY JOSEPH A. ELMS, BOSTON, MASS.

How long should the tongue of a relay armature be in order that it shall perform its work most effectively? In a polarized relay, for instance, does the inch-and-a-half tongue of the "post-office" type possess any mechanical advantage over the much longer armature tongue of other types of polarized relays?

In view of the rapid introduction of automatic systems of telegraphy it would seem as if a matter of this importance ought to be settled definitely, and what is herein set forth is intended to present one aspect of the case which does not appear to be generally understood.

Beginning with an exaggerated adjustment, for the sake of illustration, will a two-inch tongue having a play of apparently one-eighth of an inch between its contact stops, complete that play more quickly than will a three-inch tongue between contact stops separated by an interval of apparently three-sixteenths of an inch, assuming in both cases the same height of magnet from the base of the instrument.

Ask this question of any number of telegraphers and nearly all of them will probably decide in favor of the shorter tongue, and it would surprise them to be told that both these tongues would arrive at their respective contact stops at exactly the same time, and that for the purpose of close adjustment, the longer tongue would have a mechanical advantage over the shorter one. The truth of this assertion is easily proved. If there be nothing to stop the movement of the tongues their free ends will rotate and describe a circle exactly like the free end of the minute hand of a clock. Now, a circle, regardless of its radius or diameter, measures exactly three hundred and sixty degrees, any part of which constitutes so many degrees, minutes or seconds of arc. It is therefore misleading to state the distance between the relay contact stops in terms of fractions of an inch; it should be given in degrees and minutes of arc.

A circle six inches in diameter has no more degrees of arc than a circle four inches in diameter. The space between XII on a clock dial and one minute past XII is exactly six degrees. To the eye the gap appears wider on the larger dial but the minute hand, whether two or three inches long, will cross that gap in exactly the same time. Hence, a relay tongue two inches long oscillating across a gap of one degree of arc would do its work no more quickly than would a three-inch tongue playing between stops separated likewise by one degree of arc, though one degree of arc on a circle of three inches radius be one-third longer measured linearly than on a circle of but two inches radius.

But whatever be the length of the tongue of a relay armature, the prime consideration in the adjustment thereof is or should be by how many minutes of arc must its movement be bound at the point where the force operating it takes effect, which is strongest at the centre of the face of the magnet.

usually about one inch above the arbor of the armature. It is at this point that the relay magnet does its work and where the amount of work it shall do should be prescribed. It will be difficult to produce a difference of ten minutes of arc on a circle of one inch radius but such a change of adjustment would look substantial on a circle of three inches radius and could easily be made. For mechanical reasons therefore a long relay tongue is preferable to a short one for easiness and closeness of adjustment, the thing to be borne in mind being that the tongue or pointer of a relay armature will always cross a degree of arc in a given time at any point of its length, whatever that length may be.

Theoretically, a pointer may be of any length; an inch or a foot will make no difference with a given force applied to it, provided the increase in length does not add to its weight. In a pointer oscillating in a horizontal plane the question of weight is a serious one. The factor of weight increases rapidly with the length of a pointer in such a position. But the factor of weight in its effect upon oscillation may be reduced to zero if the pointer be balanced and made to oscillate in a vertical plane. There are boulders in many parts of the country so accurately balanced that a child can rock them through an arc of several degrees though these stones actually weigh many tons.

It should appear that for convenient and accurate adjustment the tongue of a relay, more especially that of a polarized relay, should have its contact points not less than twice the distance of the centre of the actuating magnetism from the arbor of the armature, the range of oscillation at that point being just one-half of what it will be at the contact points, reckoned in fractions of an inch, but exactly the same reckoned in minutes of arc, and to neutralize the factor of weight it should always be made to oscillate in a vertical plane. It ought to improve the already excellent post-office polar relay to lay the barrel horizontally on its base and make its armature tongue not less than two inches long. An adjustment in seconds of arc would of course be impracticable with a pointer of that length, since one second of arc would be equivalent to only one seventeen thousandth of an inch at the end of a pointer one foot long. But precision in minutes of arc could easily be obtained with improved adjusting devices, where excessive rapidity of movement takes place as in the recently introduced automatic printing systems. Improvement along these lines is certainly desirable.

WHOLESALE WIRE THIEVERY.—A man arrested in Houston, Tex., charged with stealing copper wire from telegraph lines stated that he had a large force of men under him and was paying them \$5 per day for removing the wires. Two automobiles were employed to haul the wire to Houston, where it was disposed of.

No telegrapher can afford to be without **TELEGRAPH AND TELEPHONE AGE**. Subscription price, \$2.00 per year.

Construction and Repair of Telegraph Lines.

The plant department of a telegraph company does not refer to the operating department alone, but to the outside lines as well. All construction and maintenance comes under the head of plant. Most operators give little or no thought to the construction of the lines over which they work, and yet it is one of the most interesting studies they could take up.

Following are the specifications of the Postal Telegraph-Cable Company for the construction and repair of lines.

The minimum depth that poles shall be set beneath the surface of ordinary firm earth is as follows:

25-foot poles	5	feet
30-foot poles	5	feet
35-foot poles	5½	feet
40-foot poles	6	feet
45-foot poles	6	feet
50-foot poles	7	feet
55-foot poles	7	feet
60-foot poles	8	feet
65-foot poles	8	feet

When rock is encountered at the surface and is of good, firm nature, 25-foot and 30-foot poles should be set four feet deep; 35-foot poles four and a half feet; 40-foot and 45-foot poles, five feet; 50-foot and 55-foot poles six feet; 60-foot and 65-foot poles seven feet deep. Where rock is encountered from one to two feet below the surface, six inches should be added to the depth for poles ranging between 25 feet and 45 feet, and one foot for poles ranging from 50 feet to 65 feet; 25-foot poles may be set four and a half feet deep where frost does not exceed a depth of one foot. All holes must be dug large enough to permit the use of three tampers to one shovel in packing in the filling, after which, soil shall be banked around the pole at least one foot above the surface. Stone should be used in keying the butt of poles when possible. Where the ground is soft or water is encountered in sufficient quantities to prevent tamping, pole braces or anchors and guys should be used. When extraordinary conditions exist the superintendent of construction should be consulted before proceeding with the work.

Gains for crossarms must be cut just deep enough to make a flat surface on the face of the pole and should not exceed three-quarters of an inch in depth on poles that are eight inches or less in diameter at the top. One pair of crossarm braces should be used on each arm, the braces to be fastened to the back of the arm.

Poles must not be roofed or scarfed at the top except through villages and towns, or other improved localities, where it may be advisable in order to give them a more sightly appearance. The top of the first gain must be placed eight inches from the top of the pole and each additional gain should be cut two feet between centres. In all new work there should be one or more extra gains cut in each pole unless otherwise ordered. The holes for centre bolts must not be bored in these extra gains except

when so ordered by the superintendent of construction.

Where square sawed poles are used gains are not required as the flat surface furnishes the required bearing for the crossarms. Crossarms will be attached to poles by the use of a centre bolt with the nuts on the face of the arms. The bit for boring holes for centre bolts must be one-sixteenth of an inch larger than the bolts.

Inspectors of poles must see that the tops of poles are sawed off square before accepting them.

In places where the ground is uneven the line should be graded as far as practicable by using the longer poles in the low places and the shorter poles at high points, but in no case should a pole be set on a high point too short to clear the wires of the bottom gain twelve feet above the ground. Poles must be so located as to leave a free passageway to all bars and gateways, barn doors, and so forth.

A lightning rod of No. 8 iron wire must be securely attached to every fifth pole with one and a half-inch staples. The rod must extend from three inches above the top of the pole to the butt of the pole, and a hand coil of about six feet stapled to the bottom.

All office and cable poles will be equipped in the same manner except two No. 8 iron wires must be used. In all exposed places such as office poles or adjacent to private or schoolhouses, stores, etc., the lightning rod wire must be driven well into the pole and covered by a strip of board about three inches wide and eight feet long, to prevent danger of coming in contact with it during lightning storms.

At the first pole each side of an office pole, and at the first pole carrying open wires from a cable pole, crossarm lightning arresters must be installed. These arresters are made from No. 8 iron wire stapled along the crossarms. Connection to the ground is made via a lightning rod as described.

Cable, office and all painted poles should be equipped with standard pole steps unless otherwise ordered. The steps should be placed on the front and back of poles, straight with the curb line. The lowest step must not be less than eight feet from the curb, and the steps must be three feet apart alternately, making an eighteen inch rise.

The trench for six foot anchor rods should be dug five feet deep and five feet in length. At either side a pocket should be dug, and the log or deadman cut about one foot longer than the trench, so that both ends of the deadman are securely held by earth that has not been disturbed in digging the trench. A round log must not be used. Split a log in half and lay the flat side uppermost with a five-eighths inch hole bored through the centre. Pass the anchor rod through, place the washer on the bottom and turn the nut up the extreme length of the thread on the rod.

(To be Continued.)

Mr. H. J. Jeffs, superintendent of the Western Union Telegraph Company, San Francisco, Cal., in remitting to cover his subscription for another year, writes: "Your courtesy in renewing my subscription for TELEGRAPH AND TELEPHONE AGE meets with my hearty approval. Enclosed find two dollars to cover the same."

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

Why are the pole-changing instruments located at the home station, and on what kind of instruments are the signals received at the home station from the distant station?

If there is no battery at the distant station, how can signals be transmitted from that station?

What is the receiving instrument at the distant station—polar or neutral?

Why is a transmitter used in the place of a pole-changer at the home station?

What type of relay is used at the home station of a Morris duplex?

Why is the differential relay not used differentially?

What is the advantage of employing a two-coil neutral (differentially wound) relay on the Morris arrangement?

Why does the current traverse one coil of the home relay when the distant transmitter is closed and both coils when it is opened?

How is the Morris duplex balanced?

Why is the term "bridge" applied to the bridge duplex?

What relay is placed in the "bridge" wire?

If the electrical pressures at the two terminals of the "bridge" wire are unequal what is the effect upon the polar relay?

Upon what condition does the balance of a bridge duplex circuit depend?

If there is no difference of electrical pressure at the two terminals of the bridge is the bridge relay affected in any way?

Is the bridge duplex an efficient device? Why?

Can the pole changer of a bridge duplex be used for any other purpose than to change the polarity of the current?

Why is it superior to the walking beam type of pole changer?

Describe the construction of the polar relay.

How is the polar relay wound and how much resistance has it?

What kind of wire is used for the magnet windings?

When used for bridge duplex operation how are the two coils connected?

What is the effect of connecting the two coils in series?

How is the combination condenser formed?

How are the plates and dielectrics of the condenser units made up?

What is the total capacity of each group of condensers?

What is the total capacity of the two groups and what is the device used for in connection with duplex work?

What is the purpose of the use of the bridge coil, designated the "5 U"?

Why does it increase the incoming current that passes through the relay?

How is the 5 U coil constructed?

What is the character of the magnetic core employed in its construction?

What is the line resistance box and what is this resistance used for?

In what way is it useful on quadruplex circuits?

What is the double leak box and what are its uses?

What is a mil-ammeter used for?

How is a bridge duplex balanced?

How many methods are there of balancing? Name them and study them.

What are the means employed to call in an attendant at a duplex repeater or terminal station?

Describe the instrument used for the purpose?

(To be Continued.)

Origin of the Word "Tariff."

The word "tariff" which has such extensive use in the management of railroads, telegraph, telephone and express companies, and in the levying of import duties (in addition to its quadrennial resurrection by political parties in the United States) had an interesting and somewhat historical origin.

In the year 717 A.D. the Saracens under Tarik conquered what is now the kingdom of Spain, from the visigoths. The conquered territory was then ruled by emirs appointed by the caliphs of Damascus until about the year 1462 A.D. After the great battle of Las Navas de Toloso in the year 1212 A.D., between the Moors and the Christians of Castile there remained in the hands of the Moors only the provinces of Granada and Cordova, which at that time embraced a considerable amount of territory bordering on the Mediterranean Sea opposite Morocco in Africa.

On the southernmost point of this land, and close to the strait of Gibraltar stood the city of Tarifa which was the last stronghold the Moors disputed with the Christians. During the long period that the Moors held possession of the "Pillars of Hercules" (Gibraltar) it was from the city of Tarifa that they levied contributions from all vessels entering or leaving the Mediterranean. Hence the generic name.

Useful Book on Wireless.

"Operators' Wireless Telegraph and Telephone Hand-Book," by Victor H. Laughter, is a book that every wireless man should possess. It is a complete treatise on the construction and operation of the wireless telegraph and telephone, including the rules of naval stations, codes, abbreviations, etc., and is written in plain language and very thorough in its treatment of the subject. It has 172 pages and 86 illustrations. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway New York. Price, \$1.00 per copy.

MUNICIPAL ELECTRICIANS.

Fire Alarm Systems for Industrial Plants.

In his paper on "Fire Alarm Systems for Industrial Plants," read before the recent convention in Cincinnati, Ohio, of the International Association of Municipal Electricians, Mr. Albert H. Cross, of New York, pointed out the importance of providing fire-alarm signaling protection for large industrial plants. Many such plants, he said, are located where there is no public fire-alarm system, and in such properties the importance of supplementing their fire-fighting organizations with an adequate signaling system is generally appreciated.

"There are, however," he continued, "more great industrial properties that are situated within the protection of public fire departments and alarm systems. Many of them maintain well equipped fire brigades, and are using fire-alarm apparatus of a type and extent equal to that in large towns.

"It being a generally accepted proposition that no matter how complete and well organized a plant fire brigade may be, it should not be depended upon to perform immediate and efficient fire duty pending the arrival of a regularly organized municipal fire department.

"It is generally held to be true that the time lost between the discovery of a fire and the sounding of an alarm is one of the chief causes for large fire loss. The logical extension of the public alarm service, therefore, would be along lines which would enable the sending of an alarm to be practically simultaneous with the discovery of a fire.

"During the last few years, and as the result of disastrous fires causing serious loss of life, a number of states have passed laws requiring factory fire-alarm systems to be installed for the purpose of enabling employees to be efficiently drilled in leaving buildings hastily; and the wisdom of such legislation is being demonstrated in practice. It is held by many of those who make a specialty of fire protection engineering, that in such cases, where the protection of human life is the first consideration, all such so-called factory drill systems should be supplemented by or combined with means for calling the public fire department over the public fire-alarm system."

Auroral Disturbances in Australia.

Mr. Alex. Grant, assistant engineer for telegraphs, Melbourne, Australia, writes as follows:

"I read with some interest in your issue of July 1 a statement regarding auroral disturbances on telegraph wires. A disturbance of this nature occurred in Australia on the evening of June 17 and the following morning, when earth currents of values ranging up to thirty-five milliamperes were detected on various circuits. Contemporaneously brilliant aurora was reported from Hobart, Auckland and Wellington. Probably the phenomena occurred in America at a time corresponding with its appearance in Australia. In that event it is reasonable to assume that all parts of the world were similarly affected."

INDUSTRIAL.

THE MONMOUTH TELEPHONE COMPANY, Monmouth, Ill., will modify its present common battery equipment. The modifications call for additional equipment necessary to convert seven positions to automatic ringing and listening, automatic peg count and flashing recall with the emergency listening feature. The new equipment will be of the Western Electric type.

SPECIAL DIPLOMA FOR REMINGTON TYPEWRITER.—A special diploma of honor has been awarded to the Remington Typewriter Company, New York, by the Panama-Pacific International Exposition, San Francisco, "in recognition of forty years of sustained excellence in the development of the art of mechanical writing." The Remington Company was also awarded a grand prize, for "Excellence of product;" a gold medal of honor for "educational value;" and two gold medals for the Remington-Wahl adding and subtracting typewriter and typewriter supplies.

Church Telephone Equipment.

A new type of telephone apparatus known as "Church Telephone Equipment" has made its appearance on the market. It will be most useful in churches, lecture halls, and theatres where the acoustic properties are poor or where there is among their audience men and women whose hearing is not normal.

The equipment consists of a special telephone transmitter for mounting on the pulpit or platform and receivers to be used by those in the audience requiring them. The transmitter consists of three special microphone transmitter units in an ebony finished case. The receiver is the ordinary watch case type with a lorgnette handle provided with a special sliding extension to vary its length from four to seven inches. This receiver is convenient to use; it may be held to the ear for any length of time without fatigue.

Each receiver is provided with a cord and plug. A jack which is connected to the line leading to the transmitter is placed in the pews. When the plug attached to the receiver is inserted in the jack, the user is in a position to listen via telephone to everything that transpires on the pulpit or stage, no matter where he or she may be sitting.

The apparatus was developed by the Western Electric Company.

PROGRESSIVE TEXAS TELEGRAPHERS.—Texas telegraph people are no doubt entitled to the banner for heading the list of electrical students. A large percentage of the Texas operators are studying correspondence school lessons in telegraphy. The Texas boys have reached the conclusion that,

"The books on the shelves
Are useless unless read;
It is not what is in the library
But what is in the head."

as one of our correspondents so aptly states the case.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.

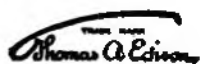


The Edison Primary Cells

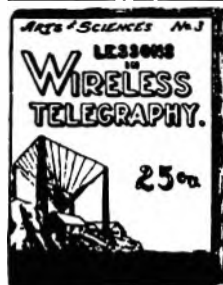
maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

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Amateur's Wireless Handy Book—A book every experimenter should own. Contains 80 pages of excellent information, including 200 call letters of amateur, government, ship and commercial stations, 100 hook-ups and aerial designs, code charts, abbreviations, and pages to insert your own friends' call letters. The most complete and reliable data ever collected. Price, postpaid, 25 Cents.

Operation of Wireless Telegraph Apparatus—This book shows how to obtain the very highest efficiency from any station and how to comply with the law; how to tune, adjust detectors, spark gap, phones, etc. How to use test buzzers, variometers, condensers, transformers. How to tune various wave lengths and how to obtain sharp waves. Also describes how to make and use wave meters. If you want good results, here's your opportunity. Price, postpaid, 25 Cents.

Wireless Construction and Installation for Beginners—A practical handbook, giving detailed instructions for the design and construction of small wireless outfits. Pages also are devoted to theory and operation, code charts and hook-ups. A splendid book; 85 pages. Price, postpaid, 25 Cents.



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THE RAILROAD.

TO ADOPT TELEPHONE TRAIN DISPATCHING.—The Ogden, Logan and Idaho Railway Company has placed an order with the Western Electric Company for one complete train dispatching system including thirty way station equipments, dispatcher's outfit and attendant telephone sets and material.

PROCEEDINGS OF ROCHESTER CONVENTION.—The printed proceedings of the convention of the Association of Railway Telegraph Superintendents, which was held at Rochester, N. Y., June 22 to 25, have been issued. The pamphlet contains 270 pages and is gotten up in the standard style of publications of this association. Besides the convention proceedings, much other pertinent information is published, including a list of members of all classes; constitution, by-laws and standing rules; standing and special committees, etc. Mr. P. W. Drew, secretary of the association is to be congratulated on the success of his work as an editor.

Suggested Rules for Telephone Train Dispatching.

1. The general rules as laid down by the American Railway Association governing the movement of trains by train-orders apply in all respects, and the same general methods will be observed as with the telegraph.

2. The train dispatcher's circuit is for the exclusive use of employees for train movements. It may be used in emergency for other business, but only when authorized by the dispatcher. The telephone must not be used by any one save an employee on duty, unless authorized by the train dispatcher.

3. The calling of offices will be done from the train dispatching office only, with the use of the selective calling apparatus. When the selector is operated, it will cause the bell in the desired station to ring, and in the controlled system to continue ringing until the push-button in the dispatcher's office is depressed.

4. The utmost care must be exercised by operators and dispatchers in transmitting orders and in reporting trains, not only to identify themselves and their offices but to avoid error in transmitting or receiving train orders. Take the safe course and run no risk.

5. (a) In transmitting or repeating train orders or messages, all numerals, including order number, train number, engine number, track number, and time must first be pronounced and then spelled, letter by letter, the receiving operator's record to show such numerals both written and spelled out.

(b) Station names must first be pronounced and then spelled out.

(c) In spelling numerals, multiples of ten shall be spelled as one word, thus: "T-h-i-r-t-y." Other figures shall be spelled by digit, thus: "Train 43 (f-o-u-r t-h-r-e-e)." "Engine 5998 (figures) (f-i-v-e n-i-n-e n-i-n-e e-i-g-h-t)." " "

(d) The cipher in numerals above ten may be designated by o in spelling out. Thus: "306 (t-h-r-e-e o s-i-x)." "1004 (o-n-e d-o-u-b-l-e o f-o-u-r)." " "

(e) The time numerals of more than one digit to be spelled out as ordinarily spoken. Thus: "11:30 (e-l-e-v-e-n t-h-i-r-t-y a. m.)" and "12:48 (t-w-e-l-v-e f-o-r-t-y e-i-g-h-t p. m.)." " "

(f) In spelling proper names where letters have similar phonetic construction, scale the alphabet to avoid error. Thus: "D, B-C-D," "T, R-S-T," "B, A-B," "P, N-O-P." " "

(g) In receiving, any word abbreviation of which is permitted by the rules, such as "engine" or "number" shall, when written, be pronounced in full.

(h) Any word about which there is the slightest question or misunderstanding shall be spelled out.

6. A station operator receiving the dispatcher's call will take down the receiver, cut in the transmitter and respond by giving the name of his station. This must be the only word used in answering calls. The use of the word "Hello" is forbidden. All communications and reports will be acknowledged by the word "Right." The usual significance of "O. K." and "Complete" on train orders is not, however changed by this system. The head receiver must be kept on the hook except when in actual use. With proper telephone apparatus there is no objection to station operators listening to what is being transmitted to other stations and thus becoming familiar with the methods of transacting railroad business.

7. Station operators calling the dispatcher will take the receiver off the hook and listen, before speaking. If the line is busy, wait until the conversation is finished. If the line is clear, announce your presence by saying "Dispatcher" and giving the name of your station. The dispatcher will acknowledge by saying "Right" or "Cut out." If the latter, comply immediately; if the former, proceed with the business in hand.

8. Employees are forbidden to make any change whatever in the telephone equipment, but will report to the dispatcher promptly, by telegraph, if the telephone is not available, any trouble. Changes in location or wiring will be made only on authority of the superintendent of telegraph.

Radio Telegraphy and Telephony for Railroads.*

BY JOHN L. HOGAN, JR.

Since the beginning of experiments in wireless telegraphy for railroad service by the Delaware, Lackawanna and Western Railroad, in 1913, there has been ample opportunity to prove the value of radio equipments for provision of an emergency telegraph service. When wires fail, because of sleet storms, washouts, wreck or other line-destroying occurrences, it is found not only convenient but extremely valuable to be able to communicate between the main dispatching points of the railroad by means of wireless. On several occasions the Delaware, Lackawanna and Western has averted extended tie-ups by such use of the radio equipments, and following these practical demonstrations installations have been made at Hoboken, Scranton,

* From *Electrical World*.

Binghamton and Buffalo. The Buffalo station at present has receiving apparatus only, pending completion of a new and permanent aerial structure. Hoboken is fitted with a five-kilowatt Marconi set and has a 400-foot tower supporting the antenna. At Scranton and Binghamton two-kilowatt Marconi sets are installed, with antennas hung with an average height of about 175 feet. It is intended that a 400-foot tower shall be erected at Buffalo, so as to permit reliable signaling in both directions between that point and Hoboken. Experiments made between the National Electric Signaling Company's plant at Brooklyn and the Delaware, Lackawanna and Western station in Buffalo have shown that ten kilowatts of sending power is ample to give good signals over the distance of about 400 miles, under average daylight conditions.

In addition to this work on radiotelegraphy as an emergency auxiliary to through wires, the Lackawanna has experimented to some extent on wireless signaling to and from moving trains. It has been found that where the traffic or other economic considerations involved warrant the expense of employing a Morse operator, installations of standard commercial radiotelegraph outfits aboard the trains will allow reliable communication over distances of about fifty miles. The fixed charge of operator's salary, however, may be the one element of cost which under some conditions will make radio equipment of trains impracticable. With this possibility in view the telegraph and telephone department of the Lackawanna has recently been experimenting with a radiotelephone equipment aboard one of the New York-Buffalo "limited" trains. A similar wireless telephone installation has been made at Binghamton, for two-way testing. Since a properly operating radiotelephone can be manipulated by any member of a train crew, by following simple directions and without need of special Morse training, complete success of the present experiments would result in the possibility of wireless signaling with moving trains at reduced operating cost.

If, however, the wireless telephone is to compete with the wireless telegraph for this work, the telephone must prove its reliability and efficiency. The telephone apparatus, to insure its adoption, must be simple in operation and must give good articulation and clear, loud speech at distances of about fifty miles without requiring the use of extremely delicate receiving instruments. In other words, the telephone which the railroads desire is one which will duplicate the already well-demonstrated performance of the wireless telegraph and in addition obviate the need of a Morse operator.

The Lackawanna's first experiments in radiotelephony have been made with instruments manufactured by Dr. Lee de Forest. The installation aboard the train comprises a complete transmitter, receiver and amplifier, while that at Binghamton is identical except for a change in the source of power and the omission of the amplifier. On the train steam is led to the baggage car directly behind the locomotive, through a special hose and fittings, and there fed to a Terry five horsepower turbine directly connected to a seventy-two-pole 3000-cycle-per-second

inductor alternator of the Radio Telephone and Telegraph Company. This combined unit is installed in a special compartment at the forward end of the baggage car. Field and armature circuits of the 3000-cycle alternator are carried to the next car in the rear, where the radio apparatus is installed. From these instruments wires run to ground, via the car wheels, and to an antenna consisting of three parallel wires run along the roofs of four adjacent cars and flexibly connected. In the original radiotelegraph work two wire antennas were used, but an increase of efficiency was later gained by adding the third wire along the central line of each car.

The stationary installation was first made at Scranton, and consists of substantially the same instruments as those used on the train. This outfit was later moved to Binghamton, where somewhat better results were secured through the use of an antenna more suited to the design of the instruments. The fixed transmitter secures its power from a similar 3000-cycle alternator, which, however, is motor-driven.

A small buzzer is arranged with push-button so that the carbon of the microphones may be agitated occasionally to prevent packing, and a short-circuiting switch is provided in order that an external "chopper" or antenna circuit interrupter may be used for telegraphic purposes.

The receiving apparatus comprises the usual two-circuit tuner (mounted in the base of the telephone cabinet) and an audion detector. On the train a three-step audion amplifier is interposed to magnify the telephone currents, but at Binghamton it is found inadvisable to use the increased sensitiveness thus obtainable, on account of the great responsiveness to static simultaneously produced.

Some exceptionally good results are stated to have been secured by the use of this apparatus. Receiving from Binghamton, the train operator has copied telephonic messages as far as Lounsbury (twenty-six miles) to the west and Foster (thirty-four miles) on the east. From Scranton east the train has exchanged telephonic messages as far as fifty miles. The train operator has reported passing each station in a zone of forty miles, for the records of the division dispatcher. Messages have been transmitted a number of times between the fixed stations at Scranton and Binghamton, sixty-three miles apart, and at night time the Binghamton sender has been heard by a station sixty-seven miles away, at New Berlin, N. Y.

The performance of the radiotelephone apparatus appears to vary somewhat from day to day. Some weeks ago the writer was invited by the Delaware, Lackawanna and Western to witness tests of the installations and it was not found possible to duplicate the best work previously accomplished. The operator at Scranton heard the westbound train from Cresco (twenty-seven miles). Approaching Binghamton, the fixed telephone was heard as far as New Milford (twenty miles), but the spark was too noisy for words other than "Hello" to be understood. At about fifteen miles distance such phrases as "I heard what you said" and "I have not got a newspaper here" could be deciphered. There was

no difficulty as to intensity of signals; whenever the voice was heard it was loud, but articulation was spoiled by the strong irregular spark noises or improper operation of the microphones.

In spite of irregularity of operation, however, the fact that radiotelephonic communication has been repeatedly obtained to and from moving trains over distances of twenty-five miles or more is well worthy of note. It remains for designers and builders of wireless-telephone instruments to supply apparatus which can be relied upon for consistently good service. Possibly the difficulties which have been developed by the tests on the Lackawanna are caused merely by lack of harmony in detail; if so, there should be little time required to eliminate them and to provide a uniformly excellent service. Perhaps, however, the troubles are not superficial but inherent in some element of the transmitter such as the microphone. In this event considerably more experimental work will be required before commercial service can be provided by telephone. Until such time as the railroads are convinced of the radiotelephone's ability to meet their requirements, however, as the Delaware, Lackawanna and Western points out, train communication over fairly long distances can always be obtained by the radiotelegraph, provided that a Morse operator is available.

Convention of Railway Signal Association.

The twentieth annual convention of the Railway Signal Association was held at Salt Lake City, Utah, September 14, 15 and 16, there being an attendance of 238. The report of the secretary-treasurer showed a membership of 1,257, and a very satisfactory financial condition.

Committee X submitted for acceptance as information data in regard to ordering lead stationary storage battery of types other than pure lead, also data covering typical cost of current for line charging storage battery.

In the discussion of the progress report of the special committee on electrical testing Mr. W. H. Elliott, of the New York Central Lines, gave the following causes of insulation failures on his road, as determined from a three-year record: Mice eating insulation, 50 per cent; broken conductors, 30 per cent; bad joints, 10; failure through mechanical injury, 5; direct failure of insulation, 5.

Mr. W. J. Eck, signal and electrical engineer, Southern Railway, Washington, D. C., was elected president, and Mr. C. C. Rosenberg, Bethlehem, Pa., secretary-treasurer.

Mackinac Island, Mich., was chosen as the place for the 1916 convention.

The Signal Appliance Association elected Mr. E. E. Hudson, of the Thomas A. Edison, Inc., chairman for the coming year, and Mr. J. Warren Young, of the Kerite Insulated Wire and Cable Company, New York, a member of the executive committee.

A telegram just received was quite wet from having been copied. The lady who received it innocently remarked to a friend that its condition indicated that it had passed through a rain storm on its way from George.

George M. Eitemiller.

Mr. Frank A. Stumm, an old-time and military telegrapher, who lives near Hackensack, N. J., and who retired from active business service several years ago, writes: "It is with much grief that I read of George M. Eitemiller's sad plight with rheumatism, an account of which appeared in TELEGRAPH AND TELEPHONE AGE, September 16. The item brings up such a flood of reminiscences that one cannot help drawing comparisons between the *esprit du corps* then and now. I have always had more regard for 'Eity' than any other brilliant telegrapher, for the reason that I could not keep up with his torrent of Morse. He was perfectly legible but he clipped the dots and dashes at both ends so incessantly that I had to cry for quarter. He was the only man who always was too fast for me, but he was such a courteous and modest knight that one could not feel chagrined by his comfortable gait on request."

MR. WALTER E. PERKINS a former old-time telegrapher, now and for many years a very popular comedian, was a recent caller at this office. The publisher of the paper who is an old personal friend of Mr. Perkins was not in at the time so he left this verse:

"Who Goes There?"

"Who Goes There?"

WALTER PERKINS,
I declare.

Push—Root—Boost, Bill, Boom!

Coming Soon!

Gee—Whiz—Rip, Bang, Tear!

Get in Line for

"WHO GOES THERE?"

OBITUARY.

THEODORE T. MOORE, chief of the telegraph division of the weather bureau, Washington, D. C., dropped dead of heart disease September 13.

F. H. W. HIGGINS, aged sixty-six years, chief engineer for the Exchange Telegraph Company, London, England, died September 1. He was at one time superintendent of telegraphs in the island of Mauritius. After returning home he developed type printing telegraphs, and made many improvements in telegraph apparatus and electrical fire alarms.

MATTHEW HAMILTON GRAY, aged sixty-one years, a well-known submarine cable engineer of London, England, died in that city recently. Among the cables he assisted in laying were those in Mexico, and the large system of the Central and South American Telegraph Company, besides the cables from England to Spain, and many others. He was formerly connected with the India Rubber Company, of Silvertown, and did a great deal of pioneer work in connection with the Pacific cable system.

Agents Wanted.—TELEGRAPH AND TELEPHONE AGE desires a few additional active agents to represent it. Those desiring to act as our agent will re-

ceive full information and instructions by addressing J. B. Taltavall, Publisher, 253 Broadway, New York.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 591 and 592 to meet the claims arising from the deaths of W. T. Leppert at Indianapolis, Ind.; E. Mesler at East Orange, N. J.; A. DeWitt at Avon, N. Y.; F. Jaynes at San Francisco, Cal.; R. E. Parr at Alameda, Cal.; N. E. Adams at Decatur, Ill.; J. Kuenzly at Colfax, Cal.; H. McDougall at Petrolia, Ont.; L. T. Bennett at Baltimore, Md.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Three octuplex installations now in operation with Chicago carry the bulk of the load of business exchanged with that city. These three installations mean the maintenance of twenty-four channels, twelve in each direction. The speed obtained is forty words per minute per channel.

A visitor from one of the interior towns, while passing through the multiplex department, seeing so much tape passing through the machines observed that the scene reminded him of a lot of snakes hurrying to get into their holes.

Mr. W. I. McFatter, of the repeater department of the Boston office of this company, was a recent visitor in this office.

Mr. A. M. Lewis, assistant chief, has returned to the office after a two weeks' visit in various cities in Canada and many points in the state of New York, where he made it his business to call on the managers and chief operators to make their personal acquaintance.

PHILADELPHIA POSTAL.

Among recent visitors were manager Scott H. Flint of Bridgeport, Conn.; assistant manager B. F. Ramsdell of Chicago and superintendent G. W. Ribble of Atlanta, Ga.

Chief operator E. W. Miller has returned refreshed from a vacation. E. W. Kauffmann has also returned from a prolonged visit to his home in Mifflintown, Pa.

The Postal Company was well represented at the Mardi Gras festival held Saturday, September 11. The affair was staged at the Philadelphia Athletic Association grounds under the auspices of The Philadelphia Electric Company.

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.

PITTSBURGH WESTERN UNION.

The following changes in superintendent A. C. Terry's district are announced:

Mr. G. R. Maddox has been promoted from operator at New Castle, Pa., to manager at Koppel, Pa.

Mr. George P. Hooley has been appointed manager of the newly opened office at Johnsonburg, Pa.

Miss Inez Dyke, telephone operator at Charleston, W. Va., and Mr. Glen A. Seafiler, night chief operator at the same place, were united in marriage on July 12.

CHICAGO WESTERN UNION.

Mr. Jeff W. Hayes, editor and publisher of the *American Telegrapher*, was recently in Chicago in the interest of his magazine. He met a number of old friends and operators of the Chicago office. Mr. Hayes left for New Orleans September 15, enroute for Portland, Ore., his home.

Guy Boyle, formerly an employe of the Chicago office, died August 11.

The regular meeting of the Testing and Regulating Efficiency Club was held September 21, Room 605, in the Western Union building, has been assigned permanently for the exclusive use of the club and will be suitably equipped.

ST. LOUIS WESTERN UNION.

Mr. J. A. McIntyre of this office, who has spent several weeks on the Pacific Coast visiting the two fairs and the numerous cities enroute has returned to his desk. He is loud in his praise of his treatment at the hands of the profession at all stopping places and at what he saw.

Mr. G. R. Alger, chief operator, is taking a well earned vacation, for a few weeks. Mr. F. P. Mullen, assistant chief, is acting as chief.

Mr. Robert L. Ludwig, supervisor in the printer department, is taking a week's rest.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashtoo G. Saylor
Secretary, . . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 60c. 30 to 35, Full Grade, \$1.25; Half Grade, 65c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade, \$2; Half Grade, \$1.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

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NEW YORK, OCTOBER 16, 1915.

Thirty-third Year.

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Development of the Telephone Transmitter.

One of the most interesting electrical inventions ever given to the world is the telephone, and almost every man, woman and child is familiar with its appearance at least. To the thoughtful man, and to the student, it is a marvelous instrument, and there is good reason to regard it, as many do, as the most wonderful of all electrical inventions.

The transmitter is only a part of what is known as a telephone. The complementary instrument—the receiver—is also a marvel of ingenuity and sensitiveness, but with this latter device the present article will not be concerned.

The history of the development of the transmitter is an extremely interesting one, and the most impressive thought in this connection is that the telephone was born and developed into the wonderful system of electrical communication as we know it to-day, within forty years—less than the life time of an individual. Dr. Alexander Graham Bell, the inventor, is still alive and in vigorous manhood, and he has been a living witness to all the great strides made in the marvelous progress in the art.

The subject of this article is the history and development of the transmitter, and a most interesting account is given in Kempster B. Miller's work, entitled "American Telephone Practice," from which we have made the following liberal extracts:

In order to transmit speech by electricity it is necessary to cause an undulatory or alternating current to flow in the circuit over which the transmission is to be effected and that the strength of this current must at all times be in exact accordance with the vibratory movements of the body producing the sound.

Prof. Bell's earliest transmitter was of the magneto type. It generated within itself the current which was transmitted over the line. In fact, it might be likened unto a dynamo, the energy for driving it being derived from the sound waves set up by the voice. This energy, however, was necessarily very small and the current correspondingly weak, and for this reason the instrument was not a practical form of transmitter, except for comparatively short lines.

Bell also used a liquid transmitter, in which a conducting fluid was held in a conducting vessel, forming one terminal of the circuit. The other terminal was a short, metallic needle carried on the diaphragm, and projecting slightly into the liquid, so that the area of contact between the liquid and the needle would be varied to better advantage by the vibration of the diaphragm than if the needle were immersed a greater distance in the liquid.

Elisha Gray devised a transmitter which, instead of generating the undulatory current itself, depended for its action on causing variation in the strength of the current by a separate source. He mounted on his vibrating diaphragm a metal needle extending into a fluid of low conductivity, such as water. The needle formed one terminal of the circuit, the other terminal being a metal pin extending up through the bottom of the containing vessel. The vibration of the diaphragm was supposed to cause changes in the resistance of the path through the fluid on account of the varying distance between the points of the electrodes and therefore corresponding changes in the strength of the current.

Bell's liquid transmitter depended on variation in the extent of immersion of the electrode, while Gray's instrument, owing to the great extent to which the pin was immersed, depended rather upon the variation of the length of the conducting path through the liquid.

In 1877 Emile Berliner patented a transmitter, depending on the principle that if the pressure between two conducting bodies forming part of an electric circuit be increased, the resistance of the path between them will be diminished, and conversely, if the pressure between them be decreased a corresponding increase in resistance will result.

Soon after this Edison devised an instrument, using carbon as the medium for varying the resistance of the circuit with changes of pressure. His first type of carbon transmitter consisted simply of a button of compressed plumbago bearing against a small platinum disc secured to the diaphragm. The plumbago button was held against the diaphragm by a spring, the tension of which could be adjusted by a thumb screw.

A form of Edison's transmitter, devised by George M. Phelps in 1878, depended for its operation upon the variation in pressure upon the electrodes by the vibrating diaphragm.

In 1878 professor D. B. Hughes made the important discovery that a loose contact between the electrodes is far preferable to a firm, strong contact. His first apparatus consisted of three wire nails, two of which formed the terminals of the circuit containing a battery and a receiving instrument. The circuit was completed by the third nail laid loosely across the other two. Any vibrations in the air in the vicinity carried variations in the intimacy of contact between the nails and corresponding variations in the resistance of the circuit. This was a very inefficient form of transmitter, but it demonstrated the principle of loose contact very cleverly. It was later found that carbon was by far the most desirable substance for electrodes in the loose contact transmitter. Hughes devised another form of transmitter and called it the microphone. It consisted of a small pencil of carbon pointed at each end and two blocks of carbon fastened to a diaphragm. These blocks were hollowed out in such a manner as to loosely hold between them the pointed carbon pencil. The two carbon blocks formed the terminals of the circuit. The instrument is of marvelous sensitiveness. The slightest noises in its vicinity, and even those incapable of being heard by the ear alone, produced surprising effects in the receiving instrument. This particular form of instrument is, in fact, too delicate for ordinary use, as any jar or loud noise will cause the electrodes to break contact and produce deafening noises in the receiver.

In 1881 Henry Hunnings devised a transmitter, wherein the variable resistance medium consisted of a mass of finely divided carbon granules held between two conducting plates. When the diaphragm is caused to vibrate by sound waves, it is brought into more or less intimate contact with the carbon granules and causes a varying pressure between them. The resistance to the current is thus varied, and the desired undulations of the current produced. This transmitter, therefore, instead of having a few points of variable contact has a multitude of them. It can carry a larger current without heating and at the same time produce greater changes in its resistance than the forms previously devised, and no ordinary sound can cause a total break between the electrodes. These and other advantages have caused this type in one form or another to largely displace all others. The form of telephone transmitter now in general use is a development of the Hunnings instrument, and is based on the same principle.

Telegraph and Telephone Patents.

ISSUED SEPTEMBER 21.

- 1,153,937. Transmitting Telegraph Key. To T. H. Mains, Dallas, Tex.
 1,154,069. Audiphone. To C. Soret, Havre, France.
 1,154,075. Telephone System. To J. A. Taggart, Rochester, N. Y.
 1,154,130. Telegraph or Telephone Relay. To C. Stille, Zehlendorf, Berlin, Germany.
 1,154,574. Repeater. To C. D. Lanning, Dorchester, Mass.

ISSUED SEPTEMBER 28.

- 1,154,628. Wireless Selective System and Apparatus. To J. H. Hammond, jr., Gloucester, Mass.
 1,154,700. Telephone Apparatus. To A. J. Kempfen, St. Paul, Minn.
 1,154,750. Amplifying Electrical Impulses. To R. A. Fessenden, Brant Rock, Mass.
 13,989 (reissue) Selective System of Telephony. To R. C. M. Hastings, Columbus, Ohio.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on October 11:

American Telephone and Telegraph Co.	124½
Mackay Companies	78-81
Mackay Companies, preferred	65-66
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4½
Western Union Telegraph Co.	78¾

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent. interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. J. R. MAYER, superintendent of telegraph and telephones. The Texas Company, Houston, Tex., was a New York business visitor October 5 and 6.

JOSEPH HENRY'S NAME HONORED.—The name of Joseph Henry, American scientist, who was intimately connected with the invention of the telegraph, was selected on September 7 to be placed in the Hall of Fame at the University of New York.

MISS CHRYSTINE WALTON JONES, of Brooklyn, has left the Western Union service in anticipation of her marriage, which will take place November 23. She was presented by her associates with two beautiful pieces of cut glass as a mark of affection and good will. Miss Jones will marry Mr. A. W. Carl, of New York.

MAUDE CLARK HOUGH, wife of Mr. I. D. Hough, division wire chief, Dallas, Tex., is the composer of a song, entitled "Once in a While," the music being by Laurence Bolton. It is an excellent piece for the parlor or concert, the theme being one of tenderness. The price is fifty cents per copy.

CONVENTION OF RAILWAY COMMISSIONERS.—A convention of the National Association of Railway Commissioners was held in San Francisco, Cal., October 12 to 16. Among the well-known public utility representatives present were Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, Mr. Samuel Insull, president of the Commonwealth Edison Company of Chicago, and many others.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. C. ADAMS, vice-president, returned from his vacation on October 7.

AMONG recent executive office visitors were G. H. Usher, general superintendent, Atlanta, Ga., and C. M. Baker, general superintendent of plant, Chicago, Ill.

MR. M. A. MACCONNELL, of the office of the vice-president and general manager, has returned from a vacation spent in the Adirondacks.

MR. B. F. RAMSDELL, assistant manager at Chicago, Ill., was a recent New York visitor.

NEW MANAGERS.—Managers have been appointed as follows: Mrs. H. K. Vennema at Menominee, Mich.; T. J. Lovett, Ashtabula, Ohio; B. G. Scott, Elizabeth, N. J.; Mrs. M. A. Walter, Princeton, N. J.; J. H. Livingston, Lexington, N. C.; C. T. Starling, Hendersonville, N. C.; George Dobbins, Stockton, Cal.; W. B. Ford, Annapolis, Md.

ENGLISH TELEGRAPH RATES.—Telegraph rates in Great Britain are to be raised fifty per cent by the British government, which owns and controls the telegraph lines in that country. This is one of the beautiful results of government ownership of telegraph lines. What would the public do to us if we raised American telegraph rates fifty per cent?—*Postal Telegraph.*

E. Cox, Chief Operator, San Francisco.

Mr. Elmer Cox, chief operator of the San Francisco office of the Postal Telegraph-Cable Company,



E. COX, SAN FRANCISCO, CAL.

to whose persistent energy the success of the recent telegraph tournament in that city was largely due, was born at Savannah, Mo., August 21, 1876, and begun his telegraph career September 1, 1892, as operator for the Union Pacific Railroad at Oakley, Kan. He was afterwards employed by the Postal Telegraph-Cable Company at Springfield, Ill., and later with the Western Union at Dallas, Tex. On October 7, 1903, he reentered the Postal service at Denver, Col., and in May the following year became night chief operator. April 1, 1905, he was appointed day assistant chief operator, and on December 17, 1906, was promoted to the position of chief operator. He was transferred to San Francisco as chief operator in April, 1910. Mr. Cox is a man of great force and high principles and what he undertakes to do he carries out, as was exemplified in the case of the San Francisco tournament. In the face of many discouragements he determined to make a success of the undertaking, if he had to do the work alone. To the outside Mr. Cox was not much in evidence, but he was the motive power, and managed the affair with commendable skill and tact.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. S. B. McMICHAEL, general manager, Dominion Messenger and Signal Company, Toronto, Ont., was a recent executive office visitor.

MR. W. J. LLOYD, general manager of the Mountain Division, Denver, Col., is the subject of an interesting sketch in the *Denver Post* of September 30 on the occasion of the close of his fiftieth year of service with the Western Union Company and its predecessors, on October 1. In all these years Mr. Lloyd has not lost a single day on account of illness, which is a remarkable record indeed. He is now sixty-two years of age and began his telegraph service as a messenger in Dubuque, Iowa, for the Illinois and Mississippi Telegraph Company when twelve years of age. He afterward became an operator. In the fifty years he says he has seen so many changes in methods of quick transmission of thought that it dizzies him to recall them. "There is nothing remaining of the telegraphy of the days when I started," he said, "except the dots and dashes—those good old Morse signals—and no one has ever been able to replace them." A picture of Mr. Lloyd, reproduced from a photograph, accompanies the article.

MR. F. E. OSBORNE, of the Los Angeles, Cal., office, has been appointed manager at Prescott, Ariz.

MR. J. E. SCOFIELD, Atlanta, Ga., who has been absent on sick leave for some months, has returned to duty and will be engaged in development work.

MR. GEORGE W. MORTON, manager for the Western Union Telegraph Company at Sidney, Ohio, for the past twenty-one years, has been placed on the pension roll. Mr. Morton has been with the Western Union Company for forty-one years as manager at various points.

Mr. J. S. C. MURPHY, district inspector at Norfolk, Va., has been appointed commercial agent at that point, vice G. R. Calvert, who has resumed his law studies.

GULF DIVISION CHANGES.—Mr. O. B. Hart, formerly manager at Muskogee, Okla., has been appointed manager at Little Rock, Ark., and is succeeded at Muskogee by Mr. O. J. Pickle. Mr. C. M. Thompson, wire chief at San Antonio, Tex., has been appointed chief operator at Shreveport, La.

OUT OF fifty multiplex circuits being installed twenty-two are in operation.

THE ELIZABETH, N. J., office was recently moved into new and up-to-date quarters in a building especially constructed for this company.

A BELT CONVEYOR system has been installed in the Denver, Col., office, and a similar system is now being put in at St. Louis, Mo. The work is being done under the supervision of Mr. R. K. Bonell, of the plant engineer's office, New York.

THE NEW HEADQUARTERS AT 195 BROADWAY.—The new building at the corner of Broadway and Dey street, which is the last section of the complete structure, is now entirely enclosed. The completed building will be one of the most imposing structures downtown. It is twenty-six stories high and will be ready for the occupancy of tenants April 1, 1916.

THE NEW BOSTON OFFICE.—The motor-generators used in the new office at Boston are operated by Edison current taken from the street mains at 220 volts. This voltage is transformed to others of different values, ranging from twenty-six for "local" use, to 320 for multiplex circuits. Twenty-four hundred wires run into the office. There are 500 clocks connected with the time service.

THE TELEGRAPH ENGINEERING CLUB has been organized in Atlanta, Ga., for the purpose of promoting study along engineering lines. The success of the undertaking is due to the energy and persistence of Mr. Rawson R. Stewart, of the plant department of the Western Union Telegraph Company. Weekly meetings will be held, and twice a month the club will meet for luncheon, on which occasions a ten-minute talk on organization, etc., will be given by some prominent person. The club's motto is: "It's not what we start but what we finish." Mr. R. R. Stewart is chairman and W. W. Boes, secretary.

THE CABLE.

MR. A. B. COURTEEN has been appointed manager of the Canso, N. S., office of the Western Union Telegraph Company, vice Mr. J. F. Fraser, retired.

THE COMMERCIAL CABLE COMPANY has completed laying its new underground cables from the site of its new building in St. John's, N. F., to its cable house at Cuckold Cove, N. F. The building is in the course of erection, and is expected to be completed before the end of the present year, when the operation of the company's cables will be transferred from Cuckold Cove to the city of St. John's.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to October 11, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914.

CANADIAN NOTES.

MR. G. W. PERRY, general manager, and C. E. Davies, traffic manager, Great North Western Telegraph Company, Toronto, Ont., are traveling through the West on company business.

MR. H. HULATT has been appointed manager of telegraphs of the Grand Trunk Railway System, Grand Trunk Pacific Railway, with headquarters at Montreal, Que., vice A. B. Smith resigned on account of sickness.

MR. P. G. GALBRAITH, inspector, Ontario Division, Canadian Pacific Railway Company's telegraph, London, Ont., was a recent New York visitor. He was accompanied by Mrs. Galbraith.

THE MONTREAL TELEGRAPH COMPANY paid a regular quarterly dividend of two per cent and the usual annual bonus of one per cent on October 15.

CONFERENCES.—A meeting of Toronto chiefs of the Great North Western Telegraph Company was held September 15. The heads of other departments were present and joined in the discussions. A meeting of branch office managers was held September 24.

Great North Western Annual Meeting.

The thirty-fourth annual general meeting of the shareholders of the Great North Western Telegraph Company was held at the head office in Toronto, Ont., September 29, when the following directors were elected: Z. A. Lash, K. C. Adam Brown, James Hedley, Hon. J. K. Kerr, K.C., Aemilius Jarvis, F. B. Hayes, D. D. Hanna, Geo. D. Perry, R. P. Ormsby.

The executive officials are: Z. A. Lash, president; Adam Brown, vice-president; Geo. D. Perry, general manager; A. C. McConnell, secretary and auditor; D. E. Henry, treasurer.

Generosity of Canadian Pacific Railway Operators.

Up to date over one hundred Canadian Pacific Railway telegraph operators have enlisted for overseas service, and those who cannot go are loyally making arrangements to care for those dependent on the operators who have responded so nobly to their country's call.

To provide regular and reasonable relief for the dependent families and to relieve the general patriotic fund the telegraphers have organized a fund of their own to which each operator contributes one day's pay per month so long as it

is necessary. The Canadian Pacific Railway officials have gladly assented to attend to the necessary accounting, remitting the amount deducted for each operator's wages to the treasurer of the fund for disbursement.

The wife of each telegrapher enlisted will receive \$20 per month, while those having children will receive larger amounts according to the number in the family.

TELEGRAPHS AND TELEPHONES ON GRAND TRUNK PACIFIC.—The most modern telephone train dispatching apparatus has been installed, and is in operation over the entire main line of the Grand Trunk Pacific Railway. An efficient commercial telegraph service over all the Grand Trunk Pacific lines from Fort William to Prince Rupert has been established, and this service is shortly to be extended to serve territory over the lines of the transcontinental railway eastward to Moncton, N. B. Mr. H. Hulatt, Montreal, Que., is manager of telegraphs.

H. Hulatt, Manager of Telegraphs, Grand Trunk Railway System and Grand Trunk Pacific Railway, Montreal.

Mr. Henry Hulatt, who has just been appointed manager of telegraphs, Grand Trunk Railway system and Grand Trunk Pacific Railway, with headquarters in Montreal, Que., vice Mr. A. B. Smith, resigned on account of ill health, was born in Lon-



H. HULATT.

don, England, February 15, 1883. Prior to coming to Canada he had considerable commercial and journalistic experience, his duties necessitating almost constant travel over all parts of the European continent.

On arriving in Canada, he was for a short time in the press gallery at Ottawa, subsequently journeying to Winnipeg, and there secured a position with the Canadian Northern Railway. In 1907 he severed his connection with that company to accept a position as private secretary to Mr. A. B. Smith, manager of telegraphs, Grand Trunk Pacific Railway, then stationed at Winnipeg. On April 1, 1910, he was appointed Mr. Smith's chief clerk, and re-

tained that position until January 15, 1913, when, on Mr. Smith's jurisdiction being extended to cover the Grand Trunk, as well as Grand Trunk Pacific lines, and his head office transferred to Montreal, Que., Mr. Hulatt was appointed commercial and traffic superintendent, and superintendent of time service of the lines west of Fort William, Ont., with head office at Winnipeg.

Mr. Hulatt was Mr. Smith's chief assistant in the construction, organization and operation of the Grand Trunk Pacific telegraph system. In 1907, when he first joined the company, only about 160 miles of pole line had been built, and 320 miles of wire erected, as against 3,186 miles of pole line, and 14,911 miles of wire at date.

Mr. Hulatt, in addition to making a close study of all that appertains to telegraph and telephone development, has also made a special study of time service matters. The watch inspection system in vogue on the Grand Trunk Pacific is admitted by experts to be one of the most efficient on the American continent.

In his new position Mr. Hulatt will have jurisdiction over all matters appertaining to telegraphs and telephones on the Grand Trunk Railway System and Grand Trunk Pacific Railway.

THE TELEPHONE.

MR. THEO. N. VAIL, president of the American Telephone and Telegraph Company, made an address before the meeting of the New York Telephone Society, October 5. Mr. Vail attended the convention of railroad commissioners of the United States and Canada in San Francisco, October 12. He made an address at the dinner, which was held in the evening of the same day.

MR. N. C. KINGSBURY, vice-president, American Telephone and Telegraph Company, New York, has returned to his office after a business trip to Denver, Col.

MR. J. J. CARTY, chief engineer, American Telephone and Telegraph Company, New York, has returned from San Francisco.

MR. J. D. NEWMAN, editor of the *Telephone Review*, New York, has been elected secretary of the Telephone Society of New York, succeeding Mr. R. S. Scarborough.

DIVIDEND.—The American Telephone and Telegraph Company paid a dividend of two dollars per share October 15.

THE GREAT EASTERN TELEPHONE COMPANY has applied to the Board of Estimate and Apportionment of New York for a franchise to do business in New York and provide telephone service at low rates. The company is a South Dakota organization.

Transcontinental Serenade by Telephone.

A chorus of nearly 5,000 employees of the New England Telephone and Telegraph Company, gathered in Mechanics' Hall, Boston, Mass., on September 27, sang "America" to an audience of several

thousand employes of the Pacific Telephone and Telegraph Company at the San Francisco Exposition. As soon as the applause at San Francisco subsided the Californians responded with the "Star Spangled Banner." The occasion was a special "demonstration night" arranged by the officials of the two companies, and a forty-piece orchestra on the Boston stage supplemented the voices of the great gathering. A special loud-speaking transmitter was used, and 2,500 telephone receivers, allowing one to every alternate chair, were installed to enable the audience to hear the interchange of greetings and song. Addresses were given by officers of each company.

RADIO-TELEGRAPHY.

MR. E. J. NALLY, vice-president and general manager, Marconi Wireless Telegraph Company of America, and his family are spending the winter at the Hotel Warrington, Madison avenue, New York.

MISS ANNA THOMSON BOTTOMLEY, daughter of Mr. John Bottomley, vice-president, Marconi Wireless Telegraph Company of America, New York, was married to Mr. Clement Burnap, at Southampton, L. I., October 7.

MR. R. A. WEAGANT has been appointed chief engineer of the Marconi Wireless Telegraph Company of America, vice Mr. F. M. Sammis, resigned.

MR. G. S. DE SOUSA, traffic manager, Marconi Wireless Telegraph Company of America, New York, is spending his vacation up the state.

MR. L. LEMON, of the Marconi Wireless Telegraph Company of America, New York, sailed on the steamer "Concho," October 6, for Galveston, Tex., on an inspection trip through the Gulf Division.

MR. C. W. LEBER, manager of the cost and sales department, Marconi Wireless Telegraph Company of America, New York, has resigned.

COCOS ISLAND WIRELESS STATION.—The wireless station at Cocos Island, which was destroyed by the German cruiser "Emden," is again in working order.

WIRELESS TO GUATEMALA.—On October 8 wireless messages were exchanged between the naval radio station at Arlington, Va., and the new government radio station erected by the Government of Guatemala at Guatemala City, via the naval radio station at Key West, Fla.

TRANSPACIFIC WIRELESS SERVICE.—In connection with the transpacific wireless service to be inaugurated with the Japanese government telegraph system in the near future by the Marconi Wireless Telegraph Company of America, the Marconi Company has transferred a squad of specially trained wireless operators from New York to its Pacific stations. The men assigned to this new service are Walter E. Wood, Wm. H. Parsby, E. N. Pickerill, R. P. Woodford, Michael Svendsen, J. L. Lynch and Wm. Vernon Moore. Mr. Pickerill and one or two of the others will go to the Hawaiian stations.

Institute of Radio Engineers.

The October meeting of The Institute of Radio Engineers was held at Columbia University, New York, October 6.

A paper on "The Training of the Radio Operator" was presented by Mr. M. E. Packman. Mr. Packman has had much experience in training operators for commercial service and his views on the proper methods of training operators in the technical, traffic and actual operating sides of their profession, and description of equipment actually used for this purpose, was given in detail.

Telegraph Oddities.

An inventor recently called at our office and told us the usual inventor's hard-luck story, which, when boiled down, amounts to about this. After his patents had been allowed and he realized that he had a good thing he brought it to the attention of Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company. Mr. Vail courteously referred the papers to Mr. Newcomb Carlton, president of the Western Union Telegraph Company. Mr. Carlton, in turn, referred the papers to Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company. Mr. Carty then turned the papers over to Mr. B. Gherardi, his assistant, who finally referred the documents with all the endorsements to the office boy. That was the end of a great patent so far as the patentee was concerned.

During the recent hurricane in the South a superintendent wanted to get into communication with one of his managers. He asked the chief operator if he could get the manager at the wire. The chief operator laconically replied that the manager was holding down the city and if he moved the town would blow away.

A Utah operator by the name of Gale had a son born to him and a friend suggested that he name the youngster North East Gale. The father wishes our opinion on the subject. This is a very good name if he shows a disposition to be stormy. If his temperament appears mild, we would suggest South West Gale.

An operator received a message, stating that the steel market was decidedly bullish. The receiving operator was, no doubt, an admirer of ex-president Roosevelt. When the customer received the telegram it read: "The steel market is decidedly bully."

A city council recently in discussing the nuisance of having bill posters utilize telegraph poles for displaying their placards reached the conclusion that if the telegraph company did not stop the nuisance the poles would be ordered down.

A telegrapher recently excused himself for only sending on an average one hundred messages per day on the ground that he believed in "Safety First."

"Auntie, did you ever get a proposal?"

"Once. A gentleman asked me over the telephone to marry him, but he had the wrong number."

Reminiscences of the Civil War.

Dr. William D. Gentry of Chicago, an old-time and military telegrapher, being a forty-niner of the telegraph, while in New York recently, gave the following account of his telegraph career:

I was raised at Hopkinsville, Ky., and was editor of one of the only two Union papers in the state, previous to the breaking out of the civil war, George D. Prentice being the editor of the *Louisville Journal*, one of the papers, and I editor of the *People's Press*, at Hopkinsville. I was bitterly opposed to the disruption of our government. I fought it manfully. Hopkinsville was the first place in the state visited by the confederates. About the fifteenth or twentieth of August, 1861, a general from Mississippi with a brigade of infantry of the Army of the South came into Hopkinsville and learning that I was one of the leading Union men in the town, warned me that I must leave and go towards the north before sun-up the next morning, or they would hang me to the telegraph post in front of my office. I learned how to operate the telegraph when I was a boy of twelve years of age, in 1848, on the first telegraph line that ran through southern Kentucky. It was the line running from St. Louis to Cairo, Paducah, Princeton, Hopkinsville, Clarksville, Nashville down to New Orleans. While I was editor of the paper I did the telegraphing and kept up with the procession of progress.

When ordered to leave I had but \$5.00 to my name. My two brothers whom I had taught the printing business were compositors in my printing office. The confederates came in and took possession of the property and I suppose used the type for bullets. I left with my sick wife, taking her on a wagon, leaving Hopkinsville at daybreak the next morning and went over to where my father was living at Guthrie, Tenn. There I left my family and taking my brother Haden went north, expecting to find employment in the telegraph office at Louisville. They did not have any place for me there but I secured transportation on an Ohio River boat to Cincinnati with the hope that I would find employment in the telegraph office there. On arrival at Cincinnati, and going to the telegraph office I found there were no vacancies, but the management secured transportation for me to Pittsburgh, and there is where I first met Andrew Carnegie, David McCargo, David Brooks and James D. Reid. There was no vacancy there, so I was furnished transportation and went to Philadelphia, where I obtained a position. I was a "sound" operator, having been the first who could read by sound that ever went West of the Mississippi.

I went to St. Louis in 1853, and, of course, visited the telegraph office to send a message to my father informing the "old folks at home" that I had arrived safely in St. Louis. When I got through I marked the message "DH Operator." I was only high enough in stature to reach the top of the counter and the receiver said: "What do you know about 'DH'?"

I said: "I am an operator and I can read by sound what those people are receiving in there behind the partition. I will write it down here to show you that I am an operator."

On hearing the ticking in the other room I read and wrote it down. It was a message that was being received in the operating room. I then asked the receiver to go in and find if any operator had received it. He went in and in a few minutes Robert Clowry, then a young man like myself, and another by the name of John Clowes, came out and looked at me in astonishment.

One of them said: "Did you receive this?" "Yes," I answered, "I am the boy." Robert Clowry said: "Come in here," and he and John Clowes gave me a royal time there for two or three days, taking me carriage riding to view the city of St. Louis. They finally secured me a position at Brunswick, Mo., where I was sent to open a new office on a new branch line that ran across and up the river from Boonville. The next year I was sent by Chas. Stebbins to St. Joseph where the main line running from St. Louis up to St. Joseph, Mo., was broken, the operator having absconded and went over the plains to California with the company's money, amounting to nearly \$1,000. Other operators went there but they could not get the wire into operation. They had tried and reported to Mr. Stebbins, the superintendent at Boonville, they could not find the trouble. He then selected me to go to St. Joseph to search out and repair the fault. On arriving at St. Joseph I found the battery and all the instruments and wires were intact. Then commencing with the wire from the outside of the office, I tested it through the city and found the current of electricity was strong but the circuit open beyond the city limits. I then hired a horse and buggy and with my climbers, pulleys, pliers and hatchet started out to test the wire every three or four miles.

After traveling, examining and testing over twelve miles of wire I got to the break. I found the trouble was a hook connection hidden in a tree-top. I made a proper connection and went back and reported to Charles Stebbins at Boonville. I was then requested to take charge of the office at St. Joseph and I did so.

Returning to my Pittsburgh reminiscences: I was told that my services were needed more urgently at Philadelphia, to which place I went. When I got there I found that the company would not allow the operators to receive by sound. It was the only way I could receive messages because I had forgotten how to receive on paper. I could not keep up by writing it from the paper but they forced me to do that with the result that I made more errors than were permissible and I was discharged on the third day by James Merrihew, who was then chief operator of the Philadelphia office. I left the office penniless and in much trouble. I had engaged a room at the hotel at Fourteenth and Market Streets near the railroad depot, at \$4.50 a week. When I was discharged Mr. Merrihew told me that I would not be paid for the three days' work on account of the many errors I made, as the company would have to make good to those who had lost by it. If the company had permitted me to receive the messages by sound I would have held my own. Bemoaning my sad lot I walked down Chestnut Street, toward the Delaware River. I remembered as I walked about Benjamin Franklin walking on the same pave-

ment similarly despondent when he first went to Philadelphia.

On reaching the river front I looked into the water and I said to myself, "In a few minutes I can end it all by jumping into that river." But I hesitated. All at once I was strengthened by the thought that when I was a boy my father and mother with me and my brother Horace and two little sisters were shipwrecked at Frankfort, Ky. The flat boat on which we were floating down the Kentucky River to go down the Ohio and Mississippi Rivers to Red River for the purpose of going to Texas and locating a claim (Texas had just been annexed to the United States and had been thrown open for settlement to the public by the government) was swamped, and wrecked. We lost everything we had and my father took some money that was given him by the people at Frankfort and took us by deck passage down the Kentucky to the Ohio and up the Mississippi to St. Louis and from there up to Louisiana, Mo., begging food on the way. At Louisiana we were put off one cold rainy April day in the evening just at dark without food; without anybody to help us and I with my brother and older sister was crying for something to eat. My father took us all into an old brick kiln where he made a fire. He then went to find his brother Thompson Gentry who he thought owned a mill three-quarters of a mile away. He found his brother had sold the mill a year previously and had moved to Palmyra, forty-five miles out from Louisiana. There we were without anything to eat, only having the clothes we had on, dirty, sleepy, and I was crying. I was only six and one-half years old. I finally cried myself to sleep but about midnight was awakened by my father speaking in a loud voice. On awaking I saw that he was on his knees and looking up talking to somebody up in the roof. I looked up there to see who he was talking to for I had no idea of there being a God. I had never ever heard any person pray. He asked God for help. I heard him say, "O God, Have Mercy on me, I am in great trouble here. I am put off the boat with my poor suffering family. We have no food, no money nor friends. Do help us." I cried myself to sleep again and early in the morning I was awakened by my father who was saying to mother: "Jane, Jane, I went down to get some driftwood to make a fire and there I found a barrel and I thought that it would make good kindling-wood and I reached in to get it, but it was so heavy I couldn't move it, and then waded in and rolled out a barrel of flour. God heard our prayer and rolled the flour off a steamer going up the river and brought it in to us and I am going to take it up to the grocery and sell it and get something to eat and go to work." He sold it for \$9.00. That morning we had a sumptuous breakfast. Father went and rented a room and went to work at his trade, tailor.

That showed me there at Philadelphia that I should go to God and ask him for help. While I was on my knees I felt that my prayer was answered. I started for the telegraph office to see if there was a letter from my family at Guthrie. On my way I met Mr. Merrihew. He saw me too at about the same time and called to me: "Oh! Gentry, I have found a position for you in the gov-

ernment service, and I want you now to take this money (\$10.00) and pay your bill at the hotel and get your things ready and I will send you to Baltimore to work under General Dix at Fort McHenry. I was rejoiced and made very happy. I hurried to the hotel, paid my bill, got my valise, rushed up to the depot on Chestnut Street and took the train for Baltimore, then took a boat and went out to Fort McHenry and appeared before General Dix. Before you can enter the service of the government you have to take an oath. As I thought then, I was enlisting in the government service as a soldier. I entered the government service there on September 4, 1861. I remained under the command of General Dix until he left. Then I was chosen to go to Relay House, south of Baltimore, and was sent there by the government and worked there nights, dispatching trains. I stayed there until the next spring. General McClellan had arranged to go with his army out from Washington to Bull Run and I was selected to go to Fort Jackson, located at the southern end of the Long Bridge over the Potomac, and given charge of the railroad as dispatcher and as operator. I was dispatcher of trains until General McClellan left there. Then General Eckert of the War Department sent me to Manassas Junction. General McClellan had several hundred thousand men there. I successfully transported the men and goods that were to go by railroad. For fourteen days I didn't sleep and hardly had time to eat, there were so many demands upon me. My heart was entirely given up to run those trains. Finally a Pennsylvania general came to me and said: "You're too useful a man to kill yourself in this way and we know that you must have sleep, and if you do not go off and take rest and sleep, I will send you to the guard house and force you to sleep."

I said: "I am running these trains and it is true there is some danger of my making mistakes in my present condition, but I haven't a bed." An operator by the name of Charles Moore volunteered to give me his bed. It was up in the garret over the telegraph office where the government business was conducted. I went into the garret but saw nothing but a lot of coffins which the confederates had left when driven South. Charley Moore showed me where his bed was and what do you think? I crawled into a confederate coffin and slept there for about thirty hours. I was all right when I woke up and went to work.

After that I was chosen to go with General Ambrose E. Burnside, of Rhode Island, at Fredericksburg, to act as one of his operators, where I met a young man by the name of John F. Guthrie (Jack), who I had previously met in Kansas City, Mo. He and I were operators for General Burnside at Fredericksburg until we were run out by the confederates.

After the battle of Manassas our force was driven into Pennsylvania and I was sent to Baltimore where I was installed as chief operator by Manager Mattingly. I was sent there by General Eckert and I thought I was there to represent the government. After being there for a few months as I thought working for the government I was selected and recommended by General Eckert and endorsed by

General Anson Stager to Mr. Robert Garret and superintendent Smith of the Baltimore and Ohio Railroad Company to act as superintendent of that railroad from Baltimore and Washington to Wheeling and Parkersburg, W. Va. I occupied that position during the continuance of the war. I learned in later years that I was not working for the government and all the war service credit I can get is about ten months. However three months is sufficient for any army standing.

While I was engaged there in the Baltimore office I was called on one occasion by the government through David Homer Bates, who was chief operator at "D I," war department office, Washington, D. C. He told me that General Eckert at the request of President Lincoln, directed that I must get an engine and go up the road to where Confederate General Gilmore had destroyed the trestle work, cutting off connection between Washington and the north and destroying the telegraph and go through the confederate lines and bear a dispatch from President Lincoln to General Hunter at Clarksburg, W. Va. I proceeded to the break. I succeeded in passing through the Gilmore army and reaching the bridge south of Havre de Grace where I found connection with Philadelphia. I had to lay there in hiding all night with my instrument hidden, expecting every minute to be set upon by Gilmore's men, but they had passed by daylight. I then walked towards Havre de Grace.

Hearing a cannon shot over my head I was halted about a quarter of a mile before reaching the bridge by what proved to be a shot from a small U. S. gun boat. I held up and waved a white pocket handkerchief, then they called for me to advance. I then went on the bridge, connected my instrument, called up Philadelphia and telegraphed the message from President Lincoln so that Hunter's army came up and closed on the enemy at Harper's Ferry.

Those were the times which tried men's souls. The government has never shown any appreciation of what I did at the call of the President that eventful night; but that was not what I was risking my life for. I did it for the privilege and honor of doing something for my country. I would gladly have suffered death then for the perpetuation of our glorious country and the honor of our flag. May it ever wave as the beloved emblem of a united nation.

CIVIL SERVICE EXAMINATIONS will be held October 20 at the usual places throughout the country for junior electrical engineer, junior signal engineer and junior telegraph and telephone engineer for the Interstate Commerce Commission. From the list of eligibles certification will be made to fill vacancies as they occur in these positions in the Interstate Commerce Commission. These examinations are for males only.

Mr. F. T. Wilbur, superintendent of telegraph, Illinois Central Railroad, Chicago, Ill., writes: "The renewal of my subscription to the AGE certainly meets with my approval and you will find \$2.00 enclosed."

Telephones and Telegraphs of Iceland.

The telegraphs and telephones in Iceland are the property of the state, and are maintained by the engineer or general director, says *The Telegraph and Telephone Journal* of London. Herr O. Forberg is the general director and he undertook the pioneer construction work about nine years ago.

The telephone switchboard at Reykjavik, the capital, has a capacity of 600 subscriber's lines, 520 of which are in use. It is also multiplied for 600 lines and this multiple is extended to a long distance or trunk section in an adjoining room. On this section are terminated about twenty-six long distance lines and by means of the multiple extension from the local switchboard incoming trunk calls can be directly connected to the local lines. The ringing arrangements consist of an alternator which is supplemented by hand generators of the usual type. The alternator, however, is somewhat remarkable, as it consists of a pendulum arrangement, which at every half beat or so reverses the polarity of certain primary battery current leads, and so provides an alternating current for ringing purposes. There being no public power supply in Reykjavik secondary cells and motor ringers are not used. The subscribers instruments are of the hand-micro-magneto pattern, the sets being of the enclosed metal pedestal type.

The first telegraph and telephone lines were built in 1906, during which year a telegraph cable was laid between Iceland and the Shetland Islands landing at Seydisfjord, where it connects with a land line to Reykjavik, 385 miles distant.

There are some 121 telegraph and telephone "depots." The country is divided into five districts, each having its own manager. The number of telegrams handled during 1914 was 72,487 as against 59,301 in 1913. The number of telephone conversations of three minutes was 178,525, as against 140,223 in 1913. The male staff consists chiefly of young men, the oldest of the telegraphers being only twenty-six years of age. The telegraphers are required to know Danish, English, German and some of them French. They have recently formed a society for the promotion of electrical knowledge in telegraphy and telephony. Mr. Otto Bjornsson is president of the society and he would be glad to get in touch with similar societies. Correspondence may be conducted in English. His address is care of the telegraph office, Reykjavik, Iceland.

Mr. Gisli J. Olafsson, manager of the Iceland telegraphs and telephones, visited the United States in the fall of 1914 and inspected the telegraph and telephone service in this country. Some interesting information regarding these utilities in Iceland was printed in our issue for October 16, 1914, and in our September 16 issue of this year a summary of the annual report for 1914 was printed.

If you are not a subscriber to TELEGRAPH AND TELEPHONE AGE it is your duty to become one. It costs only \$2.00 a year.

Wireless Telephone from Washington Across the Continent and to Hawaii.

In our October 1 issue we printed a brief announcement of the successful transmission of wireless telephone messages on September 29 from the U. S. Naval radio station at Arlington, Va., to Mare Island, Cal., where they were received by Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company.

Word was received later that the talk from New York had been heard at San Diego and Darien, Isthmus of Panama, and afterward a cablegram was received from Mr. Lloyd Espenschied, an engineer of the American Telephone and Telegraph Company at Pearl Harbor, Hawaii, stating that he had heard the message sent from Arlington. The distance to Hawaii from Arlington is 4,000 miles.

Mr. Espenschied had been sent by Mr. J. J. Carty to the far-off Pacific island several months ago, carrying with him receiving instruments, and erecting an improvised wireless station on the island. When it is remembered that not only London, Paris and Berlin are nearer New York than Honolulu, but that it is farther away than Petrograd, and even the North Pole, the magnitude and importance of this accomplishment may be partially realized.

At 12:48, eastern time, President Theo. N. Vail, surrounded by a few officials of the American Telephone and Telegraph Company, in his office at New York, picked up a Bell transmitter and called into it: "Hello, Carty; this is Mr. Vail." In spite of the fact that the words went by wire to Washington and then leaped through the air to the Pacific coast, Mr. Carty's reply came back by wire almost instantly: "This is fine; this is wonderful." After an extended conversation with Mr. Carty, Mr. Vail was followed by others present and in all cases the talkers were informed by the listeners at Mare Island that their voices were distinct and recognizable.

After the confirming reports had been received from Mare Island Mr. Vail sent the following message to Mr. Carty:

"Carty,

"I want to congratulate you on yesterday's climax in the way of achievements, the greatest in intercommunication that the world has ever seen.

"To you and the wonderful staff, created by you, the world owes a debt.

"To throw your voice directly without the aid of wires from Washington to Hawaii—nearly 5000 miles—a greater distance than from New York to Paris, Berlin, Vienna, or Petrograd and greater than that between Seattle and Tokio and Yokohama, was wonderful, but to send the recognized voice part way over wire and part through the air was still more wonderful and was the demonstration of the chiefest use that will probably attach to the wireless as amplifying and supplementing, not substituting, the wire system and bring into conversational communication ships, islands, and places which cannot otherwise be reached.

"Your work has, indeed, brought us one long step nearer our 'ideal'—a 'Universal System.'

(Signed) THEO. N. VAIL."

It is clear, Mr. Vail stated afterward, that wireless will never substitute or supplant the wire systems, but will greatly amplify them and extend their usefulness. It is humanitarian rather than commercial, but it is useful in that it makes conversation possible between places and between places and moving objects and between moving objects that could not be connected by wire. As with wireless telegraph it probably never will be dependable enough except as outlined in the message to Mr. Carty.

Secretary of the Navy, Josephus Daniels, gave out the following statement regarding the tests:

"Secretary Daniels is pleased to announce the successful outcome of experiments which have been carried on for the past few months by the American Telephone and Telegraph Company and Western Electric Company in co-operation with Capt. W. H. G. Bullard, of the United States Navy, who has jurisdiction over the radio stations of the Navy Department. The working together of these forces has made possible long-distance wireless telephony.

"To-day, September 29, speech was successfully transmitted from the Arlington radio station to the radio station at Mare Island, Cal., and there successfully received, thus making possible conversation without wires over a distance of approximately 2,500 miles, the first time this great distance has been covered by wireless telephony. In the first experiments to-day, the voice was successfully transmitted by radio to Mare Island from Arlington, the return answers and communication being made over the transcontinental land telephone line. This was successfully accomplished in the presence of officials and engineers of the American Telephone and Telegraph Company, the Western Electric Company, a representative of the Signal Corps of the Army, a representative of the technical and operating departments of the Navy Department and a few other interested parties. After this successful demonstration conversation originating in New York was transmitted over the land line to Arlington, there automatically connected to the radio transmitter which carried the voice to Mare Island, where it was clearly and distinctly received, and answers and other conversation were from there transmitted over the transcontinental line to the originating office in New York. The conversation was carried on by the president of the American Telephone and Telegraph Company, Mr. Theo. N. Vail, the vice-president, Mr. U. N. Bethell, and Mr. J. I. Waterbury, one of the directors, while at Mare Island were officials of the Navy Department, Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, and representatives of the Western Electric Company. Every official taking part in this demonstration is enthusiastic about the results and the possibility of developing this system as an extension of the telephone system to ships at sea. The fact that the voice can be started on a land wire and automatically transmitted to a voice radio transmitter holds out hope that persons inland should readily be put in touch by telephone with others at sea through some central transmitting station.

"The use of such long-distance wireless telephone

communication in naval or military operations is still in an undeveloped state, but it is expected valuable use can be made of this wonderful demonstration. Aside from such consideration the department and its officials may well feel proud that they have been interested co-operators in the first practical development of this last march in the wonderful science of radio communication."

Mr. Bancroft Gherardi, engineer of plant of the American Telephone and Telegraph Company, who is one of Mr. Carty's staff, who have been working on the wireless telephone problem, said that the results obtained in talking by wireless telephone from New York and Washington to San Francisco and Hawaii, were a culmination of long and very important investigations and discoveries which have been made by the engineers of the Bell System. These investigations have extended over a considerable period. During the early spring of this year, as a result of the work already done, the engineers of the telephone company talked over a distance of about 250 miles, using for the purpose an experimental tower which they had erected near Montauk Point, L. I., and a small tower borrowed for the purpose from private owners at Wilmington, Del. Soon after that they talked over 1,000 miles, in this case using the experimental tower at Montauk Point and an experimental tower erected for the purpose at St. Simon's Island, Ga. The results of these tests so conclusively demonstrated the correctness of their work and its possibilities that steps were immediately taken to try distances comparable with those involved in trans-Atlantic telephony, and, indeed, even looking to trans-Pacific telephony. What the results of these further tests have been is shown by the talks to San Francisco and Hawaii.

Another interesting feature of the tests, he said, was that, in a practical way, the ability to connect wireless telephone systems with wire telephone systems was shown. Mr. Vail, in his talk to Mare Island, used wire from New York to Washington. At Washington, by the special means invented and developed by the engineers of the telephone company, the wires were connected to a special wireless apparatus and to the navy's wireless tower, where the message went wirelessly to its destination.

Mr. Gherardi stated that he expected that wireless telephony would form a most important adjunct and extension to the existing schemes of communication. By its means communication can be established between points where it is impracticable to extend wires. For many reasons wireless telephony can never take the place of wire systems, but it may be expected to supplement them in a useful manner. Wireless telephone systems are subject to serious interference from numerous conditions, atmospheric and others. For many uses the fact that anyone suitably equipped can listen in on a wireless telephone talk would be a serious limitation to its use.

Now that we are able to telephone by wireless thousands of miles, why not turn our attention to communicating with planet Mars by wireless telephone.

Comments on the Long Distance Wireless Telephone Achievement.

The successful transmission of wireless telephone messages between Washington and Mare Island, Cal., and Pearl Harbor, Hawaii, on September 29, has naturally brought out comments from many prominent men indirectly concerned with this line of investigation.

Mr. E. J. Nally, vice-president and general manager of the Marconi Wireless Telegraph Company of America, New York, said:

"The recent demonstration by the American Telephone and Telegraph Company, who employed the transmitting station at Arlington to enable it to communicate with San Francisco, and later with Honolulu, has drawn forth the discussion as to the arrangement and character of apparatus employed and the claimants for complimentary mention and for priority of invention are cropping up in many directions. A recent issue of the *New York Times* contains a letter from Professor A. N. Goldsmith, of the College of the City of New York. In this letter Professor Goldsmith points out that the success of this experiment was largely due to the employment of an improved form of vacuum valve.

"Of course it goes without saying that the improvements of Dr. Lodge and of William Marconi in tuning the circuits is indispensable and of primary importance in wireless telephony as well as in wireless telegraphy. The patents, as is well known, have been in extensive litigation and have been uniformly sustained by the courts in this country, in Great Britain and on the Continent.

"Prior to 1904 a detector of the extremely minute electrical variations affecting the receiving apparatus was best exemplified in Marconi's magnetic detector or in the contact microphone, or perhaps in some electrolytic form of detector, but Professor Fleming, of the College of the City of London, pointed out that a vacuum chamber containing a hot element and cold element was well adapted to receive and respond to these extremely minute oscillations of current; he also pointed out that the vacuum valve was a rectifier of these oscillations and that it was well adapted for a detector in wireless signaling. Both before 1904 and subsequently, transmission and reception of vocal signals, that is, the variation in sound waves due to the vocal organs of the throat, were transmitted and received at limited distances and with expert care, but no such distance had been bridged as in the more recent demonstration.

"It is undoubtedly true that Professor Fleming's invention is the keystone of the arch on which this successful demonstration is supported. Many engineers and inventors have contributed, and the advance has been accomplished as the result of many failures. Taking Professor Fleming's invention of the vacuum valve, as it is called, as the starting point, others have modified it with an element located within the vacuum chamber at a point intermediate between the hot and cold element and this is considered a very useful special form of Professor Fleming's detector.

"The Fleming vacuum valve has been used by the

American Telephone and Telegraph Company in its land-line work and was very extensively employed as a repeater in the demonstration made on land lines between New York and San Francisco some time prior to the wireless demonstration referred to. It is well known that that land line demonstration was founded on the invention of Professor Pupin, who contributed the 'loading coil'; it also involved the use of a composite circuit and much experience gained by experimental work. Without the vacuum valve of Fleming, it would be impossible to telephone any such distance as indicated. Dr. Langmuir, of the General Electric Company, greatly improved the Fleming valve and Roy A. Weagant, chief engineer of the Marconi Company, has, while working in the laboratory of that company, obtained much valuable data and information, and has invented improvements which go far towards rendering the valve more practical, more constant, and more useful as a commercial apparatus."

In a statement given out in London, Mr. Godfrey Isaacs, managing director of the Marconi Wireless Telegraph Company, said:

"But for the war we should now be telephoning by wireless across the Atlantic. Our experiments were interrupted by the war, as our stations are now used by the government, but we have carried our experiments far enough to know that, undoubtedly, after peace is declared, we shall be able to talk to New York."

Prof. Michael I. Pupin, of Columbia University, New York, announced that he had perfected a device which will entirely eliminate what are known as static disturbances or electrical storms.

With the aid of his device, Prof. Pupin said, it will be possible to transmit the human voice an unlimited distance by wireless without the slightest interference from these ever-present electrical disturbances.

"There is nothing now to prevent the transmission of messages by wireless telephone to every part of the globe," he said. "We may talk to the antipodes, or, for that matter, send a message completely around the globe, if we like."

Mr. Nikola Tesla announced that he had received a patent on an invention which would not only eliminate static interference, the present bugaboo of wireless telephony, but would enable thousands of persons to talk at once between wireless stations and make it possible for those talking to see one another by wireless, regardless of the distance separating them. He said also that with his wireless station now in the process of construction on Long Island he hoped to make New York one of the central exchanges in a world system of wireless telephony.

Regarding the contention that there can be no secrecy in wireless telephone conversation, Mr. Tesla said: "I say it is absurd to raise this question when it is positively demonstrated by experiments that the earth is more suitable for transmission than any wire could ever be. A wireless telephone conversation can be made as secret as a thought."

"I have myself erected a plant for the purpose of connecting by wireless telephone the chief centres

of the world, and from this plant as many as a hundred will be able to talk absolutely without interference and with absolute secrecy. The plant would simply be connected with the telephone central exchange of New York City, and any subscriber will be able to talk to any other telephone subscriber in the world, and all this without any change in his apparatus. By the same means I propose also to transmit pictures and project images so that the subscriber will not only hear the voice, but see the person to whom he is talking. Pictures transmitted over wires is a perfectly simple art practiced today."

Dr. Lee De Forest said: "I venture to say that not one wireless man out of fifty is not aware that this extraordinary long-distance wireless reception is possible only by use of the audion detector and audion amplifier at the receiver."

"This detector has for the past two years been used almost exclusively for long-distance wireless. Recent tests by Dr. Austin, of the United States Bureau of Standards, show that it is from fifty to a hundred times more sensitive than the next best detector."

"As for the transmitter, however, it is less generally known that the large audion bulb is a generator of high frequency energy. It is the device which makes it possible to telephone by wire to San Francisco."

Prof. R. A. Fessenden, the well-known wireless inventor, stated that wireless telephony has been denied the public for ten years because of the business methods of two Pittsburgh promoters who obtained control of patents in 1902 and previously.

Electrical Exposition.

The annual Electrical Exposition and Motor Show was opened at the Grand Central Palace, New York, October 6.

The Navy shows a complete battleship central station, with the electrical apparatus by which messages and signals are sent over the entire ship, the gun-firing buttons and other apparatus. Near by is the wireless outfit to be installed on the new battleship "Oklahoma." The Army exhibits field telephones and switchboards, and the modern field wireless, with its forty-foot tower in ten sections.

During the ten days of the show the public had the opportunity to listen to conversations and music transmitted from the Pacific Coast to New York by telephone free of cost. The telephone company's booth seats 164 persons, and on the back of every chair are two watch case receivers, through which the auditor hears the waves of the Pacific breaking at the Golden Gate, and a trombone solo rendition of The Star Spangled Banner from the grounds of the Panama Exposition. The demonstration is held at a certain time each day.

A GENTLEMAN.—The mark of a man of the world is absence of pretension. He does not make a speech, he takes a low business tone, avoids all brag, promises not at all, performs much.—Emerson.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, OCTOBER 16, 1915.

STATEMENT.

Statement of the ownership, management, circulation, etc., required by Act of August 24, 1912, of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th each month at New York, N. Y., for October 1, 1915.

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THOMAS R. TALTAVAL, Editor.

Sworn to and subscribed before me this 24th day of September, 1915.

HENRY A. VAN DER PAAUWERT,
Notary Public, Kings County, No. 30.
Certificate filed in N. Y. Co., No. 9.
(My commission expires March 30, 1917.)

Long Distance Radio Telephony.

Scientific achievements of the epoch-making kind come so rapidly in these days that the world hardly ceases wondering at one before another is proclaimed.

The announcement on September 30 that the human voice had been successfully transmitted by wireless telephone from Arlington, Va., across the

continent to Mare Island, Cal., came as a surprise, but when, later, the information was published that the messages had been heard distinctly at Pearl River, Hawaii, a distance of about 4,900 miles from Washington, surprise gave way to wonder. This brilliant achievement was made possible by the utilization of the government facilities and co-operation of its radio engineers with the engineering staff of the American Telephone and Telegraph Company, and all are entitled to the highest praise for the wonderful results attained.

For some years the radio telephone problem has engaged the attention of scientists and inventors in this country and Europe, and no one doubted that it would be eventually solved, but such grand results and on so extensive a scale was hardly looked for.

The field of the radio telephone is yet to be developed; but it is enough to know just now that wireless telephone transmission is no longer a dream, but an actual realization. The master engineers who have so ably proved that it is possible can certainly be depended upon to develop the system along practical lines.

When a great invention or discovery is made there are always many real and would-be inventors who rush into print with declarations or intimations that they had accomplished the same results. The case under consideration has been no exception. The details of the apparatus employed in accomplishing this great result have not been divulged and the vociferous claimants will have to put a check on their precipitous haste for recognition until they are sure of their ground. No one will deny them credit for what they have really accomplished, but of course proofs must be forthcoming.

Some speculation has arisen as to the effect of radio telephony upon wire telephony. All those who are qualified to judge declare it will not displace any existing wire systems, but that it will be an auxiliary to them all and will develop a field of its own. In the meantime the world will await with deep interest further developments in the application of wireless telephony to the uses of mankind.

Our Efficiency Articles.

Our articles on efficiency in the telegraph service, the first instalment of which was begun in the October 1 issue, is attracting much attention, and many observations and suggestions are being received, which is an unquestionable indication of the popularity of the subject.

Efficiency in operation and management is doing a great deal of good in the telegraph service in eliminating waste, and is an excellent training for the individual. While it imposes no hardship on anyone, it teaches how to conserve effort and to do things the right way. The splendid manner in which all the employees of the telegraph companies are co-operating in the movement is highly commendable, and much good to employer and employee will be the outcome.

The second instalment of the discussion appears elsewhere in this issue and the subject will be continued in these columns until every phase of matter is fully considered.

Construction and Repair of Telegraph Lines.

(Continued from page 456, October 1)

Boulders and rocks are very necessary in wet and swampy places, and where possible to procure them they should be used with the dirt for keying down the deadman. The anchor rod must be set in direct line with the lead of the guy wire, after which the earth must be thoroughly tamped with three tampers to one shovel until the hole is filled to the surface. The length of the log or deadman may be varied according to the weight of the corner to be guyed.

Where patent anchors are authorized and furnished the superintendent of construction should be called upon for any instructions that may be necessary in connection with their use.

Rock anchors should be used only where the rock is of a good firm nature. Where the rock is level with the surface, a hole should be drilled not less than ten inches deep, and in it placed a rock anchor twelve inches long. Where rock is encountered under the surface, the holes should be drilled the same depth in the rock and two or three feet anchor rods should be used, according to the depth of the rock below the surface. The eye of the anchor in all cases should project at least two inches above the surface.

On corner poles where the side strain is very heavy, double crossarms should be used, equipped with standard blocking bolts and guyed by one or more anchor rods attached to a log or deadman placed in a trench five feet deep and the anchor rods placed in a direct line with the lead of the guy wire, which should be directly under the top crossarm. If the line carries four or more crossarms one guy should be placed under the top crossarm and one directly under the third arm. The number of anchor rods and strands of guy wire required should be determined by the angle of the corner and the weight of the line. As the tensile strength of a five-eighths inch anchor rod is more than the breaking strain of two five-sixteenths inch guy wires, where only two guy wires are necessary to hold the side strain they should be attached to the same anchor rod. The line should be head guyed at such corners by attaching the guy wire close under the top cross-arm of the first pole back of the corner, and extending it to a point on the corner pole five feet above the surface of the ground.

At square road crossing a log or deadman eight feet long should be placed in a trench eight feet back from the pole and parallel with the line. One anchor rod should be attached not less than six inches from either end of the log or deadman and so placed that one anchor is at a right-angle with the line, and one leading ahead on line, to form a head as well as a side guy, and the line head guyed to the corner pole.

The necessity for head guys should be determined by the amount of straight line back of the corner, and the number and kind of wires on the line. On lines carrying from one to six copper wires, head guys, as a rule, are a detriment to the copper wires, for the reason, that as the head guys are pulled up taut it produces a damaging strain on the wire at the point of contact with the insulator on the pole

so head guyed. Where two or more six pin cross-arms carry more than six wires head guys should be used.

Where necessary to extend guys across to the opposite side of the road, a guy pole should be set not less than five feet deep and not smaller than called for by the seven-inch specification for poles, and should extend to a sufficient height to clear the guys at least eighteen feet above the road bed. Each guy stub should be anchored to one or more anchor rods according to the strain that it is required to hold.

Guy wires should be wrapped twice around the pole and fastened with a three-bolt clamp. A clamp must also be used in attaching the guy to the anchor. All guys running to anchors in exposed places must be protected by guards of wood, or iron pipe, to make them more visible to pedestrians, horses and cattle.

Foremen will be advised when starting each piece of new line or reconstruction as to the number of poles to be set to the mile. The first pole from the corner must not be set to exceed seventy-five feet from the corner pole, and the second pole not to exceed 100 feet from the first pole, and as much closer as necessity may require, excepting on very light lines, when these distances may be increased at the discretion of the foreman. The distance between the first and second poles from the corner should in all cases be determined by the weight of the line and the side strain on the corner pole.

All special fixtures required must be submitted to the Superintendent of Construction for his consideration and approval of the article desired. Whenever practicable, a drawing should accompany the requisition for such fixtures.

Facing a corner, the two poles back of the corner pole each way must be set with arms facing the corner. In all other places the arms must be faced alternately. On slight curves side guys should be placed, and anchors used wherever possible.

When necessary to attach a guy to a tree good substantial blocks should be placed between the guy wire and the tree to prevent the wire from injuring the bark. The guy shall be looped once only around the tree.

Where high-tension circuits cross lines special precautions are necessary, and the foreman in charge of the work must refer all such cases to his superintendent for instructions.

At all river crossings with spans of 200 to 400 feet, poles on either side should be equipped with double arms. At river spans from 400 to 1,000 feet or more, two poles should be set in parallel on either side a reasonably safe distance back from the ordinary water line, and double cross-arms of special make should be placed on these poles. The arms should be of four by five good, seasoned pine lumber and twelve feet in length. The gains on these poles should be cut three feet between centers and the pins placed at equal distances, according to the number of pins required in each arm, not exceeding eight pins to the arm, the object of these special arms being to spread the wires a safe distance apart.

(To be Continued)

The Telephone Pioneers' Convention.

In our October 1 issue we gave a brief account of the proceedings of the fifth annual convention of the Telephone Pioneers of America, which was held in San Francisco, Cal., September 21, 22 and 23.

Further details of the meeting are given herewith.

The meeting was called to order at 10 a. m., September 21, by Mr. T. D. Lockwood, of Boston, vice-president of the Pioneers. He introduced Mayor James Rolph, jr., of San Francisco, who made the address of welcome, which was followed by an address of similar character by Mr. H. D. Scott, chairman of the executive committee of the Pacific Telephone and Telegraph Company, on behalf of his company. A joint response to both addresses was made by Mr. T. D. Lockwood in his usual felicitous style.

The report of secretary R. H. Starrett showed a membership of 1,253 on January 1; applications approved, 79, making a total of 1,332. There were three resignations and ten deaths, leaving the membership, on August 1, 1,319, a net gain of 66.

An amendment to Section 10 of the by-laws was passed.

The following officers were elected for 1916: President, Theo. N. Vail; vice-presidents, Thos. D. Lockwood, A. S. Hibbard, T. B. Doolittle, L. B. MacFarlane; treasurer, Geo. D. Milne; secretary, R. H. Starrett.

Executive Committee: E. F. Sherwood, F. A. Pickernell, C. G. Dubois, A. L. Salt, R. T. McComas.

At the afternoon session Mr. T. D. Lockwood read a lengthy and interesting paper prepared by himself on "Forerunners and Genesis of the Telephone Exchange," also the paper of ex-secretary Henry W. Pope, a brief reference to which was made in our October 1 issue. Mr. C. B. Hopkins, of the Pacific Telephone and Telegraph Company, Seattle, Wash., followed with a paper, in which he gave a history of the development of the telephone on the Pacific Coast.

The morning session was presided over by vice-president Lockwood, and the afternoon session by Mr. C. G. DuBois, comptroller of the American Telephone and Telegraph Company, New York.

The entertainment program, which was outlined in our September 16 issue, was closely adhered to and every member of the party spoke in the highest praise of the excellent manner in which the trip was planned and carried out. Secretary Starrett received deserved commendation for his watchful care of the party during the entire trip.

Among those in attendance were:

Aberdeen, S. D.—J. L. W. Zietlow.

Baltimore, Md.—Mr. and Mrs. E. Corrigan.

Bayonne, N. J.—Miss A. Greenslade, Miss E. Greenslade.

Belmont, Mass.—N. F. Crowell.

Berkeley, Cal.—Mr. and Mrs. J. J. Flynn.

Boston, Mass.—F. J. Boynton, Mr. and Mrs. John E. Foster, T. D. Lockwood, Mr. and Mrs. F. R. Starkey, Mr. and Mrs. L. C. Whitcher, Mr. and Mrs. E. W. Whorf.

Brooklyn, N. Y.—Miss F. H. Endres, S. B. Goodloe, Miss Rose Guntzer, Miss Lulu A. Kuntz,

Mr. and Mrs. J. O'Rourke, Harrison Pilt, J. A. Sibell, C. C. Wagner, Miss M. M. Walker, J. J. Donnelly.

Buffalo, N. Y.—Miss R. Cheney, Miss A. Dinley, Theo. L. Liesinger; Miss M. A. La France, Miss Mary McCraley, C. W. Mackenzie, Miss A. Sterling, H. C. Williams.

Chicago, Ill.—Miss H. M. Binmore, Mr. and Mrs. E. H. Bangs, Miss Nell Bowsher, Mr. and Mrs. A. P. Hyatt, Miss H. E. Hiler, Mr. and Mrs. P. V. Warner, Mr. and Mrs. J. G. Wray, Mr. and Mrs. C. E. Mosley.

Cincinnati, O.—R. T. McComas.

Clayton, Mo.—Mrs. Olive McClelland, Miss M. McClelland.

Dallas, Tex.—P. K. Baker.

Denver, Col.—Geo. R. Armstrong.

Detroit, Mich.—Mr. and Mrs. W. J. Berry.

Dundee, Ill.—Mr. and Mrs. H. J. Baumann.

East Orange, N. J.—Mr. and Mrs. H. Bouillette, Mrs. Sarah A. Redden.

Ely, Nevada.—J. S. Bennett.

Enosburg Falls, Vt.—Mr. and Mrs. C. L. Ovitt.

Eureka, Cal.—A. E. McLaren.

Fredericktown, Ohio.—Mrs. A. B. Cummings.

Fruitvale, Cal.—A. P. Harrison.

Hamilton, Ont.—H. C. Baker, Mr. and Mrs. G. Hope.

Hartford, Conn.—E. A. Smith.

Hyde Park, Mass.—G. R. Pierce.

Jamestown, N. Y.—J. W. Stearns.

Kansas City, Mo.—Miss M. D. Ray.

Leavistown, Me.—J. D. Stanforth.

Los Angeles, Cal.—Mr. and Mrs. J. G. Capito, W. W. Bunton, C. F. Mason.

Lyons, Iowa.—S. P. Jordan.

Marin Co., Cal.—M. Lawton.

Newark, N. J.—Mr. and Mrs. J. T. Blake, W. C. Graham.

New Haven, Conn.—A. F. Brooks, C. B. Doolittle.

New York, N. Y.—O. H. Berthold, Mr. and Mrs. A. S. Campbell, Mr. and Mrs. J. J. Carty, Mrs. L. Davenport, C. G. DuBois, W. E. Huntington, Mr. and Mrs. P. J. Hartman, Miss E. R. Millar, J. P. Mayers, Mr. and Mrs. J. O. Murphy, Miss K. V. Pettit, W. B. Perkins, Miss K. M. Schmitt, Mr. and Mrs. C. E. Scribner and Miss Mary Scribner, Mr. and Mrs. H. F. Stevens, Miss E. B. Stevens, Miss P. C. Stevens, W. L. Salmon, Mr. and Mrs. R. H. Starrett, Miss F. J. Taltavall, Mr. and Mrs. S. Wickham, Miss C. A. Wallace, Mr. and Mrs. G. P. Wilt, Mr. and Mrs. Chas. H. Wilson, W. L. Richards.

Oakland, Cal.—Mr. and Mrs. G. W. Moeller, Mr. and Mrs. C. S. Biers, Mr. and Mrs. J. D. O'Connell, H. S. Carpenter, Mr. and Mrs. H. J. Fleming.

Oklahoma City, Okla.—J. M. Noble.

Omaha, Neb.—Elizabeth McClure.

Orange, N. J.—Mrs. E. H. Davey, Mr. and Mrs. H. G. McCully.

Paterson, N. J.—Mr. and Mrs. W. L. Hermance, Miss J. D. Westervelt, Mr. and Mrs. T. Dusenbury.

Pawtucket, R. I.—Clifford M. Wilson.

Philadelphia, Pa.—Miss M. D. Cardwell, Mr. and Mrs. F. W. Griffin, Miss M. Smith.

Portland, Me.—Miss Ellen T. Maguire, Thomas F. Maguire.

Portland, Ore.—Mr. and Mrs. P. Bacon, J. Curran, Mr. and Mrs. W. D. Moore, Mr. and Mrs. J. H. Thatcher.

Rochester, N. Y.—H. E. Benedict.

Sacramento, Cal.—Mr. and Mrs. C. J. Wall, J. J. Sullivan, R. Montgomery, Mr. and Mrs. J. P. Noble.

Salt Lake City, Utah.—G. Y. Wallace.

San Francisco, Cal.—Mr. and Mrs. J. W. Gelkyson, B. C. Carroll, F. T. Throckmorton, Mr. and Mrs. A. N. Curtis, P. G. Reynolds, Theo. V. Halsey, Mr. and Mrs. J. H. McClellan, Mr. and Mrs. J. W. Tulloch, Mr. and Mrs. H. Keyser, Mr. and Mrs. F. W. Lawler, Mary A. Hartery, Margaret M. Driscall, Mr. and Mrs. C. J. Petty, T. Welch, Mr. and Mrs. H. M. Devers, H. E. Roberts, F. Drake, Mr. and Mrs. J. Kearns, W. F. Rowald, Mr. and Mrs. C. Teigeler, T. J. Corcoran, S. Flanagan, Mr. and Mrs. G. S. Tulloch, Mr. and Mrs. J. J. Foley, Mr. and Mrs. G. E. McFarland, Mr. and Mrs. G. Q. Stewart, W. J. Kennedy.

San Jose, Cal.—Mr. and Mrs. J. P. Jensen, Mr. and Mrs. B. Brown.

San Mateo, Cal.—Mr. and Mrs. C. S. Prendergast, Mr. and Mrs. J. T. Cronin.

Seattle, Wash.—Mr. and Mrs. C. H. Judson.

Springfield, Ill.—Mr. and Mrs. F. R. Atwood.

Staunton, Va.—Mrs. F. A. Gibbs, N. C. Watts.

Stockton, Cal.—H. L. Tyler.

Syracuse, N. Y.—Mr. and Mrs. F. A. Garrett, F. L. Teese.

Tacoma, Wash.—Mr. and Mrs. R. Nellist, A. E. Dean.

Wilmington, Del.—J. H. Mehaffey.

Reunion of Military Telegraph Corps.

The reunion of the Society of the United States Military Telegraph Corps took place at the Broadway Central Hotel, New York, October 13 and 14, with a large attendance.

The business meeting was held in the morning of October 13, and in the afternoon there was a stage ride for members and guests. Starting from the hotel the route was through Riverside Drive to Grant's tomb, the Soldiers' and Sailors' monument, through Central Park, down Fifth avenue to the residence of Mr. Andrew Carnegie, down to Madison Square, where the party disbanded.

The present officers were reelected, and the selection of the time and place for the next reunion was left to the executive committee.

In the evening a banquet for members of the society and old-time telegraphers was held. This function was for men only.

After the dinner there was an exhibition of Civil War scenes, relating to the United States Military Telegraph Corps, including war time and more recent pictures of prominent members of the corps, City Point, Libby prison, and some of the military telegraph guests. One of the most interesting exhibits was the first message sent over an electric wire, on May 24, 1844. It was written by Annie Ellsworth and consisted of the four words, "What Hath God Wrought." This message was sent from Washington by S. F. B. Morse to Alfred Vail at

Baltimore, Md., and the record, as made there, was presented by Mrs. Alfred Vail, prior to 1893, to the Connecticut Historical Society at Hartford, Conn., and is now in its possession.

Other views shown were: The Morse and Vail workshop at Speedwell. Destroyed by fire, 1908. Postmaster-general Amos Kendall's autograph appointment of James D. Reid as the first commercial telegraph superintendent.

John A. Dix's celebrated dispatch, February, 1861, to Hemphill Jones: "If anyone attempts to haul down the American flag, shoot him on the spot," with John A. Dix's autograph signature in two places.

The original message from General Weitzel, Richmond, Va., April 3, 1865, announcing the entrance of Federal troops into the Confederate capital—the first message out of Richmond for four years.

On Thursday, the fourteenth, the members were free to go as they pleased.

An effort was made to have Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, attend the reunion, but owing to his absence in San Francisco, he was unable to be present.

The reception committee consisted of ten veterans and eight sons of veterans with Charles Almerin Tinker, chairman; Henry H. Atwater, colonel Robert C. Clowry, Henry W. Dealy, Isaiah D. Maize, Stephen E. Barton, colonel Albert Brown Chandler, James Clendenin Eckert, Richard O'Brien, Francis S. Wilson, Charles P. Bruch, Jesse W. Crouse, William L. Ives, Charles W. Pearson, John Winthrop, David Homer Bates, jr., Albert Eckert Chandler, Verdie J. Knittle, Arthur L. Tinker.

Among those present were:

Ashtabula, Ohio.—Mr. and Mrs. C. W. Jaques.

Atlanta, Ga.—G. H. Usher.

Boston, Mass.—S. E. Barton.

Chicago, Ill.—Dr. W. D. Gentry, C. M. Baker.

Damascus, Pa.—G. E. Cromwell.

Davenport, Iowa.—L. A. Rose.

Lombard, Ill.—Mr. and Mrs. W. R. Plum.

New York.—David Homer Bates, col. Robert C. Clowry, C. A. Tinker, H. W. Dealy, senator W. L. Ives, W. H. Woodring, H. H. Atwater, F. J. Scherrer, J. J. Ghegan, F. A. Stumm, J. B. and T. R. Taltavall, V. G. Knittle, Frederick Pearce, M. J. O'Leary, G. B. Hatter, H. Mahnken, F. Feltman, E. P. Griffith, James Meyers, senator W. E. Burton, Mr. and Mrs. A. P. Eckert, E. Reynolds, W. I. Capen, C. C. Adams, C. P. Bruch, L. B. Foley, Wm. Maaver, jr., James Clendenin Eckert, T. E. Clarke, E. J. Nally, T. E. Fleming, E. F. Howell, E. B. Bruch, Mr. and Mrs. C. W. Naumann, P. J. Casey, T. C. Martin, W. Gellatly, C. W. Pearson.

Philadelphia, Pa.—Col. William Bender Wilson, Francis S. Wilson, I. D. Maize, F. E. Maize, D. S. Robeson, Mr. and Mrs. J. W. Crouse, John Winthrop, Clayton W. Pike, J. S. W. Phillips, Mr. and Mrs. S. S. Garwood.

Scranton, Pa.—Dr. J. E. O'Brien, Richard O'Brien.

Stockbridge, Mass.—Edward Lind Morse.

Tama, Iowa.—R. H. Ryan.

Efficiency Engineering in the Telegraph Service.

(Continued from page 454, October 1)

It must not be forgotten that efficiency engineering in its application to the telegraph and telephone service can be carried to extravagant limits. Then engineering becomes wasteful. Engineering is supposed to mean, in this connection, economy in the accurate transmission of public business. The manager of an office has principally to do with the question of how to increase the business which is the source of revenue of the company. He must exercise ingenuity to get and retain customers. Good service only makes a business house a permanent and satisfied customer of the telegraph company. The head of a mercantile house is not slow in discovering the weaknesses of a telegraph corporation, and many business men have called our attention to weak spots in the makeup of certain telegraph companies. The business man knew them better than did the managers.

The manager must also plan each day's work, which means that he must prepare a mental programme to be followed in a general way by himself and subordinates. Much of the work may be routine, but a plan is absolutely necessary in the proper conduct of the business entrusted to his care. He should see that his subordinates are neat in appearance and use none but courteous language to the patrons of the company. Whether the man in front of the counter is a polished professor from a neighboring university or an Italian fruit dealer, the money involved in the messages sent by each is the same to the company and the Italian should receive, if anything, more consideration at the hands of the employees of the company. He should be made to feel when he leaves the office that he has been dealing with friends and that they have gone out of their way to make the operations of the telegraph plain to him.

We know of an instance of an individual being insulted because he was ignorant as to the preparation of a telegram. He carried his grievances to a friend who was a political boss in the community. The result was that the telegraph company had to spend a great deal of money to avoid placing its wires underground and have lawyers explain to the city counsellor why certain city ordinances regulating the telegraph should not become law. If the manager of this office had had his clerks properly trained in courteous treatment, the company would not have been put to this great expense, simply for lack of courtesy.

Many cases involving the expenditure of large sums of money could be cited to show and prove that it pays to be a gentleman at all times, even when talking to the most humble or ignorant person. A manager should also, when necessary, remind the female employees that they should not wear flashy jewelry or any other ornaments to attract attention. It is not in keeping with the surroundings of a telegraph office, and it only serves to make customers pass remarks that they would not utter if such ornamentation was conspicuous by its absence.

Upon investigation a superintendent once found

that a manager had endeavored to intimidate a customer who had a complaint to make against poor service and a resultant loss by reciting to the customer that the company had the best legal talent obtainable, and it was prepared to fight legally any one who questioned its motives and methods. This was uncalled for and gratuitous. This language made no impression on the customer, and it required the diplomacy of a higher official to smooth his ruffled temper.

Many managers have been known to openly side with different public movements and political parties to the detriment of their employing interests. Managers have no right to express their likes or dislikes for any political party, and they have no right to array themselves on the side of any movement, city, state or national, that will cause those entertaining opposing views to regard with disfavor the action of the company through its manager.

The manager, after all that has been stated, is the company at all points where there is no one higher in authority. It is observable on every hand how the telephone interests are unceasing in their efforts to cultivate a friendly feeling with the public. This means the entire public and not a part of it. This policy more than anything else has placed the telephone interests in the front ranks of well-managed corporations. The telegraph should make a friend of every individual and any amount of trouble should be undertaken to remove wrong impressions entertained by many towards the telegraph. Of course comparisons between telegraph and telephone service are hardly possible, with justice to the former. There are many reasons for this. When a business man calls up a customer by telephone and the latter is not in, no ill feeling is engendered against the telephone company because an hour's time is lost before the customer returns to his office. The same business man may send a telegram which requires a quick answer. The message is delivered promptly but the addressee is not in his office. An answer is returned one or two hours later and the merchant is very much displeased at the apparent slow service. He has no means of knowing that his customer was not in his office when the telegram arrived. This and dozens of other similar cases cause the average business man to believe that the telegraph does not render an efficient service.

Since premium circuits have been established by one of the companies, the telegraph service has been greatly expedited. Telegraphers working way wires which are grouped should however facilitate the dispatching of business by sending slow enough to meet the ability of the receiving operators to copy. This is a case of making haste by sending slowly. The company permits the use of mechanical transmitting devices. The service is not being efficiently handled when an operator transmits at full speed one, two or more messages to an operator in a railroad station or small town who, in many cases, has many other duties to perform, the telegraph end of his work consisting of handling one to five messages per day. He is not in condition to compete with his brother operator in the city who has nothing else to do but exchange telegrams all day long. It is

therefore manifestly unfair to exceed the ability of the receiving operator in transmitting telegrams to him. Many operators in small offices in consequence of this answer their office calls with apparent timidity and reluctance. This should not be.

New wrinkles in the handling of telegraph business produce unexpected results. Operators on the premium and bonus circuits are now able to earn much higher wages than the average chief operator, and the result is that many operators are declining offers of promotion. It is to their financial advantage to work a busy wire. The difference in salary paid an operator in line for promotion and the first grade of chief operator is perhaps not more than five or ten dollars per month and this apparently does not appeal strongly to the average first-class operator. However, these discrepancies adjust themselves in the course of time and the managers who experience difficulty in persuading operators to accept promotions will no doubt be able to solve the problem after the subject has had the combined consideration of those affected by the peculiar conditions. In the meantime the students of the technical side of telegraphy will not relax their efforts to forge ahead in the race for the many good positions that are at the disposal of the employing interests.

(To be Continued.)

Handy Electrical Dictionary.

Every telegrapher and student should familiarize himself with the technical terms and expressions he comes across in the course of his daily work and in his studies. Such a book should be so compact that it can be carried in the pocket with ease. The "Handy Electrical Dictionary" fulfils this requirement. It is very handy and has a marginal index. It also contains several pages of conventional illustrations so that the student can easily recognize an instrument or circuit when he sees them in technical publications. The book is of vest-pocket size, and is for sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at 25 cents per copy for cloth binding and 50 cents for leather binding.

CIVIL SERVICE EXAMINATIONS.—Competitive examinations will be held by the United States Civil Service Commission at the usual places throughout the country for eligibles to fill the following positions: Senior telegraph engineer, grade 2; senior telephone engineer, grade 2; senior electrical engineer, grade 2; senior signal engineer, grade 2. These examinations will be held November 2. On November 3 examinations will be held for eligibles for the position of supervising telegrapher.

During a concert tour of a well-known orchestra, one of the musicians died, and the following telegram was immediately dispatched to the parents of the deceased:

"John Black died suddenly to-day. Advise by wire as to disposition."

In a few hours the answer was received, reading as follows:

"We are broken-hearted; his disposition was a roving one."

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What is the bridge quadruplex?

How are the magnets of the neutral relay wound, and what is the resistance of the coils?

What is the holding coil, and what is its resistance?

How is the holding coil connected in the circuit?

How is the static "kick" prevented in the operation of the neutral relay?

What is the function of the condenser in the arrangement?

In the high potential duplex, what is the method employed to drop the initial pressure at the generator to the desired lower value?

In the quadruplex, can the same method be employed? Give reason.

How is the fluctuation of current strength in quadruplex circuits avoided?

Study the formulas and examples of their application as found on pages 119, 120 and 121.

What is a loop-switch, and what is its purpose?

What are the component parts of a loop-switch?

How are the spring jacks arranged on the loop-switch board?

Study Fig. 45 in connection with the description of the arrangement of lamp sockets and shelf holes for the cords of a loop-switch.

What is the method of the Postal Telegraph-Cable Company of connecting the local circuits of its multiplex apparatus with the loop-switch?

What is the main line switchboard?

How is the board made up?

How are the main wires connected to the board?

What is a "flip"?

What is a "fly cord"?

What are single and double flips?

How are switchboards arranged to take care of a large number of wires?

What is the advantage of dividing the switchboard into sections?

How many wires are allotted to each section?

What other division of switchboards is practiced in large offices?

(To be Continued.)

MR. EDISON CAN NOW ATTEND CHURCH.—The item in a recent issue of TELEGRAPH AND TELEPHONE AGE, describing a telephone receiver, that will enable deaf persons to hear sermons in church and attend musical and theatrical performances, is a good thing. Mr. Thomas A. Edison, the noted inventor, will now have no further excuse for saying that his deafness is the only cause that prevents him from attending church.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.

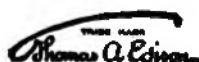


Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



THOMAS A. EDISON, Incorporated
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ORANGE, N. J.

The Diaphragm Telegraph Sounder

—embodies every essential in a telegraph Sounder: Simplicity—Durability—Clearness of Sound—Adaptability to Varying Current Changes.



Costs Nothing to Maintain

No battery needed. The only instrument that increases the sound of the relay to practically any degree. Works perfectly on a relay wound to low resistance.

Loses none of its effectiveness on account of inequality of current due to escape and induction.

Has no moving parts. No adjustments. Works in perfect unison with the relay always. Gives a clear, far-reaching sound that is easy to read.

Built with ample strength to withstand the effects of incessant use and more or less abuse. Made of brass, nickel-plated and highly polished. Guaranteed, postpaid \$3. Money order or registered mail.

Effects an enormous saving in the purchase of sounders and maintenance of local battery. Make sure that The Diaphragm Telegraph Sounder is on your next requisition. Correspondence solicited. Folder on request.

RAILWAYS LABOR-SAVING DEVICE CO.
1040 Arlington Avenue
DAVENPORT, IA.

Reference: Scott County Savings Bank

The American Telegraph- Typewriter Company,

81 PROSPECT STREET
BROOKLYN NEW YORK,

announces that prompt deliveries can now be made of their apparatus.

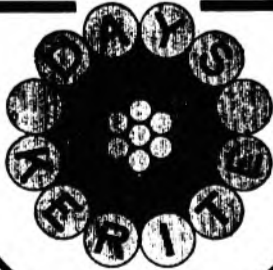
Of the old company, the name alone is retained;—the personnel of its organization has been entirely changed. The product is wholly different in design.

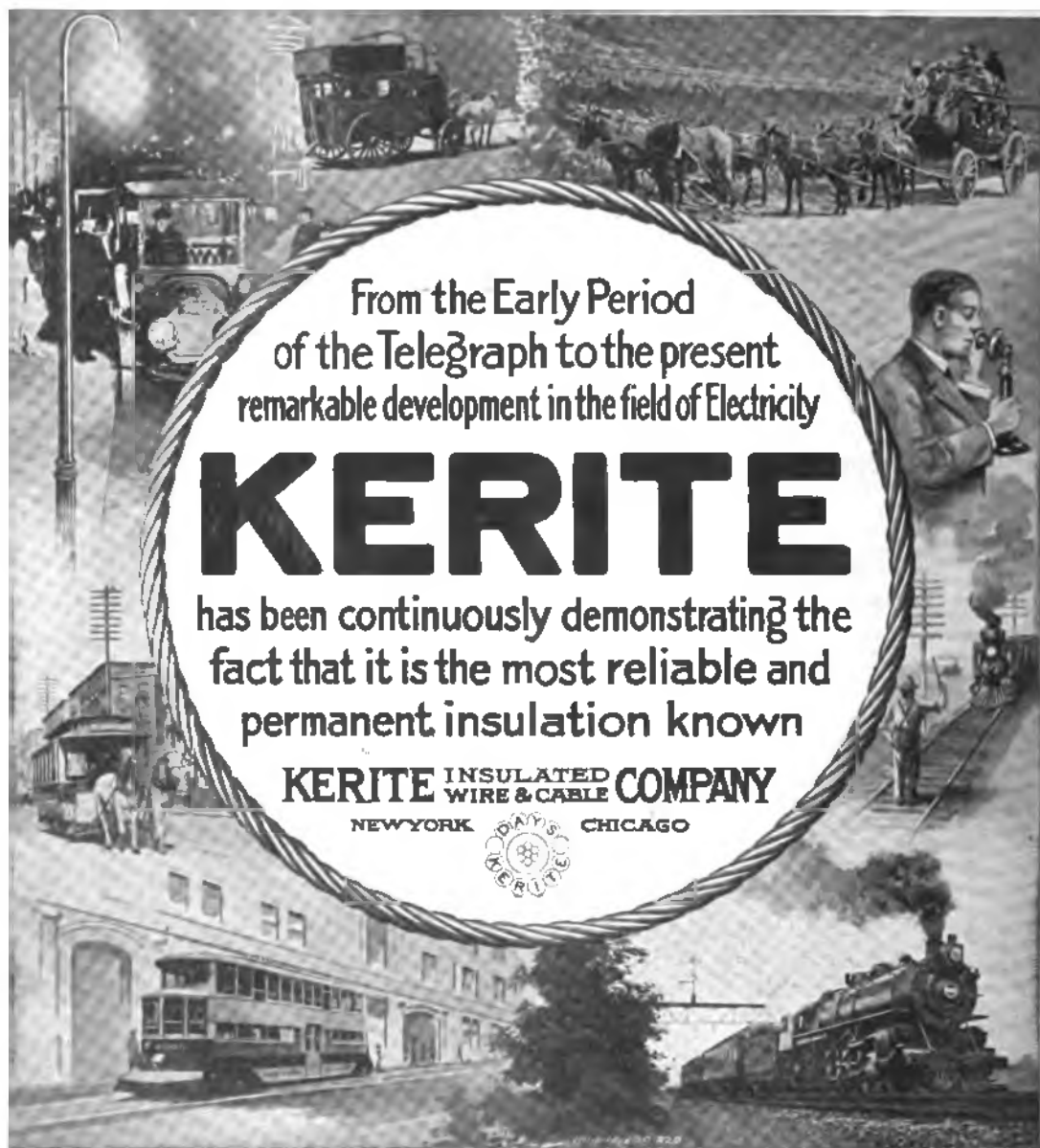
We have machines operating on the following types of circuits.

Morse way-wires.
Differential duplex repeatered.
Bridged duplex.
Simplex telephone lines.
Private lines.

The installation of our equipment in no case requires any change or rearrangement whatsoever in any single condition as found in the telegraph apparatus or wire to which it is to be connected. Multiplex circuits may be worked half printer and half Morse.

Correspondence Respectfully Solicited

18  50

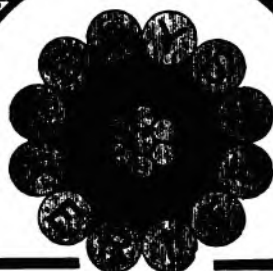


From the Early Period
of the Telegraph to the present
remarkable development in the field of Electricity

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has been continuously demonstrating the
fact that it is the most reliable and
permanent insulation known

**KERITE INSULATED
WIRE & CABLE COMPANY**
NEW YORK  CHICAGO

19  15

THE RAILROAD.

MR. CHARLES T. DAY has been appointed manager of the Southern Pacific Railway Company's new office at Portland, Ore. Mr. Day is well known to the telegraph and railroad professions.

THE EASTERN DIVISION of the Association of Railway Telegraph Superintendents will hold its regular meeting in New York, November 17, in the Young Men's Christian Association rooms at the Pennsylvania Station, Thirty-third street. The meeting will be called to order 10 a. m. Arrangements have been made for a very interesting paper on duplex telegraphing. Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., is chairman of the Eastern Division.

The Telephone and Telegraph on Railroads.

The question is frequently asked as to whether the telephone as used in the railway service is as efficient as the telegraph in the transmission of messages to way stations. As is well known, the method employed in each is quite different to that of the other, and it would be interesting to know the experiences on the different roads and the comparative results.

One railroad telegraph superintendent, who has given the matter some thought, Mr. V. T. Kissinger, of the Chicago, Burlington and Quincy Railroad, writes as follows on the subject:

"I do not believe anyone can make a positive statement that the telephone or the telegraph is superior in all cases for this class of traffic. We do know, however, that on certain lines, more messages can be handled, just as efficiently by telephone as a less number by telegraph. Probably the reverse would be true elsewhere, on the same railroad.

"The percentage of errors should not be greater over the telephone, depending more upon the experience and reliability of the operators."

We would like to hear from other superintendents on this important and interesting subject.

Wireless Experiments on New Haven Road.

MR. N. E. SMITH, superintendent of telegraph, New York, New Haven and Hartford Railroad Company, New Haven, Conn., sends us the following account of some experiments made recently by him to ascertain if the induction from that company's electric system interfered with wireless signals.

"We installed a wireless receiving plant in my private office several months ago, as a matter of experiment, and, principally, to ascertain whether or not induction from our electric system would interfere with incoming wireless signals. We placed an aerial on the top of our office building, the antenna of which is about 180 feet long and 125 feet from the ground. One of the wireless companies kindly loaned us a receiving set, with which to make our test. We found that the electric system had no appreciable effect and we have been very much gratified at the results we have noted. We have heard from Key West and on one occasion we were quite positive we heard Panama, but as to this we were not absolutely sure.

"On another occasion we were very much surprised to hear voices and phonograph music from some wireless telephone plant. We distinctly heard conversation and a Caruso phonograph record, also a band record. We were uncertain as to where the music originated, but after a little investigation we ascertained that it came from Wanamaker's New York store, where experiments were being made with wireless telephony with their Philadelphia establishment."

MUNICIPAL ELECTRICIANS.

ROCKFORD, ILL., FIRE ALARM SYSTEM.—The fire alarm system at Rockford, Ill., is a part of the fire department, under the supervision of the chief, and is maintained by city electrician Fern Shaver. Mr. Shaver also installs street lamps and maintains the police signaling system. The apparatus at fire department headquarters is of the automatic type and Gamewell make, and was installed in 1903.

FREDERICK S. PEACE, of Pittsburgh, Pa., agent for the Gamewell Fire Alarm Telegraph Company, Upper Newton Falls, Mass., was killed in an automobile accident at Butler, Pa., September 26. Mr. Peace installed the police telegraph system in York, Pa., in 1901, and had charge of the installation of the central electrical bureau at the York city hall. With him at the time of the accident was Frederick Wilson, chief of the Jamestown, N. Y., fire department, who was also killed.

L. S. BOSLEY, aged forty-six years, superintendent of fire telegraph, Springfield, Ohio, and fourth vice-president of the International Association of Municipal Electricians, died in the hospital at Springfield, on September 21, from the effect of injuries received by falling from a pole. Secretary C. R. George, Houston, Tex., sent a floral offering on behalf of the International Association of Municipal Electricians. As a mark of respect to the memory of the deceased all of the engine houses and headquarters were ordered draped in mourning for thirty days.

OBITUARY.

G. D. TROUT, a telegraph operator of Omaha, Neb., died in that city September 23.

JAMES U. RUST, aged sixty years, a prominent business man of Nashville, Tenn., and formerly a telegraph operator, died in that city October 1. He left the telegraph service in 1891, being at that time chief operator in the Nashville office.

ABEL H. BLISS, aged seventy-five years, one of the best-known old-time and military telegraphers, died at his home in Chicago on September 7. Mr. Bliss had been in failing health for some time. He was president of the Old-Time Telegraphers and Historical Association in the year 1893. He had a splendid career as a military telegrapher during the Civil War. Mr. Bliss became a member of the Chicago Board of Trade in the late sixties and amassed a fortune, retiring from active business cares about twenty years ago. He was a frequent attendant at the annual gatherings of old-time and military telegraphers and was the life of these reunions.

W. H. Woodring.

Mr. William H. Woodring, an old-time and military telegrapher, whose picture, which was taken in 1863, is shown herewith, is now a resident of New York City. Mr. Woodring was born near Easton, Pa., in 1841, and entered the telegraph service at Freeport, Ill., in 1855, for the Illinois and Mississippi Telegraph Company. He enlisted as a soldier on May 2, 1861, resigning as manager of the Rock Island, Ill., office to enter the military service. On March 2, 1862, Mr. Woodring was detailed for military telegraph service in the Department of Missouri under Captain George H. Smith, with headquarters at St. Louis, Mo. The uniform that Mr. Woodring wore when the accompanying photograph was taken was the one prescribed by General J. C. Fremont, commander of the Department of Missouri. This uniform was generally worn by tele-



W. H. WOODRING

graph operators in the service in the western army. At the close of hostilities Mr. Woodring became manager at St. Joseph, Mo., for the Western Union, and went to Kansas City as chief operator for the same interests in 1875, which position he held until 1886, when he was transferred to Omaha as manager of that office. This position he held until the end of the year, when he embarked in the electrical business. This ended Mr. Woodring's connection with the telegraph service. He is now living in retirement. Mr. Woodring was present at the reunion of the Society of the United States Military Telegraph Corps.

Miscellaneous Items.

In these days of wonderful electrical achievements one makes "light" of electricity.

SOME KIND OF A BIRD.—A message was recently received, addressed to the "Bird Hospital." The delivery clerk, after a mental contortion, directed delivery to the "Sparrow Hospital," and notified the sender. It was reported that the sender knew it to be some kind of a bird, but was not sure just what kind.—*Western Union News.*

"The train struck the man, did it not?" asked the lawyer of the engineer at the trial.

"It did, sir," said the engineer.

"Was the man on the track, sir?" thundered the lawyer.

"On the track?" asked the engineer. "Of course he was. No engineer worthy of his job would run his train into the woods after a man, sir."

LITTLE VERSES AND BIG NAMES is the title of a new book just issued. In it we find the following credited to Col. R. C. Clowry:

"Burros and Bureaus." "A good many years ago, when I was traveling in Arizona with the late Jay Gould, who controlled the Western Union Telegraph Company at that time, he purchased two burros and shipped them to two of his sons at Irvington, New York. On arrival there the agent, not understanding the situation and supposing burro spelled bureau, telegraphed the superintendent in New York as follows: 'Am short two bureaus and ahead two jackasses. Answer.'"

COMMISSIONS NOT REBATES.—The California Railroad Commission has decided that a telegraph company cannot demand from another telegraph company commission on business handed in from stores and hotels to be delivered to another company for transmission. In such cases hotels and stores act as agents and the payment of commissions to them is not in the nature of rebates.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. 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.

The Barclay Printing Telegraph System.

A new edition of "The Barclay Printing Telegraph System," written by Mr. William Finn, the well-known telegraph engineer, has been published and is now obtainable. This book gives a very complete description of the Barclay system, and has been reproduced to meet the constant call for information on the subject. It is well illustrated and is printed in clear type on finely finished paper. Every telegrapher should be familiar with the system. The price of the book is only fifty cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Any book published on telegraph, telephone, cable, radio and general electrical subjects can be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

INDUSTRIAL

Diaphragm Telegraph Sounder.

The Railways Labor-Saving Device Company, Davenport, Iowa, is marketing a device for attaching to an ordinary relay for the purpose of amplifying the sound produced by the action of the armature. It is a substitute for a sounder and gives a sharp, loud sound which is found very desirable in noisy places. There is no local battery to look after and no other adjustment to maintain than that of the relay.

In contact with the armature lever at the top is a pivoted arm the opposite end of which impinges on a diaphragm at the small end of a sounding horn. The dots and dashes being transmitted mechanically to the diaphragm by means of the arm are magnified in sound through the horn. It is evident that on a very fine adjustment of the relay the telegraph characters can be easily read by means of this device—adjustments so fine that they would be difficult to maintain with a sounder in circuit.

This diaphragm sounder is a practical instrument, and works perfectly on relays wound for standard or low resistance. Sound of any loudness can be obtained from it by varying the play of the relay armature lever. The device has no moving parts to get out of order, and is substantially made.

"DEPARTMENT OF TELEGRAPHS" is the title of a school, organized and established at 302 Broadway, New York, for the purpose of teaching operators the Continental code and radio telegraphy. Those in charge are all expert wire and wireless operators. Operators frequently write to us asking where they can learn the Continental or universal code and prepare themselves for positions as wireless operators. Here is their opportunity. The charges are exceedingly moderate. Their advertisement will be found in another column in this issue.

ANNUAL ENTERTAINMENT AND RECEPTION 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, will be held at the Lexington Avenue Opera House, Fifty-eighth street, near Third avenue, New York, Tuesday evening, November 16. As usual, a high-class bill of professional talent will be presented. Mr. R. J. Marrin has been again selected as chairman of the entertainment committee. The relief fund is an auxiliary of the society, and its purpose is to relieve distress among non-members of the profession, and afford a decent burial to unfortunate operators. Since the inception of this fund, in 1885, it has been the proud boast of the New York Telegraphers' Aid Society that any telegrapher residing in the vicinity of New York, and who died without means, should always be provided with a proper resting place and this practice has been faithfully maintained. As a matter of fact, the records show that in more than one instance the remains of a telegrapher have been actually disinterred from Potter's Field, where they were buried as unknowns and without friends, and finally given a proper burial, through the efforts

of this society. A great deal of good is accomplished, and these entertainments should receive the earnest support of all telegraph people.

New York Telegrapher's 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	\$25,912.75
Receipts	1,511.48
Total	\$27,424.23

DISBURSEMENTS.

Death benefits	\$700.00
Sick benefits	983.00
Expenses	321.40
Balance on hand September 6	2,004.40
Total	\$25,419.83

Total	\$27,424.23
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RELIEF FUND.

Balance on hand June 6	\$6,041.20
Receipts	153.96

Total	\$6,195.16
Disbursements	\$138.00

Balance on hand September 6	6,057.16
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Total	\$6,195.16
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Book on Cable Testing and Working

The third edition of "Beginners' Manual of Submarine Cable Testing and Working," by G. M. Baines, Carcavellos, Portugal, has been issued. The author is a practical cable man and has written the book in as clear a manner as possible for the benefit of beginners and students. The book contains eighteen chapters, covering every branch of cable work, principles and practice, and will be found very useful by all telegraph, telephone and general electrical engineers.

The price of the book is \$3.50 per copy, and copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

BOUND VOLUMES OF TELEGRAPH AND TELEPHONE AGE for 1914 are now available at \$3.50 per copy. Sent by express, charges collect. Unbound copies for the entire year 1914 can also be had at a cost of \$2.00, carrying charges prepaid. This affords an opportunity to secure a complete record of telegraphic and telephonic events for the year, besides descriptions of new inventions, articles by well-known writers and other matter of general interest to the telegraph and telephone worlds. Address, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

J. C. Lane, an old-timer of this office, died September 25 of heart trouble.

Frank O'Connor, traffic supervisor in the city line department, was married to Miss Agnes Sheehan, an operator in the Jersey division. Monday, October 4.

Theodore McAllister, formerly of this office (on the pension roll), died recently at Rhinecliff, N. Y.

Business in the general operating department during the past month has been very heavy and, it is stated, breaks the record for the amount handled.

Mr. J. Morison, force chief in this office, has been appointed general traffic chief, with general supervision over the way and city wires.

Among recent visitors here were J. A. Larimore, chief operator, Pittsburgh, Pa., and W. H. Peterson, chief operator, Scranton, Pa.

C. C. Lever, general wire chief, has been appointed assistant division wire chief.

G. C. Gute, assistant wire chief, has been appointed acting wire chief.

J. D. Price, of the division traffic superintendent's staff, has been appointed division traffic supervisor.

W. T. Rogers has been appointed division wire chief and division traffic engineer.

L. C. Boochever, of the division office staff, has been appointed inspector.

Andrew G. Waring, aged sixty-eight years, for over forty-five years identified with the Commercial News Department, and who has been on sick leave for some time past, died October 8.

The employees of the Central Cable office, 16 Broad street, New York, enjoyed an outing at Donnelly's Grove, College Point, L. I., Sunday, September 12, going there by the cable steamer "Western Union." After an enjoyable breakfast various games were indulged in. A game of baseball between the married and single men resulted in a score of 8 to 6 in favor of the singles. A 100-yard dash was won by G. Shea, G. Murray, second, and John Wiseman, third. The married men's race of 75 yards was won by W. Wiseman. The fat men's race, 50 yards, was won by R. H. Hairston. Other races and the winners were: Three-legged, P. Cahill and J.

SYSTEMATIC and thorough instruction in all branches of the Telegraphic Art. Installation, Maintenance and Operation of Radio, Submarine and Land Line telegraph apparatus reliably taught by experienced instructors.

Dep't of Telegraphs
Radio Stations of the World,
302 Broadway, N. Y.

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.

Lawlor; quarter-mile run, A. Lombardi. The judges were G. M. Messner, manager cable bureau; John Simmonds, division cable manager, and W. A. McAllister, traffic superintendent. After the games dinner was served. The committee in charge of the affair was composed of D. J. Gilvey, chairman; F. H. Stuchbury, A. B. Fiske, W. Virge, T. Pakenham, J. Matier and F. X. Hickey.

PHILADELPHIA POSTAL.

Manager F. H. Hoefling, of the Broad street station, was married September 21 to Miss Edythe A. Kayne.

Mr. Thos. B. Riley, manager at Shenandoah, Pa., was a recent visitor.

Chief service clerk John A. Jeffries has returned to his desk from a vacation, much refreshed.

CLEVELAND POSTAL.

Mr. Robert S. Ingle, former chief clerk of the Postal in Cleveland, Chicago, Kansas City, St. Louis and Chattanooga, appears on the New York Life Insurance Company's July and August honor rolls as one of twenty leaders in both number of policies and "Volume of business" written for those months. He is making a specialty of protection for telegraph, telephone and railroad men in the United States and Canada, many persons assuming life insurance hitherto unobtainable or restricted because of reputed hazard. Mr. Ingle retains his membership in the Telegraph and Telephone Life Insurance Association and, of course, is a subscriber to TELEGRAPH AND TELEPHONE AGE.

Mr. E. W. Collins, general superintendent, Chicago, was a recent visitor to the Cleveland office. Mr. Collins always has a pleasant word for everyone.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources - - - \$900,000
Surplus - - - 35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 20 to 25, Full Grade, \$1.25; Half Grade, 62c. 25 to 30, Full Grade, \$1.50; Half Grade, 75c. 30 to 35, Full Grade, \$1.75; Half Grade, 87c. 35 to 40, Full Grade, \$2.00; Half Grade, \$1.00. 40 to 45, Full Grade, \$2.25; Half Grade, \$1.12c. 45 to 50, Full Grade, \$2.50; Half Grade, \$1.25. 50 to 55, Full Grade, \$2.75; Half Grade, \$1.37c. 55 to 60, Full Grade, \$3.00; Half Grade, \$1.50. 60 to 65, Full Grade, \$3.25; Half Grade, \$1.62c. 65 to 70, Full Grade, \$3.50; Half Grade, \$1.75. 70 to 75, Full Grade, \$3.75; Half Grade, \$1.87c. 75 to 80, Full Grade, \$4.00; Half Grade, \$2.00. 80 to 85, Full Grade, \$4.25; Half Grade, \$2.12c. 85 to 90, Full Grade, \$4.50; Half Grade, \$2.25. 90 to 95, Full Grade, \$4.75; Half Grade, \$2.37c. 95 to 100, Full Grade, \$5.00; Half Grade, \$2.50.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 21.

NEW YORK, NOVEMBER 1, 1915.

Thirty-third Year.

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The Selector.

The selector is a comparatively recent invention. Its purpose is to select a particular office or station from a number of others on the same circuit and, at that point only, ring a bell continuously until the person signaled shuts it off by means of a push button or other device. The operation requires only a few seconds of time, after which the wire may be immediately placed in regular service. The principal advantage possessed by the selector as a call system is that it is a "long-distance" method and does not interfere with the regular use of the wires through its connection therewith.

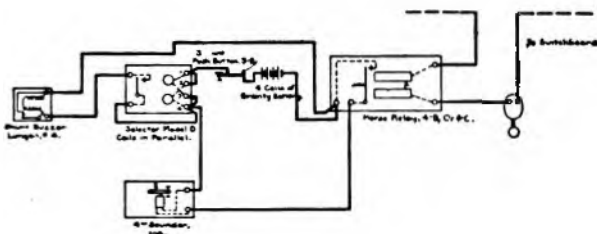
The principle of operation is similar to that employed in unlocking a combination safe lock. For instance, no amount of turning or twisting of the knob or handle of a safe door will unlock it unless the movements are done in a methodical manner, step by step, and in a regular order of rotation.

In the Gill selector system, the actual connections of which are shown in the accompanying diagram, and which will serve as an example to illustrate the principle involved in selectors generally, the lever of an ordinary Morse relay in the circuit actuates the mechanism of the selector controlling a prearranged combination through its back-stop contact point, which, of course, is especially insulated from the front stop controlling the regular Morse sounder. The regular local battery operates both the sounder and the selector magnet according to the position of the relay lever. The selectors are sometimes connected in series or multiple with the sounder instead of being operated on the back contact of the relays.

It is obvious that the mechanism of the selector, like the handle of the safe door, may be kept in

irregular activity all day without unlocking. Hence the regular movements of the relay lever which occur at all times when the Morse circuit is in operation cause no signal to be recorded, but the moment the prearranged call, usually consisting of five figures, is transmitted over the line in the predetermined combination, the mechanism of the selector is operated and closes a local circuit containing a bell, buzzer or lamp, as the case may be. If desired, the selector current can be arranged so that the moment the local circuit is closed an automatic signaling device at that station becomes active and returns an answering signal to the calling station, thus announcing the actual reception of the first call.

The signals to operate the selectors are transmitted over the line by means of a breakwheel operated by a mechanism similar to that used in the ordinary call-box systems. Each opening of the circuit thus causes the Morse relay lever to fall to the back stop. In this position the lever shifts the



SELECTOR CONNECTIONS.

local battery to the magnet of the selector and thus actuates the armature controlling the selector mechanism.

The signal usually consists of a number of figures, each numeral of which is represented by as many "dashes," or rather, openings of the circuit, as the figure represents. Thus No. 12345 would be transmitted as one, two, three, four and five "dashes" or breaks, respectively, instead of Morse characters representing the figures. In practice, however, selector combinations are more like this: 612321, 621341, 613241, etc. They always begin with six dashes for a "clearing-out" signal, and end with one dash to close the signal contact on the last step. These combinations are called five-figure combinations, the 6 not being counted, as it is only a preparatory or clearing-out signal. More dashes than six would produce the same effect, but fewer than six would not.

Selectors are being used at repeater stations to call the repeater chiefs to the particular set where trouble may exist. They are also being used at large offices where way lines are centered. In this case their use permits of a large number of these lines being concentrated on a single table before a small group of operators. No calls other than for this office are received, and those are controlled by the selectors.

In telegraph service it is possible to make these

signals by hand instead of using the breakwheel. Selective calling systems are also adapted to telephone circuits and although the arrangements are slightly modified the principle of operation is the same.

Telegraph and Telephone Patents.

ISSUED OCTOBER 5.

1,155,672. Telephone Exchange System. To T. G. Martin, Chicago, Ill.

1,156,043. Telegraph System. To W. H. Shephard and A. E. McKechnie, Bayswater, London, England.

ISSUED OCTOBER 12.

1,156,253. Telephone System. To LeR. W. Stanton, Cleveland, Ohio.

1,156,416. Telephone Exchange System. To F. R. McBerty, Antwerp, Belgium.

1,156,450. Cord Circuit for Telephone Systems. To B. D. Willis, Chicago, Ill.

1,156,475. Automatic Telephone Exchange System. To C. L. Goodrum, Rochester, N. Y.

1,156,509. Microphone. To E. Weintraub and L. B. Miller, Lynn, Mass.

1,156,524. Selenium Cell Especially Adapted for Use in Connection With Telegraphy. To K. C. Cox, Norfolk Island.

1,156,625. Wireless Receiving Improvement. To G. W. Pickard, Amesbury, Mass.

1,156,626. Telephone System. To R. L. Quass, New York.

1,156,636. Telephone Repeater. To H. E. Shreeve, Short Hills, N. J.

1,156,677. Apparatus for the Transmission of Energy by Electric Oscillation. To R. A. Fessenden, Washington, D. C.

1,156,867. Universal Sound Transmitting Means. To P. J. Hackett, Seattle, Wash.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on October 26:

American Telephone and Telegraph Co.	124 $\frac{3}{8}$
Mackay Companies	79 $\frac{1}{2}$ -80 $\frac{1}{8}$
Mackay Companies, preferred	65 $\frac{3}{4}$
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	43 $\frac{3}{8}$
Western Union Telegraph Co.	79 $\frac{1}{2}$

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's

name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. A. W. ORTON, of Rome, N. Y., an old-time and military telegrapher, attended the recent reunion of the Society of the United States Military Telegraph Corps in New York. Mr. Orton is a prominent member of that organization. He is now in another line of business at Rome.

MR. O. W. CLAPP, a well-known member of the Chicago Board of Trade, joined that organization in 1858, and has been a member continuously up to the present time. Mr. Clapp began the leasing of wires in the late seventies, and the amount of telegraph business exchanged under his name has been enormous, no doubt reaching many million messages.

MR. CHARLES R. UNDERHILL, chief electrical engineer, The Acme Wire Company, New Haven, Conn., lectured on "Electromagnets" at the University of Michigan, October 14; the University of Minnesota, October 18; the Iowa State College, October 20, and at the University of Wisconsin, October 22. During November Mr. Underhill will lecture on the same subject before the engineering students of several other colleges in the middle-west.

F. F. Fitzpatrick, Member Executive Committee, Old-Time Telegraphers and Historical Association.

The accompanying illustration is made from a portrait of Mr. Frederick F. Fitzpatrick, of New York, a member of the executive committee of the Old-Time Telegraphers and Historical Association.

Mr. Fitzpatrick has been successful in every enterprise he has undertaken, and his ability and geniality has made for him a host of friends. As an officer of the Old Timers' Association he was among those who favored the holding of the reunion in New York this year, as he believed the war in Europe, deplorable as it may be, should not be let interfere with such a congenial gathering of the old "Knights of the Key."

In the year 1881 Mr. Fitzpatrick was in the service of the Western Union Telegraph Company at Kansas City, Mo., and for some years thereafter was employed by different railroads in the West. In the year 1886 he entered the executive department of the Missouri Pacific Railway Company, remaining with that road until 1898, and during that period was assigned to positions of sufficiently varied and responsible a nature to give him a broad and comprehensive training in railroad matters.

In the year 1898 he became identified with the railway supply business in St. Louis, Mo., and has been connected with the Railway Steel-Spring Company since its organization in 1902, and on November 1, 1910, was elected its president.

The four most important positions in the organization of the Railway Steel-Spring Company are held by ex-telegraphers. Mr. Samuel T. Fulton, a member of the Old-Time Telegraphers and Historical Association, and formerly assistant to the



F. F. FITZPATRICK.

president of the Chicago, Rock Island and Pacific Railway, is its vice-president; Mr. M. B. Parker, formerly a telegrapher at Philadelphia, is its secretary, and Mr. F. J. Foley, formerly a railroad telegrapher in the West, is its general superintendent.

CANADIAN NOTES.

MR. J. McMILLAN, manager, Canadian Pacific Railway Company's telegraph, Montreal, Que., who recently returned from an inspection trip to the Pacific Coast, reports that he found the telegraph business in the west generally improved.

MR. G. W. PERRY, general manager, the Great North Western Telegraph Company, Toronto, Ont., is on an extended trip of inspection through the Canadian west, having visited Port Arthur, Fort William, Winnipeg, Regina, Saskatoon, Edmonton, Calgary. He also took advantage of the opportunity to visit Banff Spring, Lake Louise, Victoria and Vancouver. Mr. G. H. Stead, superintendent of the fifth district, accompanied Mr. Perry to Regina, Moose Jaw, Saskatoon, Edmonton and Calgary, while Mr. C. E. Davies, traffic superintendent, made one of the party a portion of the time, inspecting the installation of the new plants at Regina, Saskatoon and Edmonton, and arranging traffic organization at Regina, Saskatoon, Edmonton and Calgary.

MR. J. W. BAKER has been appointed chief operator at Vancouver, B. C., for the Canadian Pacific Railway Company's telegraph, vice F. L. Swift, resigned.

MR. I. N. MILLER, JR., president and treasurer, British Columbia District Telegraph and Delivery Company, Ltd., Vancouver, B. C., is also president of the American Club of that city. On October 7 the club's new quarters were opened, and Mr. Miller made the address of welcome. Mrs. Miller took part in the musical programme during the evening.

Grand Trunk Telegraph Appointments.

The following appointments in the service of the Grand Trunk Pacific Railway and Grand Trunk Pacific Telegraph Company are announced by Mr. H. Hulatt, manager of telegraphs:

MR. W. J. ROONEY, division superintendent of telegraphs (lines in Alberta and British Columbia), with office at Edmonton, Alta.

MR. F. T. CALDWELL, division superintendent of telegraphs (lines Cochrane and West in Ontario, Manitoba and Saskatchewan), with office at Winnipeg, Man. Mr. Caldwell has also been appointed superintendent of time service.

The positions of superintendent of plant, and commercial and traffic superintendent at Winnipeg, Man., have been abolished.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. CHARLES P. BRUCH, vice-president of this company, has received the nomination for president of the Ohio Society of New York. He will be elected on November 30 and will succeed Mr. William H. Truesdale, president of the Delaware, Lackawanna and Western Railroad. Mr. Henry W. Taft, brother of former President Taft, is an ex-president of the society.

MANAGERS APPOINTED.—R. E. Gibbons, Lansing, Mich.; H. E. Daniels, Garden City, Kan.; H. L. Carpenter, Herkimer, N. Y.; C. A. Miller, Carlisle, Pa.

MR. A. B. BANKER, manager of the Paul Smith's Hotel Company, Paul Smith's, N. Y., was a recent New York business visitor. Mr. Banker was formerly an operator in the main office of the Postal Telegraph-Cable Company, New York. Eighteen years ago he was transferred to Paul Smith's as operator for the summer season. He took advantage of the opportunities afforded him and made such a favorable impression on his employers, with the result that to-day he is business manager of this enormous hotel property.

LINES RESTORED.—All of the lines in the south that were damaged by the recent severe storms in that section have been restored and are now in working order.

POSTAL TELEPHONE IN OHIO.—The Cincinnati and Suburban Bell Telephone Company has applied to the Ohio Utilities Commission for an order to prevent the Ohio Postal Telegraph-Cable Company from transposing its wires for telephone use in Butler County, Ohio.

LINE COMPLETED.—The new line from Seattle to Sumas, Wash., on the Canadian border, has been completed. It consists of two copper wires and two iron wires. The copper wires are arranged for telephone use. The distance between the two points is 125 miles.

MAGNETIC CLUB DINNER.—The fall dinner of the Magnetic Club will be held at the McAlpin Hotel, Broadway and Thirty-fourth street, New York, at 6:30 p. m., Wednesday, November 17. The tickets will be \$2.00 each and may be obtained of Mr. J. J. Cardona, treasurer, 253 Broadway.

New Postal Office at Jacksonville, Fla.

Owing to the large increase of business, the Postal Telegraph-Cable Company moved into more commodious quarters at Jacksonville, Fla., September 1. The new office, at 115 West Forsyth street, is located in the heart of the hotel, financial and business district. It has twice the space of the

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. G. M. YORKE, general superintendent of plant, has returned from a business trip to Chicago, where he spent several days.

MR. W. N. FASHBAUGH, general superintendent of traffic, is in Boston on company business.

MR. R. E. CHETWOOD, plant engineer, New York, spent October 20 in Boston on company business.

MR. T. W. CARROLL, division traffic superintendent, Chicago, Ill., was a recent executive office visitor. He was accompanied to New York by Mrs. Carroll.

MR. DAVID B. COXE has been appointed supervisor of the Wilmington, Del., office of this company.

MR. E. L. MORGAN, automatic chief, St. Louis, Mo., spent the week ending October 23 in New



JACKSONVILLE, FLA., OFFICE, POSTAL TELEGRAPH-CABLE COMPANY.

old one, and is fitted throughout with new and handsome quartered oak furniture. The electrical equipment, which is modern in every respect, has been greatly increased to meet the requirements of the company's growing business throughout the state. To G. W. Ribble, district superintendent, and J. F. Heard, division electrical engineer, Atlanta, Ga., belong the credit of the design and fitting up of the new office.

Mr. J. C. Dolive is manager; W. H. Romyed, chief operator, and C. M. Holmes, night chief operator, besides a large force of operators and clerks.

York in connection with testing and regulating matters.

MR. GEORGE R. SHULTZ, manager of the Punta Rassa, Fla., cable office of the Western Union Telegraph Company, accompanied by Mrs. Shultz, is visiting friends in New York, where he is well and favorably known. Mr. Shultz has been manager of the Punta Rassa office for forty-eight years.

THE OFFICES of the secretary and treasurer have been moved to temporary quarters on the fifth floor at 16 Dey street.

THE EARNINGS REPORT of this company for nine months ended September 30, 1914 and 1915 (month of September, 1915, estimated), shows the following results:

	1914	1915
Total Revenues	\$35,486,659.00	\$37,653,422.00
Maintenance Repairs and Re- served for Depreciation....	6,049,060.00	6,092,182.00
Other Operating Expenses, in- cluding Rent of Leased Lines and Taxes	24,499,985.00	23,931,590.00
Total Expenses	30,549,045.00	30,023,772.00
Balance	4,937,614.00	7,629,650.00
Deduct Interest on Bonded Debt	1,002,937.00	1,001,836.00
Net Income	3,934,677.00	6,627,814.00

Western Union Helena, Mont., Office.

The new office of the Western Union Telegraph Company at Helena, Mont., is located in a building, erected expressly for the company, and has been fitted up with modern equipment and furnishings in all departments.

The following facts and illustration are reprinted by courtesy of the *Western Union News*:

The operating room, with the rest and retiring rooms for men and women, occupy the second floor and the commercial department the first floor, where the office is one of the handsomest in the state. The excellent natural light and abundance of fresh air is greatly appreciated by the sixty-one traffic employees, who were glad to move from the old quarters, where the personal comforts were meagre.

A comfortable and well-appointed rest room for women and an appropriately furnished smoking room for men are situated in the rear of the operat-

Western Union Educational Society.

The first regular meeting of the Western Union Educational Society for the 1915-1916 season was held at 24 Walker street, New York, in the evening of October 19. There was a large attendance and excellent entertainment was provided.

The musical numbers included: Piano duet, by Miss M. Larkin and Mr. W. Vaughn; vocal solos, by Miss N. Fox, Mr. N. Giffen, Miss Mabel Peacock and Mr. P. Spinnelli; selections by string orchestra, by Messrs. W. Vaughn, A. Reader, J. Dunn, A. Grieger, H. Sears, J. McIntyre, V. Corsini, W. Ryan and F. Barbusca; banjo solos, by Mr. J. Dunn, assisted by Mr. A. Grieger; song, by Miss D. Laufer, and violin solo, by Mr. Sears, assisted by Mr. McIntyre. Misses Alice Sheridan and Mary Larkin acted as accompanists.

All of the entertainers are employees of the main operating department at 24 Walker street.

Mr. Newcomb Carlton, president of the company, was present and made an appropriate and interesting address.

District commercial superintendent Mr. W. A. Sawyer addressed the meeting on the evolution of commercial and traffic methods resulting in the wonderful efficiencies of the present day, and he praised the traffic department for its good work along lines, thought a few years ago to be absurd and impossible.

"This is a day of specialization," he said, "and you members of the New York Western Union Educational Society should specialize on something and become as expert as you can on that one thing; your turn will come to make use of it. Take an interest in some particular part of your work, and make special study of it. That does not mean that



MAIN OPERATING ROOM, HELENA, MONT.

ing room. The Helena office is about the most important between St. Paul and the Pacific coast. L. E. Rudd is manager; C. C. Maxson, chief operator; A. Cullen, night chief operator; W. K. Thomson, late night chief operator; G. O. McNerney, wire chief; H. G. Bennett, quadruplex and repeater chief; O. A. Fisher, printer chief; L. P. Taber, traffic supervisor; G. P. Smith, way supervisor, and C. Q. Adams, night traffic supervisor.

you could not interest yourself in the general work of the office. But you do not wish to remain in the same position, you wish to go up, and it seems to me the way is to specialize."

Mr. A. C. Kaufman, of the commercial department, also made a short address, and emphasized the value of helping one another. "I believe in efficiency methods and all they stand for," he said. "It is simply the American idea of getting some-

where. If you will help one another you will find it will help the other fellow and yourself alike. It will help your own department; it will help the other department, and bring all together in the welfare interests of the company."

Mr. S. B. Haig, president of the society, said: "The purposes of the society are few and simple. By meeting together and by establishing our library we hoped to encourage our members to study self-development along practical lines. There are, at present, eight hundred volumes in the library, and since last December twelve hundred volumes have been circulated."

"The second year of the society's existence should eclipse the success of the past year. The year's work will be a success if each member will keep before him and will live the motto of the society—those words of Abraham Lincoln: 'I will study and prepare myself and some day, maybe, my chance will come.'"

During the winter there will be an electrical course two evenings a week, from 5:30 to 6:30, and two classes a week in English and letter writing.

Following the formal exercises, refreshments were served, after which there was dancing, and all had an enjoyable time.

THE CABLE.

DWIGHT B. CASE, aged seventy-two years, a prominent New York telegrapher for the past forty years, who has been seriously ill at his home at Roosevelt, L. I., for some time past, died October 20. Mr. Case retired from the telegraph service about ten years ago, after filling the position of chief operator of the Central Cable office, New York, for the previous twenty years. Interment was at Simsbury, Conn.

BULGARIAN BUSINESS.—Messages to or from Bulgaria are not now permitted to pass through British, French or Italian territory. Telegrams for Roumania can only go via England and Russia.

THE FRENCH CABLE COMPANY has opened for traffic a submarine cable between San Domingo and Mayaguez, Porto Rico, connected by an overland line, 115 miles in length, with San Juan.

Retirement of Mr. S. Fenn.

An interesting ceremony took place at the executive offices of the Western Union Cable System, at 26 Old Broad street, London, England, on July 29, says *Western Union News*. The occasion was the retirement of Mr. S. Fenn from the office of traffic manager. Mr. Stanley F. Goddard, the European representative, in the presence of a committee of the subscribers, and on behalf of all the members of the staff, presented Mr. Fenn with an illuminated address, setting forth the esteem in which Mr. Fenn is held by his associates, a silver tea and coffee set and a handsome grandfather's clock. Mr. Goddard spoke feelingly of Mr. Fenn's long and successful period of service, and expressed the hope that he would live long to enjoy his well-earned pension.

In acknowledging the address and gifts, Mr. Fenn expressed his grateful appreciation of the kindly feeling shown towards him by the combined staff of the Western Union Cable System. He gave an interesting account of his career from the time of his joining, as a boy, the service of the London District Telegraph Company in the year 1866, to his appointment to the position from which he was now retiring, owing to ill health. Mr. Fenn, with difficulty, keeping his emotion under control, bade farewell to the staff, through the committee he was addressing, and expressed the wish that many would reach high positions and that each and every one would be prosperous and happy in the service of the Western Union Company.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to October 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Sitoebondo and Singaradja, October 20, 1915.

THE TELEPHONE.

A. T. & T. EARNINGS.—The earnings report of the American Telephone and Telegraph Company for nine months ending September 30, shows the following results as compared with the corresponding period in 1914:

	1914	1915
Total Earnings	\$34,602,914.93	\$34,769,035.71
Expenses	4,112,484.85	4,181,120.90
Net Earnings	30,490,430.08	30,587,914.81
Deduct Interest	6,241,562.35	5,049,384.13
Balance	24,248,867.73	25,538,530.68
Dividends Paid	20,679,164.54	21,592,194.63
Balance	3,569,703.19	3,946,336.05

BELL SYSTEM EARNINGS.—The earnings report of the Bell Telephone System in the United States for eight months ending August 21, shows the following results as compared with the corresponding period in 1914:

	1914	1915
Gross Earnings	\$149,669,237	\$156,750,415
Total Expenses	110,765,283	113,955,873
Net Earnings	38,903,954	42,794,542
Deduct Interest	12,547,139	12,281,386
Balance Net Profits	26,356,815	30,513,156
Deduct Dividends (paid for six months and estimated for two months)	20,277,995	21,568,279
Surplus Earnings	6,078,820	8,944,877

MR. THEO. N. VAIL, president American Telephone and Telegraph Company, has returned from San Francisco, where he attended a meeting of the

railroad commissioners of the United States and Canada. He made an address before that body at the dinner held October 12.

MR. T. D. LOCKWOOD, general patent attorney, American Telephone and Telegraph Company, Boston, Mass., was a recent visitor at headquarters in New York.

CORNER-STONE CEREMONIES.—The Friars laid the corner-stone of their new monastery, on West Forty-eighth street, New York, October 21, with ceremonies, the echoes of which were heard across the continent over the transcontinental telephone from the old clubhouse in West Forty-fifth street to the Administration Building of the Panama-Pacific Exposition in San Francisco.

AUSTRIAN TELEPHONE SERVICE.—There was a loss of \$1,450,000 last year on the Austrian telephone service. Economies have made a saving of \$450,000, but the remainder will have to be met by increasing the charges.

Review of Principal Articles in Contemporary Telephone Publications.

"ADVERTISING AND PUBLICITY IN THE TELEPHONE FIELD" is the title of an interesting account in *The Telephone News*, of the activities of the publicity department of the Bell Telephone Company of Pennsylvania. The whys and wherefores of advertising are discussed, and pointers are given on directory advertising, signs and special activities. The article is well illustrated.

PHYSICAL CONNECTION IN CANADA.—The Dominion of Canada Railway Commission recently ordered the Bell Telephone Company of Canada to connect with municipal or independent systems for long-distance service. *Telephony* for October 16 publishes abstracts of the order and of the dissenting opinion. The independent companies will take an appeal to the Supreme Court on the question of compensation.

MODERN WARFARE BY TELEPHONE.—The *Western Electric News* for September contains a lengthy and well-illustrated article on the uses of the telephone in modern warfare and military communication. It goes into the details of establishing and maintaining service under the severe conditions found at the front. The illustrations show the method of laying and erecting lines and operation of the system in the field and at headquarters.

INDIANA INDEPENDENT TELEPHONE ASSOCIATION.—A full account of the recent convention of the Indiana Independent Telephone Association in Indianapolis is printed in *Telephony* for September 25. The principal subjects discussed at the meeting were: Operation, workman's compensation, valuation, transmission efficiency and other topics of practical interest. President Uhl reviewed the history of the independent movement and secretary W. S. Vivian discussed the value of association.

OREGON RULES.—The rules prescribed and or-

dered by the Oregon Public Service Commission as a result of the investigation into the rates, charges and regulations of the Pacific Telephone and Telegraph Company, in the state of Oregon, are published in *Telephony* for October 16. The rules cover advance payments by subscribers, short term contracts, customers' deposits, termination of contracts, unmetered and flat-rate service charges, metered or measured exchange service, inter-exchange or toll service, interest on deposits, contracts, service connections, extensions, modifications.

MOTOR TRUCKS IN TELEPHONE CONSTRUCTION.—The *Telephone Review* prints an interesting article by W. J. Sommers and W. M. Van Deusen on special uses of motor trucks in telephone construction. The required characteristics of motor trucks for this class of work are dwelt on. The subjects considered in detail are the power winch and drums; truck body and derrick; resetting poles; pole replacement and shifting; pulling aerial cables, etc. It is an extremely practical article and is well illustrated with views showing the various operations in the construction of lines with the aid of motor trucks.

TELEPHONY IN ENGLAND.—*Telephony* for October 16 prints an interesting article by "Jack" Brooks, on the results of tests made on the new London-Birmingham-Liverpool telephone cable, and other subjects concerning telephone practice in England. It is estimated that the taxation of telephones made necessary by the new budget will increase the revenues on telephones by \$3,550,000 for the year 1916-1917. To obtain this increased revenue the flat rates to subscribers are increased from \$85 to \$100 per annum in London, and from \$50 to \$60 per annum in the provinces. Two-party and four-party line services are also increased, and the long-distance rates are advanced, according to mileage. Pay-station fees are raised also.

RADIO-TELEGRAPHY.

DR. LEE DE FOREST, the well-known wireless inventor, is in London, it is stated, for the purpose of adapting the audion amplifier to the detection of the approach of airships and Zeppelins.

MR. DAVID SARNOFF, assistant traffic manager of the Marconi Wireless Telegraph Company of America, sailed for Havana and other southern points on the steamer "Saratoga," October 23, for a vacation trip.

MR. CLARENCE B. SMITH, assistant auditor, Marconi Wireless Telegraph Company of America, New York, was married to Miss Georgiana Mae Axt, of Passaic, N. J., October 20, and is spending his honeymoon in Washington. His office associates presented the happy couple with a silver tea service.

MR. G. HAROLD PORTER, purchasing agent of the Marconi Wireless Telegraph Company of America, sailed on the steamer "Momus," October 23, for New Orleans with his family for a two weeks' rest.

"WHAT TRANSCONTINENTAL WIRELESS 'PHONE MEANS," is the title of an interesting article in the *New York Times* for October 17. The story is based on an interview with Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, regarding the significance and possibilities of transcontinental wireless telephony. An excellent picture of Mr. Vail accompanies the article.

WIRELESS WITHOUT TOWERS.—Mr. R. S. Woolverton, United States radio inspector at San Francisco, Cal., in collaboration with Palmer B. Hewlitt, of Hollister, Cal., has invented a method of transmitting and receiving radio messages without the use of towers. It is stated that the inventors have received messages from Honolulu, Hawaii; Sayville, L. I., and Arlington, Va. In place of the usual elevated antenna, a short wire is laid upon the ground.

Wireless Greetings.

Members of the International Gas Congress, the American Gas Institute and the Pacific Coast Association saw a Marconi wireless set in operation in a banquet room of the Inside Inn on the grounds of the Panama-Pacific Exposition, where they attended a dinner on the evening of September 30. Marconigrams were exchanged between Lucius E. Pinkham, governor of Hawaii, and Dr. Alexander C. Humphreys, president of the International Gas Congress.

A short aerial was installed on the roof of the Inn by the Marconi Wireless Telegraph Company of America and extended to the banquet table, where it was connected with a ten-inch induction coil and a tuner of the latest Marconi type. An operator in full uniform was in charge of the apparatus. The banquet table was in actual wireless communication with the Hawaiian city.

Value of Radio to Vessels in Distress.

During the fiscal year 1915 the radio inspectors of the Bureau of Navigation reported twenty-six cases of vessels leaving American ports which met with accident or disaster, requiring the use of wireless to summon assistance. Four of these were from fire; twelve were from running ashore, stranding, or getting into an ice jam; three were from the breakage of machinery; four resulted from collisions; one from shifting of cargo; one vessel was storm battered and water logged and one was torpedoed. Excepting in the case of the "Lusitania," which was torpedoed, the assistance thus rendered resulted in but two lives being lost. Since the close of the fiscal year the following disasters have occurred:

On September 13, the steamship "Sant' Anna," bound from New York to Naples with 1,700 Italian reservists and crew aboard, caught fire in mid-ocean and all persons on board were saved. The SOS call brought the steamship "Ancona" to the assistance of the disabled vessel and 600 persons were taken off. The "Sant' Anna" then proceeded to port, convoyed by the "Ancona," and the entire 1,700 passengers and crew saved.

Six days after the "Sant' Anna" disaster, the Greek liner "Athinai," bound from New York to Piraeus, caught fire in mid-ocean and was abandoned by the passengers and crew, numbering 470. The call for assistance was answered by the steamships "Tuscania" and "Roumanian Prince;" 341 persons were taken on board the "Tuscania," the remaining 129 being taken off by the "Roumanian Prince." The vessel was entirely destroyed.

The use of radio apparatus on vessels carrying passengers, or with fifty or more crew, is now accepted as essential to the safety of those on board, and the report of the "Athinai" shows conclusively that many persons might have been lost and perhaps the cause of the disaster never known had not this vessel been equipped with radio apparatus.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

CAPACITY OF AERIALS.—Prof. G. W. O. Howe read a paper before the British Association, at Manchester, England, September 10, on the subject of the capacity of aerials of the umbrella type, which paper is printed in full in *The Wireless World* (London) for September. Several curves and diagrams accompany the text. Prof. Howe is the subject of a personal sketch in the same number of *The Wireless World*, and a portrait of him appears as the frontispiece.

STRAIN IN MAST STAYS.—The result of practical experiments and calculations by an expert wireless engineer, engaged in erecting tall steel masts, are given in *The Wireless World* (London) for September. A useful formula for calculating the strain in mast stays is presented.

WIRELESS IN THE WAR.—An interesting article on the use of wireless telegraphy in the war is printed in the September number of *The Wireless World* (London). It gives a résumé of the work which is being accomplished both on land and sea, and is illustrated with a view of the Ok Meidan, Constantinople wireless station, and others.

THE WIRELESS AGE (New York), October number, contains several stories of a wireless character, which makes this number unusually interesting to those who like to indulge occasionally in reading matter of the lighter sort.

STANDARD EQUIPMENTS.—The two new Marconi standard equipments recently brought out—the two kilowatt and one-half kilowatt types—are fully described and illustrated in *The Wireless Age* (New York) for October.

SNAKE ON THE WIRES.—A lineman for the Postal Telegraph-Cable Company in Kansas, who was sent out to clear a cross, found an eight-foot snake lying across two wires. In removing the reptile he fell from the pole with the live snake twisted around his arm. An assistant killed the snake. The lineman suffered no injury from his fall.

Trans-Atlantic Wireless Telephone Now an Accomplished Fact.

Speech was successfully transmitted by wireless telephone from the Arlington, Va., radio station to the Eiffel Tower in Paris, and received at the latter station by two engineers of the American Telephone and Telegraph Company on October 21. The equipment used was that employed September 29 in talking by wireless telephone from Arlington to San Francisco and Honolulu, Hawaii.

The engineers stationed at the Eiffel Tower were Messrs. H. E. Shreeve and A. M. Curtis, and were sent there by Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company with receiving apparatus. Mr. Carty received a cablegram from Mr. Shreeve in Paris, who reported speech received by him and the time of its reception. Mr. B. B. Webb, one of the telephone engineers at the Arlington station, manipulated the transmitting apparatus and did the talking throughout.

Simultaneously with the reception at Paris, speech sent out from Arlington was received on the wireless antenna at the Western Electric laboratories in New York and at the temporary station of the American Telephone and Telegraph Company at the Pearl Harbor navy yard, Honolulu. Mr. Lloyd Espenschied, at Honolulu, reported that he heard the conversation throughout the entire schedule and that Mr. Webb's voice was easily recognized.

Colonel Samuel Reber, U. S. A., who is in charge of the radio signal service of the United States Army, stated that the successful transatlantic radio telephonic experiments, while possessing great historic interest as the first authentic instance of the transmission of audible speech across the Atlantic Ocean, have less scientific significance than the recent radio telephonic transmission from Arlington to San Francisco and Honolulu. The distance covered was much less than that from Arlington to Honolulu and the transmission almost entirely over water, a much easier condition. Had it not been for war conditions the engineers of the American Telephone and Telegraph Company would have talked to Paris from Arlington before they did to San Francisco and Honolulu.

A dispatch was received on the night of October 21 from Mr. Theo. N. Vail, president of the American Telephone and Telegraph Company, from the Hotel El Tovar, Grand Canyon, Arizona, in which he said:

"The talk from Washington this morning, heard both in Paris and Honolulu, is but an amplification of the talk previously had between New York and San Francisco via Washington, which was heard at Honolulu and many other wireless stations. It establishes as a fact that under favorable atmospheric and electrical conditions, with proper equipment which the engineers of the American Telephone and Telegraph Company have developed, we will be able to carry on conversation between New York and European points as well as to the western coast and points across the Pacific Ocean."

Mr. J. J. Carty, chief engineer of the telephone

company, stated that the trial from Arlington to Paris employed the new American Telephone and Telegraph wireless system, and was conducted by the company's engineers, Mr. R. A. Heising, Mr. B. B. Webb and others of its staff at Arlington, Va., and Mr. H. E. Shreeve and Mr. A. M. Curtis, two of its engineers, at the Eiffel Tower at Paris.

"In a cable message received from Mr. Shreeve," Mr. Carty said, "he reports the successful transmission of speech across the Atlantic. He heard Arlington say 'Hello,' and a number of other words, and he heard Arlington say 'Good-bye, Shreeve,' repeated a number of times.

"A most striking feature of these tests," continued Mr. Carty, "is that our engineer at Honolulu distinctly heard his associate, Mr. Webb, at Washington talking to Mr. Shreeve at Paris, and he recognized his voice. This I learned from a cable message which I have just received from Mr. Espenschied at Honolulu, stating he plainly heard Mr. Webb at Arlington talking to Mr. Shreeve at Paris saying 'Hello, Shreeve, this is Webb talking,' etc. Mr. Shreeve also reported hearing speech from Arlington on two days last week.

"Announcement of the success of these experiments," said Mr. Carty, in conclusion, "was deferred owing to the delays in cabling, and our inability to communicate promptly with the French officials. We are under the greatest obligations to the French officials for their extraordinary courtesy in permitting us to experiment at all at the Eiffel Tower when it is so urgently needed for military purposes. Only those who know the importance of wireless in the European war can appreciate the extraordinary nature of this courtesy of the French government, without which the result just achieved would not have been accomplished."

Preservative Treatment of Telephone Poles.

Messrs. F. L. Rhodes and R. F. Hosford presented a paper at the meeting of the American Institute of Electrical Engineers at St. Louis, Mo., October 19, giving results obtained from the preservative treatment of telephone poles.

The paper sets forth results that have been reached in the plant of the American Telephone and Telegraph Company and associated companies through the use of distillates of coal tar or of wood tar for the preservative treatment of wooden poles. The experience reported covers several typical processes for applying the preservative.

Data are given for poles treated by pressure, open tank and brush methods, and the relation of these methods of treatment to the conditions which have determined the choice of pole timbers in the United States is outlined. The experience with brush treatments has reached a more advanced stage than that with the other types of treatment and is consequently discussed in greater detail. Rates of decay, increase in life by treatment, the effect of seasoning and the characteristics of the damage to poles caused by decay and by insects are all covered.

San Francisco Telegraphers Entertain Mr. Edison at a Banquet.

On the night of October 19 a unique banquet was tendered to Mr. Thomas A. Edison by the San Francisco telegraphers. It was known as a "speechless" banquet, because all of the addresses were telegraphed and the noise of the instruments reminded one of a large telegraph operating room.

Mr. Edison made it plain that he wanted only telegraphers to be present, Mrs. Edison and Mr. and Mrs. Henry Ford being the only exceptions.

The banquet hall of the Commercial Club was turned over to the committee in charge, and miniature telegraph poles were erected on each table, with cross-arms, insulators and everything that goes with a real telegraph line. On each table there was a sounder, and on the speakers' table, there was a key at the place of each speaker. At Mr. Edison's place there was a resonator with a sounder, in addition to his key, and Mr. Edison kept his right ear in the resonator during all the "speeches." He laughed and clapped his hands like a school-boy when some one of the "speakers" scored a point.

Mr. Edison himself was the first "speaker." His Morse was clearly readable to all those present, and his reference to Bogardus was applauded to the echo.

The menu was printed in dots and dashes, but consisted of more substantial things. Mr. Edison, however, who is abstemious in his diet, satisfied his appetite with apple pie and a bottle of milk, which were brought to him toward the close of the dinner.

"Silent speeches" were made by Messrs. C. H. Gaunt, general manager, and H. F. Dodge, assistant general manager, Pacific Division, Western Union Telegraph Company; J. B. Coggins, manager for the Postal Telegraph-Cable Company; E. L. King, superintendent of telegraph, Southern Pacific Company; Arthur W. Copp, of the Associated Press; R. E. Mulcahy, a well-known broker; Neal Estes, the "youngest operator," J. W. Thompson, the "oldest operator," and M. H. De Young, proprietor of the *San Francisco Chronicle*.

Mr. J. G. Decatur acted as toastmaster. In introducing Mr. Edison as the guest of honor, he "said": "Good evening, all operators: For the first time in the history of San Francisco, the members of our craft have assembled, to be honored by one of their own profession—the foremost man of the world.

"With this inspiring thought for each and every one of us, I present to the telegraph operators gathered together on this memorable occasion their distinguished guest, Thomas Alva Edison."

In responding to the toast, "Greetings to the Fraternity," Mr. Edison "said":

"I am delighted to meet the old-timers of the telegraph, as well as the younger generation. Bogardus, who for so many years collected from us, has passed away and the new regime is on. My ability for flinging conversation to an audience is zero, so my lifelong friend, Samuel Insull, will help me out and do the act. 73." (Applause.)

Mr. Insull was the only one present permitted to

"open his mouth," which he did in response to Mr. Edison's invitation. Mr. Insull said:

"This is the first time in the thirty-five years that I have known Mr. Edison that I have seen him enjoying the speeches at a dinner and making a speech himself.

"While I am engaged in the light and power side of the electricity business, I could not help thinking, as I sat here to-night and looked at you fellow craftsmen, of the enormous range of our profession, of what Edison had done, before I knew him, for telegraphy; for his wonderful creative brain had practically closed its efforts in that direction when I became associated with him. I remember, however, a president of the Western Union saying that what Edison had done for telegraphy had saved that company \$400,000 a year. Since then he has applied himself with such wonderful results to the



THOMAS A. EDISON.

telegraph, the phonograph and his system of electric lighting.

"It must be a great inspiration to you to-night to have sat here and learned the genial character and the warm personal feeling of Thomas A. Edison, the man."

Mr. C. H. Gaunt was detained in Los Angeles on business, but that did not prevent him from "cutting in" at the banquet and responding to the toast: "Development of Operators." He said:

"The development of good operators is a long, hard process. They first require to be born with a capacity for every form of human endeavor calling for intelligence, integrity, industry and reliability. The silk purse made out of a sow's ear has never yet proved satisfactory. After the subject has been well born the next stage of his education begins. Reading, writing and arithmetic are only parts of what should be pounded into the young operator's head.

"The more knowledge of all good books and all good language he can have the better it will be, but such knowledge should be real and genuine and not

superficial. Then should follow a knowledge of business in all its ramifications. The methods by which members of the human race get on together in their millions of mutual interests are of the greatest importance in the development of a first-class man at the key.

"Then or before should come a knowledge of the technicalities of the business. Following this education must come a long drill in the line of experience with fellow-workers, superior officers and the public at large. All men are more or less fitful, uncertain and unknowable, and the operator who can come nearest to guessing all the moods and tempers of those about him will, other things being equal, have the greatest measure of success."

Mr. M. H. De Young, proprietor of the *San Francisco Chronicle*, responded to the toast, "Reminiscences of an Operator," and his address came as a surprise, as few, if any, of the guests knew that he was an operator at one time in his career. He said:

"A touch of the key brings two telegraph operators together, no matter what the distance may be that separates them. A touch of the telegraph key brought the spark into the brain of our distinguished guest, who afterward developed the electric light. Edison's experience with the electric telegraph certainly was the foundation for his work with the electric current, which has done so much for mankind. * * *

"The telegraph operating room is the atmosphere he likes and the memories of his workdays at the key as an employee are the bright ones of his career. We are proud of our distinguished Americans, and Edison is entitled to sit on the front bench."

Between Mr. Gaunt's "speech" and that of M. H. De Young, some old-time telegraphers in New York "cut in" with this message:

"On behalf of those of your earlier, and on behalf of your later, telegraph friends and associates. I send '73.'"

This message was signed: "David Homer Bates, vice-president Old-Time Telegraphers and Historical Association, and secretary of the Society of the United States Military Telegraph Corps."

Mr. H. F. Dodge "spoke" of the "Responsibilities of the Operator."

"This gathering with Mr. Edison as the inspiring center," he said, "is not only a fraternal tribute to him, but a remarkable recognition of the vitality of the original Morse method of telegraphy, of which he has been a great exponent. The responsibility of the operator is equal to the responsibility of the system which created the operator. The successful handling by dots and dashes of an enormous proportion of the complicated telegraphic correspondence of to-day establishes the skill and integrity of the Morse operators and illustrates the wonderful endurance of that system of transmission."

"In spite of the encroachments of the automatic systems, the Morse method stands at this moment conspicuous and unrivaled, a monument to those who perfected it and a gratification to the multitude of men and women who have shared in the responsibility of learning it and applying it."

"I think our responsibility to Mr. Edison at this

moment is to express our sincere appreciation for the honor of this visit, and to leave with him our love and very best wishes for a good time in San Francisco and a safe trip home. And now I propose we give three hearty cheers for him and his gracious party."

Mr. J. B. Coggins responded to the toast "Fraternity." He "said":

"Fraternity in its sense comprises the brotherly relationship of all mankind. We telegraphers are only a small company of this becoming bond of fellowship, but we have one with us this evening and of us who has been in a greater degree instrumental in developing this kindly, harmonizing spirit than any man of any time. Edison has poured the light of heaven over all social life and gladdened its soul with sweet music. We love you, Tom, every mother's son of us. We even forgive you for inventing the quad. I thank you."

On behalf of "Railroad Operators," Mr. E. L. King "said":

"The railroad telegrapher, whose duties are many and varied, refers with pride to the fact that the world's greatest genius, Mr. Thomas A. Edison, was at one time employed in that capacity and, judging from the number who have risen from that position and who now occupy prominent places in the financial and business world, the foremost among them being our illustrious guest, I venture the remark that the opportunity and training as a railroad telegrapher has been of considerable value to them. '73.'"

Mr. R. E. Mulcahy "talked" of "Broker Operators" as follows:

"Don't think I am going to send like Hank Cowen, or Tom Miller, or some of the old military men, but I'll do my best. In determining what constitutes a first-class broker operator, it must be remembered that certain qualities are necessary that are true to the making of success in any other line of endeavor, namely, a healthy constitution and a calm mind that is able to decide automatically what should and what should not be done. Next to a good sending arm, concentration is the most necessary adjunct. This is where the power of the mind asserts itself and lost motion is eliminated."

"The broker man must be a rapid and plain sender, as well as a first-class receiver, in order to give value received. Their requirements constitute all the art of telegraphy. To the greatest mind of the world our guest, Thomas A. Edison, the brokers and the broker operators of the world transmit their love and devotion."

"Press Operators" was the toast responded to by Arthur W. Copp. He "said":

"As an old Associated Press man, I wish to pay homage to the men with whom I have worked so long. The Associated Press owes much to its telegraphers. Their skill makes possible the handling of the tremendous volume of news matter now delivered daily by that association to its members. Deprived of their services, that news organization would lose much of its value."

"The press operator represents the high type of his profession. He must have more than mechanical

ability. He must have also a wide knowledge of current events. It is his ability to put his mechanical skill to intelligent use that makes him so valuable in the daily chronicling of the world's history."

Neal Estes, the "youngest operator," "spoke" on "Ambitions," and J. W. Thompson, the "oldest operator," responded to "Experience."

Secretary of the Navy, Josephus Daniels, sent greetings from Washington by telegraph.

Mr. J. G. Decatur, commercial representative of the Western Union Telegraph Company, and manager of its interests at the exposition, made an excellent toastmaster and to his energy and resourcefulness the success of this interesting event was largely due. Considering the shortness of time he had at his disposal for the preparatory work, he did remarkably well, and he proved to be a complete master of the situation.

Mr. T. S. Brickhouse, winner of the championship event and the Carnegie diamond medal at the recent telegraph tournament in San Francisco, was among those present at the banquet.

There were about 500 telegraphers in attendance, about 150 being members of the Western Union Efficiency Club.

The city was illuminated at night in honor of Mr. Edison.

Answers to Questions.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(26) Q. Why are insulators made of glass? Is it because they are cheaper than porcelain or any other insulating material? I. M.

A. Glass insulators are cheaper than those made of porcelain. Many porcelain insulators are used for telegraph and telephone purposes, too, but glass gives the best all-around satisfaction.

(27) Q. Can you give me the air-line distance between the Sayville, L. I., and the Nauen, Germany, wireless stations? R. M. T.

A. The distance between the two points, as measured in a straight line, is approximately 4,000 miles, but the term "air line" in this case cannot be taken literally. The usual understanding of an air line is that it is a straight line between two points, but where the distances are great the curvature of the earth must be considered, and the "line" becomes curved in the vertical plane. A real straight line between Sayville and Nauen would pass through the earth, and the middle point of such a line would be 348 miles below the surface of the earth. In other words, in order to have a true air line the towers at both stations would have to be 348 miles high.

(28) Q. Are the terms "current," "power" and "energy" synonymous? They seem to be so used by many writers. Will you please explain the difference between them? Also, please state if there is any difference between a "recording wattmeter" and an "integrating wattmeter." C. M. A.

A. Current is measured in amperes; electromo-

tive force is measured in volts; power is measured in watts, and energy is measured in watt-hours. Unfortunately this distinction is not generally made by writers who ought to know better. The terms "power" and "energy" have just as definite a significance as the terms "velocity" and "distance." Energy is the product of power and time, while distance is the product of velocity and time, and it is just as improper to use the term "power" where "energy" is intended as it is to use the term "velocity" where "distance" is meant. What is sold by electric light companies at — cents per kw-hour is electrical energy—not current or power, and this is measured by a watt-hour meter and not by a wattmeter of any description whatsoever. Although recording wattmeters (those equipped with charts) can be and have been built, it is physically impossible to construct an integrating (that is, adding) wattmeter to measure energy. The amount of energy used cannot be determined directly by means of a wattmeter; account must be taken of the time, and this fact gives rise to a unit of electrical energy—the watt-second or joule. The terms "time-meter" is equally as appropriate as the term "watt-meter" for an instrument which measures watt-hours.

(29) Q. Will you please give me a brief account of wireless telegraphy, its inventor, scope, etc., and oblige? W. W.

A. Wireless telegraphy was invented by Guglielmo Marconi. He, of course, was able—as is the case with practically every perfected invention—to take advantage of experiments made and facts ascertained, before he began his work, by other scientists. Before Marconi brought practicable results out of the effort to transmit messages without the use of wires, attempts had been made for twenty years to reach the goal. The first important theories were those of professor H. Hertz, discovered in 1887. Sir Oliver Lodge made some further experiments in 1894. Marconi began his work in 1895, and early in the beginning of the present century wireless telegraphy was recognized to have passed the experimental stage. Many stations were erected in the years 1900-1907. Wireless telegraphy has, of course, greatly broadened its scope, as its use has been able to be extended, in recent years. An interesting occurrence of the past year was the adoption by the United States Signal Corps, of the United States Army, of a portable wireless telegraph outfit designed under favorable conditions to carry messages 800 miles. During the year the Marconi Wireless Telegraph Company has brought out a wireless apparatus which enables the navigating officer of a ship to take bearings of wireless telegraph stations for finding the position of his ship, and also for indicating the presence of another ship. Experiments were carried on in 1914 by J. H. Hammond, jr., co-operating with the United States War Department, in the developing of a system for controlling torpedoes by wireless waves. Official reports of the government state that vessels moving at a speed of thirty miles an hour may be controlled with precision and reliability at distances up to 8,000 yards.

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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. Issues over one year old, 50 cents for one copy, but where two or more copies are purchased, the price will be 25 cents per copy.

BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

Returning Prosperity in the Telegraph Business

It is gratifying to note the large increase of business for the telegraph companies, after a long period of apprehension and depression. When the European war began the telegraph, as well as other lines of business, felt the effects of the great disturbance, and there was a wide-spread pessimistic feeling. But this has given away to optimism, with the result of a general awakening of business activity. If public sentiment is pessimistic everything looks dark and business tends to stagnate; if it is optimistic all things work for activity and enthusiasm.

Business revival for the telegraph companies means steady and more general employment for operators, as well as greater prosperity for the companies themselves. The well-being of the latter is essential for the welfare of the former, for if business is slack the employees are the first to feel the effects of the dullness.

The cable companies have naturally had all the business they could handle, even through the period of depression following the opening of hostilities, and have had no complaint to make.

Wireless has suffered from the abnormal conditions, but the companies have not been dormant by any means on account of them; they have taken ad-

vantage of the opportunity to put the house in shape for business when all of the shackles now placed upon it are removed.

Thanksgiving Day is near at hand and everyone in the telegraph service has reason to be thankful for the blessing of employment, and all that it implies, in these days of darkness and suffering in so large a part of the world.

Wireless Telephone, Arlington to Paris.

In our preceding issue we announced a wireless telephone triumph which will stand in history as one of the greatest achievements of man in this, the most wonderful century of the world's progress. The successful transmission of human speech by wireless telephone from Arlington, Va., to Honolulu, Hawaii, a distance of about 4,900 miles, was the achievement recorded, but in the past few days another equally interesting and important step has been made along the same line, namely, transmission of speech by wireless telephone from Arlington, Va., to Paris, France. As far as distance is concerned, however, the latter performance is not so great as the former, and its success was regarded as a foregone conclusion by the engineers who are conducting the experiments.

The public is becoming so used to frequent announcements of great scientific accomplishments that what is really a wonderful result does not always impress the mind of the people as deeply as its importance warrants. However, the public mind is a fickle thing and cannot be depended upon always for appreciation.

Since a distance of nearly 5,000 miles has been covered by the human voice by the aid of the wireless telephone it is logical to assume that there can be no earthly limit to this method of communication. Indeed, it is stated that preparations are now being made to make a test with Tokio, Japan. After Tokio has been brought within hearing of the human voice greater distances will, no doubt, be essayed until it may be possible some day for a person to talk into a wireless telephone transmitter and hear his own voice in a receiver at his elbow after his words have traveled around the world. So great results have been accomplished by the wireless telephone that one can be excused from indulging in an occasional flight of fancy, for we have begun to think that with the wireless telephone all things are possible.

Edison Day at San Francisco.

It is not given to many living men of note to witness such a reception in their honor as was tendered to Mr. Thomas A. Edison at the San Francisco Exposition on October 21, in celebration of the thirty-sixth anniversary of the birth of the electric lamp. Mr. Edison has produced many inventions of great benefit to mankind, but the most important of them all is unquestionably the electric lamp.

We remember in the early days of the lamp the discussion in the prints of that time as to how a plurality of lamps could be connected on one circuit so that any one could burn independently of

the others. The multiple system of connection—"multiple-arc" as it was commonly called those days—was on trial for its life, but Edison proved its entire adaptability and fitness for the purpose and the civilized world has been enjoying the fruits of his genius ever since.

Mr. Edison's work in telephony was also of the most important character. We mention this fact incidentally in this connection because of the statement officially made in the past few days that Mr. Edison conversed over a telephone for the first time on the occasion of the Edison day celebration at the fair. It hardly seems credible that an inventor of one of the most efficient of the many telephones devised in the early days should never have talked into one, but it is evidently true, because we have his own word for it.

Resistance of Radiotelegraphic Antennae.

A suggested explanation of increase of resistance or radiotelegraphic antennae, which has been observed under certain conditions where the wave length is increased, has been offered by L. W. Austin in a paper on the subject issued by the Bureau of Standards.

Up to the present no satisfactory theory of ground resistance has been developed. The experimental curves of antenna resistance, on account of the decreasing radiation resistance, fall rapidly at first, as the wave length is increased, and then as the wave length is further increased remain nearly constant if the ground conditions are good, as in the case of a ship's antenna, or again rise nearly in a straight line if the ground conditions are poor. This rise may be very rapid in the case of peculiarly poor grounds. For instance, the resistance of the Bureau of Standards antenna rises from thirteen ohms at 800 meters wave length to thirty-eight ohms at 2,000 meters.

Great difficulty has been found in explaining this increase of resistance with increasing wave length, but it is believed that the antenna system must be looked upon as a condenser, the antenna itself being the upper plate and the ground water the lower plate. Between the ground water and the surface there is usually a layer of semi-conducting material, which would correspond to a poor dielectric in the case of an ordinary condenser. It is well known that the dielectric losses in imperfect condensers generally increase in proportion to the wave length of the current employed in the measurement. It is found that by covering the surface of the ground under and around the antenna with a wire net, thus making the net the lower plate of the condenser, the ground losses nearly disappear.

Copies of this paper, "Resistance of Radiotelegraphic Antennae," will be mailed on application to the Bureau of Standards, Washington, D. C.

Historical Specimens of Telephone Apparatus.

The latest acquisition to the museum of the Institution of Electrical Engineers, London, England, is a pair of telephone receivers presented to Queen Alexandria (then Princess of Wales) in 1879.

Those who remember the history of the early days of telephony will remember that the invention of the telephone by Alexander Graham Bell in 1877 was followed by the manufacture of large numbers of telephones by amateurs, as the construction of the instrument was so easy and simple. Only one pair of instruments was used, as a rule, the same instrument being used for receiver and transmitter.

The telephones which have been presented by Queen Alexandra to the institution are of this class. They were in actual use between her Majesty's sitting room and the schoolroom at Marlborough House for quite a number of years. The cases are of boxwood, with terminals at the side. A pole magnet, very weak now and possibly not over strong then, passes inside the handle, and at the end is a fairly long coil of wire. Possibly the most interesting feature, in view of the fact that the instruments worked, is the very thick diaphragm, quite probably cut out of a thick ship's biscuit-tin.

The institution has some other early specimens of telephone instruments, among which is one of the so-called "electro-motograph" chemical receivers, used in conjunction with the carbon transmitter (invented simultaneously by Edison in America and Hughes in England), before the combination of the Bell-Edison companies, when the Edison company was unable to use the Bell patent. The user of the instrument has to turn a handle, which causes a chemically treated chalk cylinder to revolve. A platinum-tipped tongue bears against the cylinder, and is fixed to a mica diaphragm. The friction on the cylinder varies with the current received, and causes the diaphragm to vibrate and to emit the sound of the voice—distorted in much the same way as a gramophone.—*Telephony.*

GOVERNMENT SHORTCOMINGS.—In a communication, printed in a recent issue of *Leslie's Weekly*, a writer says: "The inefficiency and extravagant cost of government ownership of public utilities was revealed to me on a recent trip. The United States government controls the Alaska cable. I sent a ten-word message—or tried to send it—from Ketchikan to Seattle. The rate was nineteen cents a word for a distance of 600 miles. I paid \$1.90 and one cent tax on a government-line message. When I got to Seattle, three days later, the message had not arrived and I took no little satisfaction in sending a 50-word night message by the Western Union from Seattle to New York, a distance of 3,200 miles, for \$1.00 (one cent for tax added) and finding that this was delivered within a few hours." If the traveler had used the Marconi System in Alaska the rate would have been seven cents per word less than he paid and the message would have been delivered within an hour.

PROFITABLE TELEGRAPHER'S CRAMP.—In the City of London Court a telegrapher was awarded \$2,000 as compensation for incurring telegrapher's cramp while in the service of the postmaster-general. He is also in receipt of a pension of \$260 a year, and has received \$765 as an additional allowance under the superannuation act.

Long Distance Wireless Telephony.

BY S. M. KINTNER, PITTSBURGH, PA.

In the several articles appearing in your issue of October 16, describing and commenting upon the long-distance wireless telephone accomplishment of talking to Hawaii from Arlington, Va., there is some word of praise for everyone even remotely associated with the public test, excepting the one who actually pointed out the way by means of which wireless telephony could be accomplished. If you can spare me the space I should like you to publish this, in order that the historians of the future may have the benefit of this cross reference to earlier publications, from which they may learn the facts of the pioneer work in this art.

R. A. Fessenden is the originator of the wireless telephone. A very broad patent, No. 706,747, was issued to him on August 12, 1902, which describes and claims this wonderful invention very fully. He had the broad conception of the possibility of transmitting speech by means of a substantially continuous radiation of electromagnetic waves, whose characteristics were changed to conform to sound waves and of detecting this varying radiation at a receiving station where the indications at each instant were proportional to the intensity of the radiations. He not only conceived this as a possibility but actually constructed apparatus and proved the correctness of his ideas. A number of other patents for various modifications of this broad idea have been issued to Fessenden from time to time, since the date mentioned, see, for instance, patents Nos. 753,863, 793,649, 793,650. Fessenden had his apparatus to such a degree of perfection in 1906 that he was able to transmit speech, that originated on a wire line, over a distance of eleven miles by wireless, where it was again returned to a wire line and reproduced by means of the ordinary telephone receiver. All of this, and much more, is set forth in a very complete paper read by Fessenden before the American Institute of Electrical Engineers and printed in the July, 1908, transactions.

Other publications regarding this early work are to be found in the following: *American Telephone Journal* of January 26, 1907, and February 2, 1907, and *London Electrician* of October 4, 1907.

It is rather interesting to note that the American Telephone and Telegraph Company was represented at the test reported in the *American Telephone Journal* of January and February, 1907, and that a very extensive report was made to it describing the results of the test.

It is also rather significant of the part others have played in developing this invention to read in the Fessenden American Institute of Electrical Engineers article of 1908 of the utility of the invention for long-distance trunk line service, of the greater accuracy of speech transmission over that secured over the wires, etc.

Your statements regarding Fessenden's troubles with his financial backers is unfortunate, to say the least. It is not clear to me how the gentlemen referred to have "denied the public" the use of this invention for ten years. The suggestion that they

would prefer to lock up such rights rather than share with the public in using them is too silly to require any consideration. Your readers are not interested in Fessenden's troubles with his partners, but may be interested in knowing that he still retains his interest in the company, and that the courts have decided against him in the suits started by him.

Mr. Edison's First Talk Over a Telephone.

At the Edison laboratories in Orange, N. J., on the night of October 21, in honor of the thirty-sixth anniversary of the invention of the electric light and the celebration of Edison Day at the San Francisco fair, a remarkable demonstration of the transcontinental telephone was given. One of the most unique numbers on the programme was the transmission by wireless telephone of a diamond disc phonograph record of an address to Mr. Edison by Mr. Miller Reese Hutchison, his chief engineer.

Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company, who was listening in at Chicago, congratulated Mr. Edison on his achievements and Mr. Edison said that he had heard very plainly the records which were transmitted over the telephone. Then Mr. Carty announced to Mr. Edison that the engineers of the American Telephone and Telegraph Company had successfully transmitted the human voice to Paris.

Mr. Edison could hardly believe that this had been accomplished. When Mr. Carty repeated his statement, Mr. Edison said: "That is wonderful, that is wonderful."

Mr. Edison, from San Francisco, made the following remarkable statement: "It may seem strange to those who know of my work on the telephone carbon transmitter that this is the first time I have ever carried on a conversation over the telephone. To talk across a line 3,400 miles on my first attempt at a telephone conversation seems to be a pretty big undertaking, but the engineers of the Bell System have made it easier to talk that distance than it used to be to talk thirty-four miles. In my research work I have spent a great many years listening to the phonograph but it gives me a singular sensation to sit here in California and hear the new diamond disc phonograph over a telephone all the way from Orange, N. J."

Among others who assisted in the transcontinental celebration of Edison Day were: Mr. Carl H. Wilson, vice-president and general manager of the Thomas A. Edison, Inc.; Robert Morrison, of the Edison Incandescent Lamp Works, Harrison, N. J.; James Mallory, president of the Edison Portland Cement Company; John W. Lieb, vice-president, New York Edison Company, and Mr. N. C. Kingsbury, vice-president, American Telephone and Telegraph Company.

No telegrapher can afford to be without TELEGRAPH AND TELEPHONE AGE. Subscription price, \$2.00 per year.

The San Francisco Telegraph Tournament.

Following is the complete matter sent by Mr. T. S. Brickhouse in the championship event at the San Francisco telegraph tournament, held August 27 and 28. It was transmitted in the following order: Twenty commercial messages, ten railroad messages, some brokerage matter and about 500 words of straight press matter, and is printed in the same order.

TWENTY COMMERCIAL MESSAGES.

1 SF 9 San Pedro, Cal. Aug. 28th, 1915

Chas. H. Swanson,
324 Euclid Ave., St. Louis, Mo.

Did you send the money Answer quickly my expense.

Mother

10

Portland, Ore. Aug. 28th, 1915

Chas. D. Phelps,
Planters Cafe, Los Angeles, Cal.

Exposition great Come and meet us here Return home Friday

Helen

6

Seattle, Wash. Aug. 28th, 1915

W. R. Grace & Co.,
San Francisco, Cal.

Steamer total wreck Cargo fully insured.

W. R. Grace & Co.

7 Collect

Pittsburg, Pa. Aug. 28'15

H. O. Harrison & Co.,
San Francisco, Cal.

Car trucks shipped today Southern Route

Ford Auto. Co.

8 Collect

Sacramento, Cal. Aug. 28'15

Sutro & Co.,
New York.

Sell seven thousand Goldfield Consolidated at market

Sutro & Co.

9 Collect

Topeka, Kan. Aug. 28'15

E. H. Pierson,
Liberal Arts Bldg., San Francisco, Cal.

Work progressing rapidly Seven machines sent today express

Factory

6

New York, N.Y. Aug. 28'1915

Hon. Jas. Rolph, Jr.,
Mayor, San Francisco, Cal.

Congratulation on success of the tournament.

Thos. A. Edison.

7

Detroit, Mich. Aug. 28'15

General Electric Co.,
Mills Bldg., San Francisco, Cal.

Car Columbia Dry Batteries leaves Detroit tonight.

National Carbon Co.

6

Kearney, Neb., Aug. 28'15

Simon Guggenheim,
Senate Chamber, Washington, D.C.

Vote against Senate Bill 36

A. B. Chandler.

8

Elko, Nev. Aug. 28'15

Chas. D. Hodges,
234 Ellis St., Berkeley, Cal.

Goods arrived OK Send bill of lading quick

Mrs. C. D. Hodges

9

Wm. P. Kyne

700 Pantages Bldg., San Francisco, Cal.

Will be able to furnish service as per telegram.

Gene.

8

Detroit, Mich. Aug. 28'15

Ford Motor Co.,
Chicago, Ills.

Car out today contains your entire order Thanks
Ford Motor Car Co.

7

Toledo, O., Aug. 28'15

J. J. Whalen,
253 Broadway, New York, N.Y.

Everything OK at home All send love

Ralph

10 Collect NPR

Williams, Az., Aug. 28'15

Henry King,
Globe Democrat, St. Louis, Mo.

One—Rancher kills self and wife—300

Blair

7

St. Louis, Mo. Aug. 28'15

Geo. H. Tay Co.,
Second & Mission San Francisco, Cal.

Car bath tubs goes forward Santa Fe tomorrow
Randolph & Co.

9

Syracuse, N.Y. Aug. 28'15

E. P. Hall and Co.,
346 Ellsworth St., Detroit, Mich.

Enter order for two dozen small broilers by express

C. R. Downs Brok. Co.

8

Elmira, N. Y., Aug. 28'15

Atkins, Kroll & Co.,
San Francisco, Cal.

Ship fast freight seventeen gross of number two.
A. J. Smith and Co.

8 Collect

Harvey, Ills. Aug. 28'15

White and Co.,
Singer Bldg., Seattle, Wash.

Machines shipped today Northern Pacific to
Pocatello

White and Co.

8

Pittsburg, Pa. Aug. 28'15
American Steel And Wire Co.,
Rialto Bldg., San Francisco, Cala.
No beams the size you mention on hand
W.D. Seaver

16 Collect

Springfield, O. Aug. 28'15
Chas. Jones,
1243 South 8th St., Cairo, Ills.
Will arrive Tuesday afternoon Mother will be
with us not feeling well so bring car

Harriet

TEN RAILROAD MESSAGES.

Pocatello, Aug. 28th, 1915.

Agent,
Blackfoot.

Reserve one lower standard for W. B. Hart des-
tination Butte On at Idaho Falls.

Lansing.

Macon, Aug. 28th, 1915.

Agent,
Augusta.

Please send me few copies form C. S. 2283 first
train.

Bunce.

Hammond, Aug. 28th, 1915

W.J.S.,
Battle Creek.

Four cars meat for Buffalo ready for No. 64
Agent.

Harrisburg, July 10th, 1915.

Agent,
Pittsburg.

Delay the reporting of coal on form 696 in cars
P.R.R. 20588, 20340, 20833, 20537, 20052, 20244,
20426, 20858, 20742, 20646, 20059 and 20242 from
Altoona May 25th Send the 606 quick if o.k.

D.L. Fields,

Duluth, July 10th, 1915.

S.B.M.,
Minneapolis.

Following cars loaded with wheat for Chicago
will be transferred to boat here Monday: Soo Line
14267, 12996, 19844, 2936, 1761, N. P. 12849, 16352,
14846, G.W. 3648, C.B.&Q 29461, 18642.

P. B. D.

Danville, July 10th, 1915

H. B. C.,
Chicago.

Bridge over South Fork at Kankakee at Momence
unsafe for fast service. Issue slow order Will have
repairs completed about noon tomorrow.

W. H. M.

Battle Creek, July 10th, 1915.

Agent,
Bay City.

See my W.B. 364 July 6th and change 3rd item
to read 4 cases Postum instead of one Memo W.B.
for three cases to follow.

Robinson

Webster, July 10th, 1915.

E. B. Stanton,
Worcester.

Charges transferred by P.D.E. accrued fiscal year
\$8.50 previous \$3,729.18 interest in suspense \$10.08
total \$3,747.76 Equipment purchased for account
\$2,625.29

H. B. M.

Auburn, July 10th, 1915.

R. S. Dunn,
Augusta.

B. & M. 18684, 19721, 17342 and N.Y.C.&H.R.R.
13847 from your station today in Train 64 without
waybills. Wire destination and will card bill them,
you to furnish regular billing by mail.

A. R. N.

Vicksburg, July 10th, 1915.

H. B. D.,
Lake Charles.

Rush copy your way bills I.C. 498, 499 and 500
June 2nd covering cars I. & N. 36241, 28946 and
I.C. 20439 cotton for New Orleans.

B. M. D.

BROKER MATTER.

ax 99 1-2a100 1-2 ln 109 1-2a12 st 81 1-4a3-4
q 125a6 1-2 us 66 5-8a77-8 q 112 7-8a13 bo 79
3-8a5-8 q 70a3-4 pu 157a61 cpu lo 1-4a11
q 29a33 mnp 72 1-2a3 np 106a3-8 ut 65 3-4a6 1-2
ak 32 5-8a3 wo 135a1-2 mo 33a1-2 f 82 5-8a3
s 29 1-2a30 1-4 abs 56 1-4a1-2 q 103a8 ge 171
1-4a2 ksu 23 1-4a1-2 q 55 1-2a3-4 na 70a1
tex 9a10 lor 168a70 ww 103a4 q 120a3 b 85a1-4
crx 40a50 al 12 1-2a3-4 q 30a31 can 57 1-2a5-8
q 105 7-8a6 1-8 cr 15 3-8a5-8 q 80a1-2 dr 26
1-8a3-8 lk 49a50 acm 32 7-8a3 q 69a70 tw 90a1
alo 53 5-8a4 q 95a98 nw 123 1-2a4 q 160a70
sls 42a3 q 85a90 a 100 3-4a1 q 97 1-2a100
af 57a3-4 q 115a16 3-4 bi 118a21 q 118a26
bs 255a60 q 130a3 mp 2 1-2a3 u 128 3-8a1-2
q 80 1-2a7-8 bp 5 1-2a7-8 q 23a7 cjp 14a16
q 30a40 ar 78 1-4a3-8 q 106a7 tou 1a3 dl 410a21
gw 11 1-4a12 q 29a 1-2 wm 24a1-2 wc 29a31
is 23a5 rl 36a40 gu 61a1-2 lo 17a19 ins 32
5-8a7-8 do 22 1-8a1-2 en 24a5 q 86a90 du ofd 66
hl 7a1-4 q 24 5-8a5 lv 143a3-4 cl 41 1-2a2 q 1013
1-2a4 ow 27 1-2a8 sp 85 3-8a1-2 sr 13 1-2a5-8
q 44a5 1-2 gmo 178a82 q 194a5 gno 40a1-4
pa 107 7-8a8 rx 3a1-2 q 7a9 ri 12 3-4a13
r 1-8a3-8 q 1-4a1-2 cf 38 3-4a9 k 5 1-2a6 1-2
q 15 1-2a16 wx 110 1-4a1-2 bx 78a1-4 q 104a6
ill 102 1-2a3 nh 61a2 but 66 1-2a7 cx 25a8 f 45a9
s 37a42 fy 42a3 ia 6a12 q 15a20 j 250a325
om 115a20 q 125a50 prs 50 1-2a1 q 99 1-2a100 1-2
rc 23a1-4 mi 27 1-4a1-2 anc 68 3-4a9 agr 55a6
q 93a4 nal 62 1-2a3 1-2 q 109a10 ry 35 3-4a6
q 88 1-2a91 sk 144 3-8a7 1-2 q 127a9 fs 25a8
q 45a9 ap 145a7 q 117a19 n 105 1-4a6 rhc 42
3-4a3 q 95a6 rg 147 7-8a8 f 80a4 rg 80 1-2a2
ruf 102 3-8a3 1-2 gq 117 5-8a7-8 ip 9 1-2a10
q 38a1-2 po 117a20 tav 51a1-2 snu 140a50
tc 36 3-8a3-4 vc 35 1-2a3-4 q 100a2 nv 14 1-8a1-2
cy 45 5-8a3-4 at 22a25 lm 215a5 ru 45 1-2a3-4
e 26 1-2a3-4 f 41a1-4 ez 31 1-2a3 7-8 uw 19a1-2
q 34a5 vx 5a11 wa ofd 1-4 q 1-8a1-4 wf

3-4a7-8 f 2a1-2 s 3-4a1 pc 24 7-8a5 q 95 1-4a1-2
 txo 131 1-2a3 gr 51 1-4a5-8 q 103 1-2a4 1-2
 may 35a7 q 95a7 pm 32a3 ib 20 5-8a1 q 74a1-2
 ibc 20 5-8a1 q 75a6 cru 68 1-4a1-2 q 103a1-2
 stu 84 3-8a1-2 q 100a2 1-2 msm 113 1-2a18 1-2
 q 125a40 mxf ofd 23 s 4 3-4a5 sf 4 1-2a5
 f ofd 10 1-2 s 5a6 sb 11a1-2 q 25 1-2a31 1-2
 ab 108 1-2a9 1-4 ac 60a7 ao 48 1-2a9 3-4 q 92a7
 wu 68 1-2a9 att 121 1-2a2 1-8 ca 144a1-8
 co 40 1-8a3-4 d 3a5 q 7 1-8a8 hm 117a18
 ms 14 1-8a15 1-2 q 32 1-2a40

ABOUT 500 WORDS STRAIGHT MATTER.

The financing of the cotton crop of this country is by no means merely a local problem. Owing to the magnitude of the amount involved and to the fact that a very large section of the country has for years depended mainly on the proceeds of the cotton crop to pay its obligations to other sections, the financing of the crop is a matter of national interest. The cotton states are important buyers of California products, and their prosperity is a matter of direct concern to us.

While the crops of the entire country promise a large yield the movement of the Northern crops is not expected to cause even a ripple upon our financial surface. The supply of capital available for that use is abundant.

The cotton states, however, have not yet developed to a point where the money locally accumulated will even in ordinary times finance the crops locally produced. They have been financed by money deposited in the banks by the National Treasury, the ordinary resources of the banks of the whole country, and very largely by advances from Europe.

There is no money to be had now from the National Treasury or from Europe, and our banks must handle the crop from their own resources.

This it is anticipated that they will do without trouble, through the aid of the Federal reserve system, which will now have an opportunity to show what it was created for.

A great number of the cotton producers will have received payment for their cotton before it is harvested. The crop has been pledged for store debts.

As the season advances, the merchants will have got to the end of their financial rope. Their own capital has been used up, and they have borrowed all that the local banks can supply, and there is, in addition, a great demand from growers who have unpledged cotton and need the money for it. Up to a certain limit the banks of the states having surplus funds can supply the Southern banks, but there finally comes a limit to that. The Northern crops have to be moved.

It is at this point that the Federal reserve banks come to the rescue, taking the place of the treasury deposits and the European advances. When the banks have loaned all they can spare, the Federal reserve banks buy or discount the paper. When the Federal reserve banks' money is gone they deposit their paper with Federal authorities and receive currency. And this can go on indefinitely. There will be no such trouble as there was last year.

Unfortunately, this aid can be given only through banks in the Federal reserve system, which are vir-

tually all national banks. The time will probably come when all banks which can qualify will belong to the system, but some modifications of the law may be necessary to bring in the state banks.

The objection of the state banks to joining is that the system is controlled, not by those who have the money in the banks, but by a central body politically constituted. The state banks are waiting to see how the political power is used.

Mr. Brickhouse sent this matter in thirty-eight minutes, forty-nine and three-fifths seconds. Mr. H. C. Emrich, second, sent it in thirty-nine minutes, twenty-seven seconds. Mr. Brickhouse's time for



CARNEGIE CHAMPIONSHIP MEDAL.

the 500 words was eleven minutes and eighteen seconds. It is understood, of course, that the 500 words of matter, and the messages, were spelled out in full, as printed, no abbreviations whatever being used, except in the broker matter. The first prize in the championship event was the Carnegie diamond medal and \$200, and the second prize a \$200 Edison phonograph with twenty-five records.

Mr. Jos. Coffey, manager, Postal Telegraph-Cable Company, Oklahoma City, Okla., in renewing his subscription for another year, writes: "The magazine that puts 'Tell' in telegraphers, keeps them abreast of the times, and dissipates the fossils of time."

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



Type 403 400 Ampere Hours Capacity

The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

Improve Your Service by Installing Edison.



THOMAS A. EDISON, Incorporated
247 Lakeside Avenue
ORANGE, N. J.

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 Jones' Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students, 1915 edition now ready, price \$2.00; 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.

The American Telegraph- Typewriter Company,

81 PROSPECT STREET
BROOKLYN NEW YORK,

announces that prompt deliveries can now be made of their apparatus.

Of the old company, the name alone is retained;—the personnel of its organization has been entirely changed. The product is wholly different in design.

We have machines operating on the following types of circuits.

**Morse way-wires.
Differential duplex repeatered.
Bridged duplex.
Simplex telephone lines.
Private lines.**

The installation of our equipment in no case requires any change or rearrangement whatsoever in any single condition as found in the telegraph apparatus or wire to which it is to be connected. Multiplex circuits may be worked half printer and half Morse.

Correspondence Respectfully Solicited

KERITE

AN INVESTMENT

An illustration of a thick, multi-stranded cable, likely made of Kerite, coiled in a spiral. The cable is shown in a perspective view, with its individual strands visible. Below the cable, several coins are scattered, some showing the profile of a person and others showing a star pattern. The background is a dark, textured surface.

WHEN you put your money into **KERITE** you make an investment in service. You do more than buy conductors, insulation and protection. You obtain the best possible combination of the most desirable qualities in permanent form. **KERITE** remains long after the price is forgotten.

KERITE INSULATED WIRE & CABLE COMPANY

General Offices, 30 Church Street, New York Western Office, Peoples Gas Building, Chicago

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Chicago 20-102

THE RAILROAD.

AMONG RECENT NEW YORK VISITORS were Messrs. G. A. Cellar, superintendent of telegraph, Pennsylvania Lines west of Pittsburgh, Pittsburgh, Pa.; W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., and J. F. Caskey, superintendent of telegraph, Lehigh Valley Railroad, South Bethlehem, Pa.

MEETING OF EASTERN RAILWAY TELEGRAPH SUPERINTENDENTS.—The Eastern Division of the Association of Railway Telegraph Superintendents will hold its regular meeting in New York, November 17, in the Young Men's Christian Association rooms at the Pennsylvania Station, Thirty-third street. The meeting will be called to order to a. m. Arrangements have been made for a very interesting paper on duplex telegraphing. Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., is chairman of the Eastern Division.

TRAIN DISPATCHING IN CALIFORNIA.—The California Railroad Commission has issued an order authorizing the Southern Pacific, the Atchison, Topeka and Santa Fe, the San Pedro, Los Angeles and Salt Lake, the Western Pacific, the Northwestern Pacific and the McCloud River railroad companies to deviate from the provisions of chapter 494 of the laws of 1915 in certain specified cases and classes of cases. The law mentioned forbade the delivery or transmission of train orders by the trainmen themselves. The effect of it was to compel the railroad companies to have telegraph operators at all stations. The custom of conductors, brakemen, engineers or fire men receiving or sending orders or reports on the movement of trains by telephone at small stations, was prohibited.

MUNICIPAL ELECTRICIANS.

MRS. W. Y. ELLETT, wife of Mr. W. Y. Ellett, superintendent fire telegraph, Elmira, N. Y., celebrated her sixtieth birthday October 10. There was a family gathering. The invitations were of a unique character, being in verse composed by Mr. Ellett. There was a large gathering of children and grandchildren, and the affair was a happy and enjoyable one.

FIRE ALARM SYSTEM IN LOS ANGELES.—The installation of a modern fire alarm system in Los Angeles, Cal., is urgently recommended by chief Eley. The new system, he says, should allow for the growth of the city for at least twenty years to come.

FIRE ALARM OPERATED BY HEAT.—A fire alarm system of a number of thermopiles distributed throughout the building to be protected and connected in series to a galvanometer cabinet, has recently been placed on the market. Connections are also made from the cabinet to fire alarm bells and to a trouble buzzer. A break in the circuit, a drop in battery voltage or a total failure of the battery will cause the operation of a trouble alarm, which continues until the trouble is remedied. The thermopiles consist of cubes of dissimilar metal connected in couples and mounted in porcelain. The jointed ends of the couples are exposed, while the other

ends are concealed in the base. According to the manufacturer, a temperature rise need not be more than ten degrees Fahrenheit, but must take place within sixty seconds in order to operate the fire alarm. A single thermopile is designed to operate throughout a maximum floor area of 400 square feet.

OBITUARY.

C. B. Masterman, aged fifty-nine years, an operator for the Western Union Telegraph Company in Baltimore, Md., died October 7.

W. O. Coffe, aged fifty years, a former press operator at Akron, Ohio, the inventor of the transmitting mechanical telegraph key, known as the Mecograph, was killed in an automobile accident in Cleveland, on October 17.

Vest Pocket Electrical Dictionary.

Every operator and student should carry with him a copy of Weber's "Handy Electrical Dictionary" if he is anxious to make progress in his studies and avoid guesswork. 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. For sale by 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 up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. 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.

The Barclay Printing Telegraph System.

A new edition of "The Barclay Printing Telegraph System," written by Mr. William Finn, the well-known telegraph engineer, has been published and is now obtainable. This book gives a very complete description of the Barclay system, and has been reproduced to meet the constant call for information on the subject. It is well illustrated and is printed in clear type on finely finished paper. Every telegrapher should be familiar with the system. The price of the book is only fifty cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, can supply any electrical book published. Send for book circular.

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

In practice, in what part of the building do all main wires, loops and other external circuits terminate, where old-type sub-switchboards are used?

Are these wires run direct to the switchboards in the operating room?

Where there are two or more switchboards in the operating department, how are the conductors brought up from the sub-switchboard?

How are the wires distributed and connected to the switchboard?

How are the flexible cords connected?

What type of switchboard is in general use at intermediate offices?

Are the wires at an intermediate office permanently grounded as they are at a terminal office? If not, state the reasons therefor.

Study the switchboards illustrated in Figs. 51, 52, 53 and 54, pages 135 and 139.

How are loops or wires "split"?

What is the "Testo" cut-out switchboard, and what is it used for?

What is the advantage of a "Testo" switchboard?

In what respects does this type of board differ from the standard peg switchboard, and how are patching and other connections made? Study Fig. 63.

What is the name of the standard Western Union main line and loop switchboard?

What are pinjacks, and what part of the old-type switchboard do they replace?

How are pinjack switchboards constructed?

What is the difference between a main line switchboard and a loop switchboard?

What is the method of connections employed to reduce the number of flexible cords on the front of the board?

Study the diagrams of switchboard pinjacks on page 148 (Fig. 65).

How is the face of the main line switchboard made up?

Study carefully the construction and arrangement of the porcelain panels.

How are the regular connections of loops and apparatus made through the switchboard?

Study diagrams 66, 67, 68, 69, 70 and 71 for various circuit connections.

How is the intermediate station pinjack switchboard made up?

What is the Skirrow switchboard system, and what telegraph company is it used by?

Study the description of this switchboard in asso-

Describe the Postal Telegraph-Cable Company's new type of peg switchboard for intermediate stations.

What is the "crossbar" type of switchboard, as used by the Postal Company, and how is it made up?

Study and describe the Postal Company's branch line switchboard, which is illustrated on page 165.

What is the annunciator circuit, shown in Fig 78, used for?

What class of lines is this type of switchboard used for?

(To be Continued.)

The Military Telegraphers' Banquet.

The banquet of the Society of the United States Military Telegraph Corps, which was held at the Broadway Central Hotel, New York, in the evening of October 13, was one of the most delightful ever given by that body. The room was attractively decorated with American flags and historical pictures, relating especially to the survivors of the United States Military Telegraph Corps during the Civil War, were hung on the walls. At the head of the room, over the speakers' table, was the quotation from Grant's Memoirs, "No orders ever had to be given to establish the telegraph."

A strikingly lifelike bronze bust of general Thomas T. Eckert was loaned for the occasion by Mr. James Clendenin Eckert, elder son of general Eckert, and arranged around the room were pictures of the "Sacred Four" (the telegraph staff of the war department during the Civil War, consisting of Messrs. Thos. T. Eckert, David Homer Bates, Charles A. Tinker and Albert B. Chandler); Edwin M. Stanton, U. S. Grant, prof. S. F. B. Morse, Andrew Carnegie, Robert T. Lincoln and president Lincoln's cabinet. At one side of the room the greeting, "73," blazed forth in electric lamps.

The affair was devoid of formality and was greatly enjoyed by all those present. The addresses were short and appropriate to the occasion.

A prominent feature of this year's reunion was the meeting of a number of the veterans who had not seen each other since the war closed, over fifty years ago. Another special feature was the presence of a large percentage of sons and grandsons of the original members of the corps.

After the banquet a group picture was taken of those present, including prominent guests, among them Edward Lind Morse, professor Morse's son. After the flashlight of the group secretary David Homer Bates gave an interesting exhibition of pictures relating to the early history of the telegraph, Mr. Carnegie's connection therewith, etc.

Letters of greeting were received from Messrs. Andrew Carnegie, Thomas A. Edison and Robert T. Lincoln. Mr. Bates sent a letter to Mr. Carnegie, in reply to his greetings, in which he, Mr. Bates, referred to the success and enthusiasm of the meeting and the prominent persons present.

If you are not a subscriber to TELEGRAPH AND TELEPHONE AGE it is your duty to become one. It costs only \$2.00 a year.

Efficiency Engineering in the Telegraph Service.

(Continued from page 482, October 10)

Those in authority should adopt the method of paying bills by check, the check to be marked "no other receipt necessary." This is now regarded as sound practice. The bills can be marked "paid by check No. — on —." This saves the rehandling of the bill and makes it unnecessary on the part of the recipient to write an envelope in which to enclose the receipted bill. At the same time it saves the postage stamp. But, most important of all, it keeps the original bill in the possession of the manager, to be filed away as a voucher.

Many managers have secured business from customers by relating stories of good telegraph service that secured for other business houses profitable orders. It is always well to remember the good and efficient service that has been rendered, by giving actual cases of excellent telegraph work. It has more effect with the customer than a general good-service statement. The fact that a business house sent a telegram to London and received a reply within a half hour, closing an important and profitable deal, creates a better impression on the listener than to tell him that wonderful time was made with London on a telegram a few days ago. A manager must never endeavor to deceive a customer. He may carry his point for the time being, but sooner or later he will be found out and his days of usefulness as a manager will, as far as that customer is concerned, have come to an end. A customer usually knows more about the telegraph than he is given credit for, and a telegraph man treads on dangerous ground if he undertakes to misrepresent facts. The straightforward truth wins friends every time; an untruth may apparently heal a sore for the time being, but it is only temporary. One who is accustomed to misrepresent facts will not stop until his shortcomings have been brought home to him. The company he represents is then the sufferer.

A superintendent once informed us that whenever he visited one of his offices he usually made some excuse to gain admission to the messengers' quarters. He added that if he found them neat and a fairly good discipline in force he knew that the manager was capable and that a goodly proportion of the boys would appreciate the discipline and study for promotion either to the bookkeeping department or the operating room. He stated that he had never known this to fail. Many high officials in the service refer back with pride to the days when they were messengers and received the encouragement of the manager to excel. In this connection it is a notable fact where there are lady managers, neatness, cleanliness and discipline are apparent. It will perhaps surprise many to know that over one-third of the managers of independent telegraph offices in this country are ladies and the service rendered by them is generally efficient. Of course their offices do not rank among the largest, but many of them are very important. At the same time female employees have a good knowledge of testing wires and the management of switchboards, as well as adjusting

of repeaters and the balancing of multiplex apparatus.

A manager of a small office once informed us that it was impossible for him to make any impression on one of his customers in his arguments to persuade him to give him a share of his telegraph business. The customer's grievance was that the company owed him \$1.50 on account of inefficient service performed years previously. The manager was advised to pay the \$1.50 out of his own pocket if necessary to gain a good customer. He had spent many hours endeavoring to persuade the customer differently, but to no avail. The manager finally paid the amount in dispute with the result that he now secures several dollars' worth of telegraph business each month. Was it a good investment?

The prompt collection of bills is a very important subject to all managers. Efficiency in collecting bills is just as important as efficiency in testing wires. Customers should be impressed with the desirability of paying their bills before the tenth of the month, providing, of course, they are rendered on the first or second of the month. It, no doubt, requires a few days' time to audit a telegraph bill, particularly if the items are numerous. But at the end of ten days steps should be taken for collecting the outstanding amounts due the company. There are, of course, concerns that pay on the fifteenth or twentieth of the month. Exceptions in such cases must be made. A manager can usually impress upon his customers the necessity of paying telegraph bills as promptly as possible, as he has to have a clean sheet with the treasury department before the end of the month. If a manager is lax in pushing his collections the customer will take advantage of it and the telegraph company's money will remain in the bank to the credit of the customer. The prompt collection of bills can be reduced to a science, and every manager ought to make this subject one of his principal duties. A traveling auditor once informed us that there was the greatest difference in managers in this respect. When the books of many were examined, they showed a small balance in the bank, a large number of bills outstanding uncollected with no system in the management of the finances of the company. Such managers should not be surprised if they receive unsatisfactory commendation from their superintendent. They must not overlook the fact that the treasury department is all the time following up superintendents who countenance managers slow in making their remittances to headquarters. There are many collection methods and business plans that have been prepared for the benefit of the business community by skilled accountants, and where a manager feels that his experience in the collection of bills is limited, he should study some of the books on this subject that are available. Some managers are born collectors, so to speak. Others make difficult work of inducing a customer to part with his money.

(To be Continued)

Any book published on telegraph, telephone, cable, radio and general electrical subjects can be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessment 593 to meet the claims arising from the deaths of F. Walker, at Spokane, Wash.; T. T. Moore, at Washington, D. C.; J. T. Etzel, at Reading, Pa.; D. W. Dorgan, at Toronto, Ont., and A. G. Waring, at Newark, N. J.

NEW YORK TELEGRAPHERS' AID SOCIETY ENTERTAINMENT.—The annual entertainment of the New York Telegraphers' Aid Society, consisting of high-class vaudeville, followed by dancing, will take place Tuesday evening, November 16, at the Lexington Avenue Opera House and Terrace Garden Fifty-eighth street and Third avenue, New York. The entertainment is for the benefit of the relief fund, which is an auxiliary fund maintained by the net proceeds of these entertainments, and is used for the immediate relief of worthy telegraphers who may be in distress, and who, because of infirmity, are ineligible for membership in the society. Tickets are on sale at the office of the Serial Building Loan and Savings Institution, 16 Dey street, and at Room 1129, 24 Walker street.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Mr. Herrick Smith, of the Richmond, Va., office, is in New York for a few weeks studying the printing telegraph systems.

M. S. Lantlis, an operator in this office, died on October 11.

PHILADELPHIA POSTAL.

Among recent visitors were Mr. E. Reynolds, vice-president and general manager, New York, and J. E. Zecher, manager, Atlantic City, N. J.

Messrs. Kauffman, Furlong and Bessemer went to Princeton, N. J., October 23, to assist manager Dean and his assistants with the very large file of press due to the Dartmouth football game.

Mr. M. Auerbach has resigned.

ST. LOUIS WESTERN UNION.

Love's messenger, "Cupid," has been working overtime, which has resulted in several weddings in the past few months, the latest being that of Mr. A. J. Baggot, Morse operator, to Miss Anna She-

han, of the automatic department, and Mr. Harold Kennedy, operator, to a St. Louis lady. According to rumors and indications more weddings are in sight.

Mr. Charles Hern, Morse supervisor, is having trouble with his eyes, and is laying off to have them treated.

Mr. Earl L. Morgan, chief in the automatic department here, has been transferred to the service in New York. His many friends wish him good luck and success. His successor has not yet been appointed.

Among recent visitors to St. Louis were Mr. C. W. Frye and Mr. C. F. Fisher, of the traffic and plant departments, New York City, and Mr. B. P. Hancock, Dallas, Tex., traffic manager of the Gulf Division.

The Western Union Electrical Society held its regular monthly meeting in the club room of the Central Library Building, in the evening of October 21, with a good attendance. Messrs. Roe and Speer, of the commercial department, addressed the society on "Service from a Commercial Standpoint," pointing out the necessity of co-operation among commercial and traffic employees in giving good service to patrons of the company. Their remarks were interesting and well received. The social committee was authorized to make arrangements for an entertainment to be given some time in November.

Mr. C. E. Dubbs, quad chief in the plant department, has been placed in charge of the Commercial News Department, vice J. J. McHugh, assigned to other duty.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Dey Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, Monday, Wednesday and Friday, 2.30 to 4.30 p.m.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Closes at 1 p.m. Saturdays

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 LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade
ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 30, Full Grade, \$1.00; Half Grade, 50c. 30 to 35, Full Grade, \$1.20; Half Grade, 60c. 35 to 40, Full Grade, \$1.50; Half Grade, 75c. 40 to 45, Full Grade \$2; Half Grade \$1

M. J. O'LEARY, Sec'y. P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 22.

NEW YORK, NOVEMBER 16, 1915.

Thirty-third Year.

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Motor-Generators.

Since the year one of the telegraphic era electric batteries have been employed for the generation of current for the operation of telegraph lines, but for many reasons they are objectionable and undesirable for this class of work. Main-line batteries take up a large amount of space which can be ill-afforded in these days of high costs, and require very close attention to keep them in proper working order. Batteries served their purpose well so long as there was nothing better, but they have had to yield to the march of progress. The modern way of generating electricity is by machinery, which possesses many important advantages over the time-honored battery. It should be understood, however, that there is no present indication that the battery will become wholly extinct because there are situations where it can be used to advantage, the selection of a battery or a machine for a given service being largely one of costs. In all large cities and most moderate-sized towns, however, machines are employed.

In recent years motor-generators have come into extensive use for the purpose of supplying current for telegraph main lines, and for local purposes as well, also for telephone exchange work. These machines are so constructed as to transform the available commercial electric light or power current in any given place into the desired telegraph current.

Motor-generator sets are also used in wireless telegraphy, wireless telephony, operating bell and alarm systems, charging storage batteries, operating railway signals, and for other purposes.

The function of a motor-generator set is to change the voltage of direct current; to change di-

rect current to alternating current; to change alternating current to direct current, or to alter the number of cycles of alternating current.

Motor-generators are more economical than storage battery under prevailing commercial rates for electric energy when the telegraph load is fairly uniformly distributed over the twenty-four hours, and when the machines are so proportioned that they regularly operate between fifty and 100 per cent of their full load rating, and when there is no charge for break-down service, or the charge is small.

A motor-generator, as the name implies, is a motor and a generator mounted on one base, the shaft of the two machines being usually coupled together, but in some instances the armatures of the two machines are mounted on one shaft. The motor is driven by the commercial current, and the



TYPICAL MOTOR-GENERATOR.

generator delivers a current suitable for the operation of telegraph circuits.

The standard direct-current potentials used for telegraph purposes are of the following voltages:

Locals,	26 and 52 volts positive.
First potential,	80 volts positive and negative
Second	160 " " " "
Third	240 " " " "
Fourth	320 " " " "

When occasion requires, the 26 and 52-volt machines may be given a negative polarity.

For printers, 110 volts are necessary, but when this voltage is not obtainable directly from the power leads, a motor-generator may be used for transforming the current to the voltage desired.

While the foregoing is the range of potential required by important offices operating duplex, quadruplex and automatics, only the minimum number of voltages necessary for the efficient operation of the service in the smaller offices are provided for economical reasons.

As a matter of economy, where the electric supply is of the direct-current, three-wire system, with the neutral wire permanently grounded, it is desirable to use the supply current direct without transforming through motor-generators. Short duplexes may be operated very satisfactorily direct from 110-volt, three-wire system. The voltages on the different commercial three-wire systems range from

110 to 120 volts on each side of the neutrals, but in cities where a three-wire system having 240 volts each side of the neutral is available the operation of motor-generators for the 240-volt potentials is unnecessary and wasteful. Current should be taken directly from the power leads for this potential.

It is preferable to secure three-phase alternating current where it is furnished. Such current is usually better than direct current for operating telegraph motor-generators on account of greater stability on fluctuating loads on the power circuit.

In places where the supply of current is not dependable, accumulators or a gas, oil or steam engine and generator is usually installed, but on account of the great convenience of motor-generators it is usually desirable to use them in preference to other means. The efficiency of motor-generators rapidly falls below maximum for loads operating below rated full load.

The modern telephone motor-generator plant provides electric current for two principal purposes:

First—The talking current which actuates the transmitters and receivers.

Second—The ringing current by which operators and subscribers are signaled.

The talking current is taken usually from a set of storage batteries of twenty to forty volts. Owing to the great sensitiveness of the telephones to current fluctuations, the usual commercial form of generator cannot be used to supply the talking circuits. The rapid, though slight variations in current strength, produced by the action of commutation, introduces certain tones into the circuits which seriously interfere with the conversation. It is therefore necessary to have a generator of special design which will generate a current whose characteristics will approximate those of a storage battery. Special noiseless telephone generators are made and used to charge the storage batteries from which the talking current is drawn. By reason of the smooth quality of the current, they may be employed to charge the batteries while the latter are supplying the power board, or to supply the talking circuits direct should the batteries become disabled, or if for any other reason it is desired to do so.

Telegraph and Telephone Patents.

ISSUED OCTOBER 19.

1,157,018. Telephone Exchange System. To F. R. McBerty, New Rochelle, N. Y.

1,157,040. Telegraph Transmitter. To E. H. Pierson, Topeka, Kan.

1,157,396. Selective Signaling System. To J. A. Hulit, Chicago, Ill.

ISSUED OCTOBER 26.

1,157,745. Automatic Telephone System. To R. S. Wilbur, Jersey City, N. J.

1,157,746. Telephone System. To C. S. Winston, Chicago, Ill.

1,157,839. Telegraphy. To D. L. Bodroff, Milwaukee, Wis.

1,158,123. Apparatus for Generating and Re-

ceiving Electromagnetic Waves. To R. A. Fessenden, Washington, D. C.

1,158,124. Signaling Apparatus for Aerial Navigation. To R. A. Fessenden, Brant Rock, Mass.

1,158,221. Party-Line Telephone System. To H. Hovland, Lincoln, Neb.

1,158,309. Transmitter for Wireless Telegraphy. To Carl Shou, Holte, Denmark.

1,158,375. Submarine Telegraphy. To K. C. Cox, Norfolk Island.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on November 10:

American Telephone and Telegraph Co.	128 $\frac{1}{4}$
Mackay Companies	81 $\frac{1}{4}$ -84
Mackay Companies, preferred	65-66
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4 $\frac{1}{8}$
Western Union Telegraph Co.	87 $\frac{1}{4}$

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charge on the purchase of stock is \$1.00 on transactions covering from one to ten shares. For ten or more shares the commission charge is 12 $\frac{1}{2}$ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. THOMAS A. EDISON has returned from his trip to the Pacific Coast and is again in harness at his Orange, N. J., laboratory. He received an enthusiastic reception on the occasion of his visit to Los Angeles, Cal., October 28. He was accompanied by Mrs. Edison. The party left for San Diego the next day by automobile.

DR. CHARLES P. STEINMETZ was, on November 2, elected president of the Common Council of the city of Schenectady, N. Y., on the ticket of the local socialistic party.

COL. A. B. CHANDLER, formerly president of the Postal Telegraph-Cable Company, New York, now retired from active business cares, has returned to his home in Brooklyn, N. Y., after spending the summer months at Randolph, Vt.

MAJOR NORMAN HARRISON, engineer in chief of the Union Postal Telegraphs, Pretoria, South Africa, who has held the position of director of

army signals for the past twelve months, has been appointed to command the Royal Engineer Divisional Signal Company, which forms part of the South African oversea expeditionary force.

MR. SIDNEY WEIN, author of several articles published in this journal during the past three years on selenium cells and cable telegraphy, will be married in New York, November 21, to Miss Celia Stock.

MR. WALTER C. HUMSTONE, formerly superintendent of the Western Union Telegraph Company, New York, who retired from active service twelve years ago, and who spent the summer months at Pittsfield, Mass., is again in New York for the winter.

R. E. Mulcahy, Former Operator, and now a Successful Broker in San Francisco.

Mr. Richard E. Mulcahy, an old-time operator, considered the greatest private wire executive the world has ever produced, and now partner of the firm of E. F. Hutton and Company, stock brokers, New York, members of the New York Stock Ex-



R. E. MULCAHY

change. New York Cotton Exchange and Chicago Board of Trade, with branches at San Francisco, San Jose, Los Angeles, Pasadena and other points, operating twelve thousand miles of duplex private wires, was born in Clayton, Mich., December 27, 1857, and entered the telegraph service in Belle Plain, Iowa, in 1868, as a messenger. Becoming an operator, he rapidly advanced through the positions of train dispatcher, chief dispatcher, superintendent of telegraph, superintendent of construction and general superintendent. He left railroad work in 1893 to enter the brokerage business in San Francisco, and has been engaged in that line ever since. He entered the firm of E. F. Hutton and Company in 1903 as its Pacific Coast manager, and in February, 1912, was made a partner.

NOBEL PRIZES.—The Swedish Government has awarded Nobel prizes to Mr. Thomas A. Edison and Nikola Tesla for their work in physics. Nobel prizes are, under the will of Alfred Nobel, Swed-

ish scientist, awarded to "the person who has made the most important chemical discovery or invention" and to "the person who has made the most important discovery in the domain of medicine or physiology." The value of each prize averages about \$40,000.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. J. G. BLAKE, general superintendent, Pacific Division, San Francisco, Cal., has returned from a trip of inspection through his division.

MR. J. F. SKIRROW, associate electrical engineer of this company, New York, has been appointed a member of a committee of six by the Public Utilities Commission of the State of Connecticut to formulate rules to govern the joint use of poles in that state. The committee meets in New Haven, Conn., every Thursday.

MR. E. KIMMEY, superintendent, New York, is absent on a business trip through Vermont.

MR. JOHN J. WHALEN, manager of the operating department at 253 Broadway, New York, has returned from his inspection trip through New England.

MISS MARIE HALL, of the auditor's office of this company, has been transferred to the supply department.

MR. E. J. HUBER, Racine, Wis., has been appointed cashier and assistant manager for this company at Indianapolis, Ind.

MR. H. A. ABRAMSON, manager at Escanaba, Mich., has been transferred as manager at Racine, Wis., vice E. J. Huber, transferred to Indianapolis, Ind.

MRS. S. E. OSTROM, wife of manager S. E. Ostrom, of the 20 Broad street office, New York, died recently.

MANAGERS APPOINTED.—A. E. Calder, Bel Air, Md.; E. Spencer, Butler, Pa.; Miss J. M. Florence, Newport, Tenn.; C. E. Holland, Monroe, Mich.; H. D. Thompson, Ann Arbor, Mich.; L. J. Harper, Charlotte, Mich.

DELLOS LA PRETTE, station lineman for this company at Albany, N. Y., died at his home, October 22, of acute indigestion. He entered the service of the company in 1887 and his work and loyalty as a faithful employee was fully recognized.

THE JACKSON, MICH., OFFICE of this company will be moved into new quarters about the first of the year. Mr. Charles H. Routledge is manager.

ACCURACY FIRST.—This company has just gotten out a card for posting around offices, desks, etc., containing the words "Accuracy First" in white letters on a bright red back ground. The red panel is enclosed in a blue border on which the name of the company and its ideals are printed.

MAGNETIC CLUB DINNER.—The fall dinner of the Magnetic Club will be held at the McAlpin Hotel, Broadway and Thirty-fourth street, New York, at 6:30 p. m., Wednesday, November 17. The McAlpin is one of New York's newest and most popular hotels and has a wide reputation for

its banqueting facilities. Many out-of-town telegraph people will be in attendance at the dinner. An excellent programme of entertainment has been provided. Tickets will be \$2.00 each, and may be obtained of Mr. J. J. Cardona, treasurer of the club, 253 Broadway, New York.

Charts for Telegraph Offices.

The *Sixth District Bulletin* issued from the office of Mr. C. A. Comstock, superintendent of the Postal Company, Chicago, Ill., contains some interesting information regarding the value of charts to exhibit business conditions.

Each manager, it says, should have a chart showing the traffic load at his office. This can be obtained by using paper ruled with vertical and horizontal lines, the vertical lines showing the hours of the day or half-hour periods and the horizontal lines show different units, as one, five or ten messages. Show by dots on the vertical lines the number of messages handled during the hour. A line connecting these dots will show the curve for the day. Then it can be easily seen if the force is arranged properly to take care of the traffic.

In Mr. Comstock's office there is a chart on a rather enlarged scale. It is called a "planning board." It's a reminder or tickler of the various duties for each one. The board is divided into squares, along the top are the days of the week and months of the year, at the side the various positions in the office. Little tags are placed on L-hooks showing the tasks to be done on that day placed on the line of the person to do them. It takes a lot of routine matters off the mind and acts as an automatic taskmaster.

Another useful chart is a large blueprint of the district. With various colored tacks and with the use of small rubber bands wire interruptions, general repairs, where the linemen are working, etc., are shown. Another similar chart is used to show business conditions at the various offices and still another chart shows prospective changes in force, where money transfer service is suspended, leave of absence, etc.

Graphic methods are more effective than figures. They can be more easily grasped.

RETRENCHMENT IN BRITISH TELEGRAPH SERVICE.—The retrenchment committee, of which the British Chancellor of the Exchequer is chairman, has presented to the government an interim report, in which it recommends economies in the public service which can be carried into effect at once and without legislation, says the *London Daily News*. The principal recommendation is that in the post-office considerable savings can at once be made without detriment to the State. The committee considers that certain unremunerative postoffice services should be made self-supporting, and chiefly the telegraph service, on which there is now a loss. The amount of this loss has not recently been estimated, but it is a serious one, and part of it is due to the six-penny "wires." The committee holds that the service should pay its way, and if its recommendation is adopted by the government, as

it doubtless will be, the public may have shilling telegrams again. Further, there is reason to believe that the committee recommended that the low press rates of telegraphy should be increased. It has been stated lately that the loss to the postoffice on this advantage given to the newspapers is \$1,000,000 per annum.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MESSRS. NEWCOMB CARLTON, president; L. McKisick, assistant to the president; W. N. Fashbaugh, general superintendent of traffic, and G. M. Yorke, general superintendent of plant, left New York, November 6, on a business trip through the west and southwest. Among the places to be visited are St. Louis and Kansas City, Mo.; Dallas and Galveston, Tex., and New Orleans, La. Mr. W. C. Merly accompanies the party as secretary. They will return to New York November 21.

MR. W. A. SAWYER, district commercial superintendent, New York, recently made a business trip to Utica and Albany, N. Y. The Utica office is being renovated.

MR. A. C. TERRY, district commercial superintendent, Pittsburgh, Pa., in an address read before the State Board of Trade at Fairmont, W. Va., October 19, outlined the plans of his company with respect to giving the state better telegraphic facilities. There are in the state of West Virginia 289 telegraph offices, he said, of which 284 are of the Western Union Company. Developments and extension of facilities are now in progress.

MR. R. E. CHETWOOD, plant engineer, New York, is absent on a business trip through the west and south, to be gone about two weeks. Mr. Chetwood has been appointed by the Utilities Commission of Connecticut a member of a committee of six to consider the matter of rules for joint use of poles. He does not represent his company on the committee, but serves in an individual capacity.

MR. I. N. MILLER, district commercial superintendent at Cincinnati, Ohio, has retired. He will act in an advisory capacity. Mr. Miller occupied the position of superintendent since 1880.

MR. A. A. MONTGOMERY, commercial manager at Cincinnati, Ohio, has been appointed district commercial superintendent at that point, vice Mr. I. N. Miller, retired.

MR. P. J. HOWE, assistant to the plant engineer, New York, is in Montgomery, Ala., on company business.

MR. CHARLES A. CRANE, manager of the St. Paul, Minn., office of this company, has been elected president of the St. Paul Rotary Club.

MR. GEORGE HELDORFER, who began work with the Western Union in Burlington, Iowa, fifty years ago, is spending a few weeks at his farm in southern Kansas. Owing to a nervous break-down, it was necessary for him to resign the managership of the Burlington office four years ago, since which time he has been doing emergency work at that point.

MR. SAMUEL GRAY, manager at Beaumont, Tex., told "The Story of the Telegraph" at a luncheon of the Round Table Club in that city October 15.

MANAGERS APPOINTED.—W. H. Linder at Morristown, N. J., vice Miss C. Sturm; Eugene Gillespie at Farmington, Conn., vice Miss T. Burke; Miss T. Burke at Putnam, Conn., vice Mrs. M. W. Terwilliger; Miss Pauline Denzer at Westfield, N. J., vice L. J. Burdge; Stanley Coe at Litchfield, Conn., vice Mary Glynn; Mr. George H. Grimm at Perth Amboy, N. J., vice Miss Marie W. Sheehan; Miss Eva M. Ashdown at Jersey Shore, Pa., vice R. E. Jenkins; C. M. Bleiler at Berwick, Pa., vice W. B. Jacobson; C. A. Bilms at Ocean Grove, N. J., vice R. Bligh; Miss H. M. Burdick at Hudson Falls, N. Y., vice V. L. Carpenter.

THE WESTERN ELECTRIC COMPANY has leased the thirteenth, fourteenth and fifteenth floors of the new Western Union building at the corner of Broadway and Dey street. The space will be occupied by the executive and general departments, with the exception of the engineering and patent departments. Possession will be taken during the summer of 1916.

MULTIPLEX CIRCUITS between Cleveland and New York and Cleveland and Chicago were put into operation recently. The automatic department at Cleveland is in charge of Mr. R. Holloway, general supervisor. Miss J. Wood is in charge of the Cleveland-New York multiplex, days, and Miss Maude King, nights. Misses Velma Warner and Edna Gillman are in charge of the Cleveland-Chicago multiplex circuit days and nights, respectively. Mr. Paul Martin is in charge of the printers at Cleveland.

MOTOR-GENERATOR PLANTS.—During the past thirty-four months twenty-seven new motor-generator plants have been installed in the Mountain Division, thereby eliminating 35,652 cells of gravity battery. Eleven additional motor-generator plants will be installed at various places in the near future. These will displace 6,665 gravity cells.

THE CABLE.

CABLE REPAIRED.—The submarine cable which connects Mull, Coll. and Tiree with the mainland of England, and which was interrupted on August 23, has been repaired, and communication now goes on by the usual channels. During the six weeks of interruption the wireless stations on the west coast maintained communication.

CASTAWAYS AT MIDWAY ISLAND.—In the afternoon of October 12, a small sloop appeared off the Commercial Pacific Cable Company's station at Midway Island, Pacific Ocean. The vessel contained the captain of the schooner "O. M. Kellogg," his wife and nine of the crew. The "Kellogg" was wrecked September 25 on a small island, 750 miles west of Honolulu, and the captain and crew reached Laysan Island in a small boat. There they borrowed a sloop and sailed for Midway Island. Superintendent Morrison, of the Commercial Cable Company, towed the sloop into Midway harbor and provided for the comfort of the castaways,

who were all well but exhausted from lack of food. The United States Navy Department sent a vessel from Honolulu to Midway to bring the castaways to Honolulu.

SELENIUM CELL.—Mr. K. C. Cox, of Norfolk Island, South Pacific Ocean, has obtained a United States patent on a selenium cell, especially adapted for use in connection with telegraphy. The object of the invention is to so arrange the selenium in the cell as to obtain a cell with comparatively low resistance and considerable current-carrying capacity, combined with a high degree of sensitiveness to changes in the illumination of its surface and small "inertia" effect.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to November 10, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Allucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914.

CANADIAN NOTES.

MR. G. D. PERRY, general manager, Great North Western Telegraph Company, Toronto, Ont., states that his company purposes stringing a double copper line between Montreal, Que., and Vancouver, B. C. It will require about 6,000 miles of wire and will cost about \$300,000.

MR. HULATT ELECTED DIRECTOR.—At the adjourned annual meeting of the shareholders of the Grand Trunk Pacific Telegraph Company, held in Montreal, Tuesday, October 12, Mr. H. Hulatt, manager of telegraphs, Grand Trunk and Grand Trunk Pacific Railway, was elected a director of the company.

ROBERT MACCORD, aged seventy-two years, a pioneer telegrapher of Canada, died in Montreal, Que., October 31. He worked in many of the principal offices in the Dominion at various times.

Mr. W. J. Rooney, Division Superintendent of Telegraph, Grand Trunk Pacific Railway, Edmonton, Alb.

A circular recently issued by H. Hulatt, manager of telegraphs, Grand Trunk and Grand Trunk Pacific Railways, Montreal, Que., announces the appointment of W. J. Rooney, superintendent of plant, telegraph department, Grand Trunk Pacific Railway, Winnipeg, Man., to the position of division superintendent of telegraphs for the provinces of Alberta and British Columbia, with jurisdiction over all matters appertaining to construction and maintenance of telegraph and telephone lines, and operation of railway and commercial telegraphs, with office at Edmonton, Alb.

Mr. Rooney was born in Toronto, Ont., May 22, 1882, and commenced with the Toronto Electric

Light Company on October 19, 1896, serving in the stores and wiring departments. He resigned on January 17, 1903, to accept a position in the construction department of the Great North Western Telegraph Company at Toronto, but severed his connection with that company November 30, 1905, to take service in the telegraph department of the Grand Trunk Pacific Railway at Montreal, Que.

Over six hundred miles of telegraph line in the prairie provinces were built under his personal direction, and in the capacity of general foreman and superintendent of plant, to which latter position he was promoted on January 15, 1913, had jurisdiction over all telegraph and telephone construction undertaken between Edmonton, Alberta, and Prince Rupert, B. C.

Mr. Rooney, who is well known in Edmonton, transferred his office and staff from Winnipeg, and is already established in the western city.

THE TELEPHONE.

MR. N. C. KINGSBURY, vice-president, American Telephone and Telegraph Company, New York, has returned from Chicago, where he spent a few days on business.

JOINT TELEPHONE CONVENTION.—The Independent Telephone Association of America and the National Independent Telephone Association will hold a joint convention at the Hotel La Salle, Chicago, December 8, 9 and 10.

THE TRANSCONTINENTAL TELEPHONE LINE is carried on 130,000 poles, traversing thirteen states. One phantom and two physical circuits are established by four copper wires, each .165 inch in diameter, running the entire distance. A mile of this wire weighs 435 pounds, the weight of the line being 5,920,000 pounds.

A **SCHOOL FOR OFFICE BOYS** has been opened by the Chicago Telephone Company. The company has fitted up regular schoolrooms for them and the first classes have already been held. The classes will meet three times a week, from 12 to 2. The only stipulation the company makes is that the boys devote themselves as earnestly to their studies as they do to their work. The object is to train the boys so as to keep them in the service after they have outgrown their positions as office boys.

A TRANSCONTINENTAL JOKE.—At a recent meeting of the Telephone Society of Buffalo, N. Y., the principal feature of the evening was the announced demonstration of transcontinental telephone service. After members of the society had talked with the supposed mayor of San Francisco, the man who had impersonated him strolled in from a nearby room carrying a placard which read: "I am mayor Rolfe, of San Francisco." In all about 150 of the unsuspecting audience talked or listened in on the various transcontinental connections. The noise that broke loose when the joke was exposed is said to have amounted almost to a riot.

Apparatus for Transcontinental Telephony.

Some details of the equipment used in the recent experiments in radiotelephony between Arlington,

Va., and San Francisco, Cal., have been published in the London *Electrician*.

At the transmitter a bank of large bulbs very similar in construction to, and embodying the elements and circuits of, the De Forest "oscillon" was used. These were energized from a common generator, their circuits acting in unison on the common radiating antenna. Other auxiliary audion paths, which were in their turn voice controlled from a master microphone, controlled this high-frequency energy as generated.

At the receiving station the De Forest audion detector and amplifier were used, connected so as first to amplify the high-frequency currents to approximately 100 times their original intensity, and then to transform these into low-frequency telephone currents.

Automatic Telephony in Chicago.

Mr. Kempster B. Miller, the well-known telephone authority, author and expert, who was authorized by the Chicago City Council to investigate the automatic telephone situation in that city, has presented his report. As a result of his analysis of the situation Mr. Miller states that the problem resolves itself into a choice between two comparatively simple courses:

(a) To take the property for forfeiture and dispose of it for cash.

(b) To permit the sale of the property to the American Telephone and Telegraph Company.

Mr. Miller concludes that any attempt to continue the operation of the automatic system as a competing enterprise, either under city or private control, and either with or without interconnection with the system of the Chicago Telephone Company, will not be conducive to better or cheaper telephone service in Chicago. It will tend to lower the possible standard of service, raise the cost of service, and will, in all probability, cause the loss of large sums of money, failing for lack of public support.

Some Observations on Modern Tendencies.

Mr. Theo. N. Vail, president, American Telephone and Telegraph Company, made an address on "Some Observations on Modern Tendencies" at a dinner given by the Railroad Commission of California to the National Association of Railway Commissioners, San Francisco, Cal., October 13. The address, which is full of interest to the business man, has been printed in pamphlet form. A section is devoted to "Control and Regulation vs Government Ownership."

The address covers these subjects: Modern tendencies; controlling conditions; the human factor; what are the influences that have been working for better or worse in our economic and social relations and conduct? What has been the effect of these changes; another and even greater change has taken place in the conditions which control human progress in this country; the telephone; government ownership; is our form of government adapted to operation and management of utilities? Control and regulation. Each subject is

discussed very comprehensively, and the entire address makes interesting reading.

The chapter relating to the telephone gives glimpses of the history of the invention and leads one through the many steps of its development and extension.

"When the first telephone line was built between Boston and Lowell," said Mr. Vail, "telephone experts did not believe that commercial talk would be possible, and if possible did not believe that there would be business enough to pay expenses. After it was built, the Bell experts found a way to make conversation possible and business followed.

"Physicists advised us that if the extraneous noises due to earth and atmospheric currents could be gotten rid of, it would be possible to talk between New York and Chicago over a copper wire as large as a man's wrist. The Transcontinental talk is now being carried on over ordinary copper circuits and "phantom" circuits are now superimposed on the regular circuits, increasing the line capacity. The Boston and New York line was projected; then Chicago, then Denver, each a step; and when the chief engineer of the Bell System advised that talk over a transcontinental line was possible, work was commenced, and in July, 1914, the first test was made, and by January, 1915, the line was opened for commercial purposes.

"If there were no Bell System, only disassociated individual companies or groups of companies, no line over a few hundred miles long would have been built, or if built it could not be operated as satisfactorily as under the present conditions. Efficient commercial telephone operation can only be maintained when every operator on the line and the system connected with it is under one control. For long distance and the wireless, the cost of experimentation, construction and loss before self-sustaining would be beyond the possibility of any one of the disassociated companies.

"The development of the exchange service has been by the same process. As each hundred miles in the distance presents new problems, so does the adding of each hundred subscribers to a local exchange. When the development reaches city and suburban exchanges, with instantaneous connection and connection with adjacent exchange districts, the problems become very complicated.

"When in July, 1914, after the talk to San Francisco, the chief engineer said that wireless conversation was possible, authority was given him to go ahead and for some months conversations were carried on between more or less distant temporary low power wireless stations. At last, believing that the art was at least as far advanced as was the art of telephony at the World's Fair in 1876 and further development depended on the use of the best wireless towers, we approached the Navy Department and immediately their great wireless stations were placed at our disposal. The wireless experts of the navy became as much interested in the problem as were those of the telephone company. What was accomplished you know. What will be accomplished is unknown. Little by little, step by step, development is probable until it can be utilized

at least as a supplement to the great Bell System.

"Talking over the wireless is like talking in a boiler shop," Mr. Vail continued. "Earth currents, and electrical disturbances which sweep through space, are picked up by the wireless antennae and translated into noise by the delicate receiving instruments.

"These storms are the *bête noir* of the wireless, whether telegraph or telephone, and for months at a time they will be so continuous and so serious as to make wireless communication over great distances impossible and over short distances extremely difficult.

"There were the same difficulties in the early development of the telephone. The grounded telephone wires, acting as do the antennae of the wireless station, picked up these same currents and translated them into noise. Some may remember that these noises in early telephone times made conversation always difficult and sometimes impossible. The noises caused by earth currents were gotten rid of by making the telephone circuit of two wires entirely insulated from the earth. The atmospheric disturbances still remained but were neutralized by transposing the two wires, or virtually twisting them, and in this way the regular telephone conversational current was given a noiseless path. What device will be possible to neutralize the effect of these electrical storm disturbances on the antennae of the wireless is yet the problem of the future.

"What the development of the telephone has emphasized is this fact, that the problems which have been solved could never have been by any system of disassociated unrelated local telephone companies. No one company would have had the "machine" to develop and for that reason no such problems. The magnitude and the cost and the advance work necessary would have been beyond any local system."

POLE SUPPLY.—It is said that about 4,000,000 poles are needed annually for renewals and new lines in the United States and Canada. Well-stocked German forests, which are the best managed forests in the world, produce only 250 trees to the acre; the poles now standing (35,000,000) would thus represent all the timber growing on more than 130,000 acres. In Canada considerably less than 100 poles are cut to the acre, so that nearly 500,000 acres of forests have been cut to obtain the poles now in use, and about 50,000 acres are cut over each year to furnish the poles for renewals. That means cutting at the rate of 100 acres a day.

CLOCK WATCHERS.—There are two kinds of clock watchers: One sees how much longer he must work before he can go home, the other sees how much longer he can work before he must go home.

Mr. B. N. Roney, manager of the Western Union Telegraph Company at Bloomington, Ill., in remitting to cover his subscription for another year, writes: "I thank you for keeping my standing good. In your belief that I cannot get along without the journal, you commend my judgment."

RADIO-TELEGRAPHY.

NEW RADIO STATIONS.—Additions to the list of radio stations of the United States, as given by the Bureau of Navigation in its October list, include eleven special land stations and six ship stations.

WIRELESS BUENOS AIRES TO NEW YORK.—The Federal Holdings Company of New York has been granted a concession for the construction of a high-power wireless station in Argentina, near Buenos Aires, for communication with a station to be erected at New York.

First Naval Wireless Telephone Order.

Secretary of the Navy, Josephus Daniels, late in the afternoon of November 5, sent to rear admiral N. R. Usher, commandant of the Brooklyn navy-yard, a naval order by wireless telephone from Washington. This is claimed to be the first naval order ever sent by wireless telephone. The order was dictated into the transmitter by secretary Daniels personally and received in like manner by rear admiral Usher.

The make-up of the circuit was as follows: Telephone wire from secretary Daniels' office to the main telephone exchange in Washington; wire to radio station at Arlington, Va.; wireless telephone to radio station in the Western Electric Company's building, New York; wire telephone to Brooklyn navy-yard. At the Arlington and Western Electric Company's stations the message was automatically switched from wire to wireless and wireless to wire.

Earth Connection.

Great difference of opinion exists as to the advisability of grounding the antennæ, Sir Oliver Lodge maintaining that it is inimical to very sharp tuning. The general opinion, however, is that the antennæ should be grounded, and that if the system of ground wires is properly constructed it is beneficial and increases the distance over which signaling can be carried on. In the early days of radio-telegraphy it was a common practice to use a copper plate buried in the earth for a ground connection, but by experiment it was found that the best earth connection was formed of a large number of wires laid in the ground radially from the station and stretching out from it as far as possible. It is not necessary that the wire should be deeply buried, if the station stands on grass land it is sufficient to turn up the turf, insert the wires and replace the turf. At the point where the wires meet they are connected together and led into the station. Prof. Fessenden, in America, devised what he called a wave chute, which consists of an arrangement of wires identical with that described, the wires, however, being laid on the surface of the ground and not buried. In a ship station the grounding is effected by connecting to the side of the vessel.

No telegrapher can afford to be without TELEGRAPH AND TELEPHONE AGE. Subscription price, \$2.00 per year.

MUNICIPAL ELECTRICIANS.

VICTORIA, B. C.—A new fire alarm system has been installed in this city by the Northern Electric Company at a cost of \$10,000.

WILMINGTON, DEL.—A new police and fire alarm system is to be installed at Wilmington, Del. The central office will be in the new city building. The Gamewell system will be put in.

THE FALL RIVER, MASS., FIRE ALARM SYSTEM is a part of the fire department, under the supervision of superintendent James J. McGuine, who has been in charge since 1903. Assistant superintendent George Cullen was appointed in August, 1910; he had several years' previous experience in maintaining this system. A lineman is permanently employed; additional help is employed when necessary. None of this force is a member of the fire department nor subject to fire duty. The apparatus at headquarters is automatic type and Gamewell make, mainly installed in 1898. A telephone at each station, usually with an extension telephone on the second floor, is directly connected to the switchboard at fire headquarters. There are 113 public and eighty-nine private boxes, all of non-interfering, spring-actuated trigger pull type.

Answers to Questions.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(30) Q.—What is the meaning of the term "cat-whisker," as used in connection with wireless apparatus? L. W. T.

A.—The term "cat-whisker" refers specifically to a short length of phosphor bronze wire used to connect the fixed terminal of a detector to the mineral placed in a small metal cup which forms the other terminal. It derives its name from its resemblance to a cat-whisker. The "cat-whisker" wire is so bent that its free end will rest firmly on the mineral in the cup. The construction of this simple detector, as well as of other pieces of apparatus used in wireless telegraphy, is described and illustrated in "Wireless Construction and Installation for Beginners," copies of which may be obtained at the office of TELEGRAPH AND TELEPHONE AGE. Price 25 cents.

(31) Q.—Is there any difference between subaqueous and submarine cables? I have noticed that both terms are used to indicate a cable laid beneath the surface of water, and I would like to know if both terms mean the same thing. T. B. M.

A.—No; they mean different types of cable, although both are submerged. The so-called subaqueous cables are relatively short and are laid in comparatively shallow fresh water, where they usually sink into the mud. Submarine, or ocean cable, is generally very long and is often laid at great depths on irregular bottoms, sometimes spanning spaces between rocky ledges.

California and Its Distinguished Visitor.

BY HARMON D. JONES, OF SAN FRANCISCO.

California, San Francisco, the exposition and the fraternity of telegraph operators have been highly honored by a visit from the greatest living American—Thomas Alva Edison.

A thrill of inspiration has charged every soul with the magnitude of the man's wonderful achievements, whose greatness is the greatness of unwearyed industry and invincible patience, and that is what really makes him such an inspiring example.

As a partial indication of the love and regard Californians have for this benefactor of the world, we cannot refrain from stating that he has been greeted first of all by fifty thousand souls on his arrival, then by over ninety thousand on Edison Day, then by seventy-five thousand school children, not to say anything about the numerous fêtes carried out in his honor by the city administration and his old-time associates at the telegraph key.

We can imagine no way in which we can better express our profound admiration for Mr. Edison than by calling attention to his modesty, displayed in response to interrogations as to how he has been able to accomplish the numberless blessings which the peoples of the universe, both consciously and unconsciously, enjoyed. He said: "There's

This is the first vacation I have had in years, and I am enjoying every moment of it. What may have been accomplished through my agency has been by



FIG. 2.—GUESTS' TABLE.

Left to Right—M. H. De Young, Henry Ford, J. G. Decatur, T. A. Edison, Mrs. Edison.

work—patience and hard work—and plenty of both."

What a revelation; and we, way out here in Cali-



FIG. 1.—ONE-QUARTER SECTION OF BANQUET HALL, SAN FRANCISCO.

nothing of a wizard about me—I work—that's all. Sometimes I work twenty hours out of the twenty-four, sometimes eighteen, always twelve at least.

fornia, need just such inspiration, if it is needed anywhere in America. Mr. Edison has come like an inspired prophet, to tell us the story we ought to

have known years ago, and who is there of us who will not be proud to learn of so great a teacher? And where did he learn to utilize the miraculous magic? Not in society, not in politics, not in the club or pool room, but in his own workshop. The secret seems to be that he was simply more earnest, more determined and more vitally concerned to learn the truth and to make it of service to mankind, and that is just what he has done. He did not bring any of the wonderful forces of electricity into existence, he simply learned that they existed and caused them to respond to his masterful mind, and he developed not only the modern



FIG. 3—MR. EDISON EXPLAINING TO MR. FORD THE FEATURES OF HIS OLD PERFORATOR.

telegraph equipment, the electric light and the phonograph, but hundreds of other marvels, without which the world to-day would have to begin life all over again.

It has been a glorious and rare privilege to have had such a notable and distinguished guest with us here in California, with such a message.

A dozen or more of the vast industries with which Mr. Edison's name is indelibly linked were extremely anxious to do him honor in various ways, but to the telegraph fraternity was granted the distinction of banqueting him in what has proven the most unique affair of the kind ever given in behalf of the Genius, which was made possible through the co-operation of Mr. Samuel Insull, of the Commonwealth Edison Company of Chicago, who, perhaps, has been more closely associated with Mr. Edison than any other man, and who, realizing the warm spot in Mr. Edison's heart for his craftsmen in the art of telegraphy, grasped the suggestion of "talkless toasts" and "speeches by telegraph," and strongly urged the great man to single out and accept the hearty invitation of the telegraphers; a privilege which we deeply appreciate and are thankful for the inestimable opportunity made possible through Mr. Insull's co-operation.

The Commercial Club rooms in the Merchants' Exchange Building, San Francisco, were packed to their utmost capacity with a bustling, enthusiastic assemblage of past and present telegraphers long before the hour set for the arrival of the Edison party. The greeting of the guests of honor was most thrilling and the drawing back of the tansy and the revealing of the banquet hall, with its unique decorations, brought forth tremendous

applause. The speakers' table, elevated two feet above the floor level, was profusely decorated with California's most beautiful flowers banked up against and around the miniature telegraph line which extended the full length of the table, and thence from table to table throughout the immense room until the line spanned forty tables. The speakers' table was equipped with senders' sets and resonators with sounders, while on each table in the hall was a sounder which ticked off the speeches and toasts to the entertainment and edification of the 421 operators present.

In one place in the vast hall stood an Edison phonograph which wafted beautiful music during the progress of the feast, while in another part of the banquet room was placed an Edison recorder on which was recorded all of the telegraphic proceedings of the evening. It is the intention of the committee to have the records taken on this great occasion reproduced on Edison diamond disc records and presented to the inventor as a souvenir of the occasion which afforded him and the assemblage so much genuine satisfaction.

It was a dinner unique in history. From the time Mr. Edison took the seat of honor until the last toast had been ticked, not an oral word was spoken, the clicking tongues of brass made human speech unnecessary. The white-haired inventor, leaning his head close to the resonator at the right of his plate,



FIG. 4—MR. EDISON DEMONSTRATING THE TELEGRAPH TO SCHOOL CHILDREN.

Photo by International News Service.

with his hand at the key, soon recovered his old-time ability and with a nimbleness to be envied, indicated that he was still a master of the Morse code; every mirthful wrinkle on his beaming face told how he enjoyed that part of the banquet which followed the feast. Mr. Edison is not a sumptuous diner and course after course were laid before him and removed untouched, until his old-time associate very opportunely suggested an acceptable "last course," whereupon a huge apple pie and a bottle of milk were served, lighting up the countenance of the "man of the hour" with a happiness beyond de-

scription. This was a signal to the "ops" and with one accord the assembled hosts were on their feet; and such an expression of joy was manifested by voice, hand-clapping and napkin waving as would send a thrill through a monument. We "hit the nail on the head," and there was not the slightest doubt as to the genuine satisfaction the "happy thought" caused. Some one opened the key and asked: "Is it as good as it used to be?" To which Mr. Edison replied: "It's fine." This called forth another hearty round of applause.

Mr. J. G. Decatur, manager, Western Union Telegraph exhibit and offices on the Panama-Pacific International Exhibition Grounds, who was the originator of the plan out of which grew this happy occasion, and who, with a number of other Western Union officials, acted as a committee on arrangements, was chosen toastmaster.

After the tables had been cleared and the last musical number rendered, the crowning feature of the event began. The toastmaster began to "fill-full" the greatest moment of his career. Those who know the "Judge" remarked that he would rather be toastmaster at this memorable feast than president of the United States. The committee and the assemblage take off their hats to Mr. Decatur for the tremendous success of the affair, to which he contributed so much.

Toastmaster Decatur then addressed the audience by telegraph. (His remarks, together with the speeches that were delivered in Morse characters, were printed in our issue for November 1.) The banquet, together with the speeches, lasted one hour beyond the allotted time. The mayor of San Francisco and his aids, who were to escort the Edison party about the city to witness the elaborate lighting scheme prepared in honor of the inventor, entered and were royally received, and tens of thousands of eager souls walked the streets below waiting to greet the distinguished visitor. So great was the fascination of the event in the banquet hall that Mr. Edison was completely oblivious of the fleeting time, and Mr. Insull refused to break in on his enjoyment, remarking that he was having the time of his life. The only deviation from the set plan to confine all speeches to the wire was made when Mr. Insull was requested by Mr. Edison to make an oral response for him.

(Mr. Insull's remarks were printed in full in the previous issue of our paper.)

While the guests were still standing, the hosts filed past and each one was greeted with a handshake and the good wishes of Mr. Edison, who was earnest in his remarks about the marvelous good time he had had. The visitors were then spirited away by the mayor and his party, but the telegraphers were prone to leave the hall, a general handshaking and a revival of old acquaintance created a fitting close of a memorable event.

Edison Day at the exposition was a great event and the advantage he took of the Western Union exhibit in the Palace of Liberal Arts only confirmed his love and loyalty to the field of his early endeavor. He seemed delighted to have an opportunity to show inventor Henry Ford the intricacies

of the telegraph and some of his primitive and modern inventions, and the picture herewith shows we were watchful to take advantage of the opportunity. Again, on school children's Edison day, Mr. Edison once more took occasion to demonstrate the telegraph to the rising generation, much to his own joy and happiness, as well as to the gratification of the thousands of youngsters who gathered around the booth.

In commenting upon his reception and entertainment Mr. Edison said: "There's no use talking; there's something different about the West. What a pride you people have. What a people you are. There is a tang in the atmosphere of the West; the people are full of life and enthusiasm."

The committee feels a thousand fold repaid for its efforts in bringing about this great event, and the appreciations expressed by the 400 confirm the impression that never before in the history of the telegraph, as recalled by veterans, has such a unique, interesting and generally satisfactory achievement happened, and everybody identified with the affair is thankful for the opportunity of participating.

At the close of the address by telegraph of C. H. Gaunt, general manager of the Western Union Telegraph Company, San Francisco, Cal., which was sent over a telegraph wire from Los Angeles to the banquet hall at San Francisco, the guest of the evening, Mr. Thomas A. Edison, remarked to Mr. Gaunt by telegraph: "Your Morse is like copper-plate."

Filipino Operators.

In a letter from one of our American subscribers in the Philippines he has this to say regarding the ability of Filipino telegraph operators:

"The native operators are very progressive, the majority becoming first operators. They seem to take quite readily to the craft and are very studious, that is the younger men. Of course there are a few that never get anywhere. Once they obtain a position they are satisfied and will not study any more; they waste their time running around. But the majority of the native operators are good, studious men. It is just as Mr. W. S. Beach says in his article in your March 1, 1915, issue: 'As telegraph operators the Filipinos are very good, some of them acquiring marvelous speed.' I will say more than that. Not only do they acquire marvelous speed, but their sending is good and clear, and generally they are capable of receiving as fast as they send."

DIAPHRAGM TELEGRAPH SOUNDER.—In our October 16 issue we described a device manufactured by the Railways Labor-Saving Device Company of Davenport, Iowa, for the purpose of magnifying the sound produced by the action of a relay armature, thus doing away with the necessity for a sounder. One of the instruments is now on exhibition in the office of TELEGRAPH AND TELEPHONE AGE, and all those who have seen and tried it have been favorably impressed with its work. Others who would like to look it over and test it are welcome to do so at our office.

Early Telegraphing in the Northwest.*

BY GEORGE E. HINMAN, NEW YORK.

Latter-day telegraphers have little conception of the crudities of equipment in the early times. The pioneer line in what was then the extreme northwest, was constructed by the Northwestern Telegraph Company about the beginning of the civil war. It consisted of a single wire extending from Milwaukee, along the Milwaukee and La Crosse Railroad to La Crosse, Wis., which was then the end of the rail system in that direction. Thence the wire extended along the Mississippi River through Winona, Red Wing, Hastings, etc., to St. Paul, Minn., a total distance of 400 miles. It crossed the river several times. At each crossing a watchman was stationed to lower the wire into the water when steamboats approached. Eventually high masts were erected and the annoying interruptions ceased.

In the winter of 1865-6 I was sent to La Crosse as manager. At Winona, Frank Merrill was in charge, assisted by his brother, Gilbert ("Gib"), who died suddenly in New York a few years ago. The manager at St. Paul was Edward Curry, a Canadian, a friend of the late Erastus Wiman, and a wonderfully expert operator. When Curry died, eight or ten years ago, he was secretary of the Staten Island Rapid Transit system, one of Mr. Wiman's enterprises.

At Hastings was Miss Lisaide Atherton, an eighteen-year-old girl, who was six feet three inches in height. Nearly, at Red Wing, was Miss Laura Coates, whose girth was of nearly the same measurement.

At River Falls, Wis., presided Clem. Greene, afterwards a Chicago lawyer, and long since dead. Miss Hannah Beers, the operator at Trempealeau, Wis., married a millionaire lumberman of that place named Macdonald. Minneapolis, then a promising town of 3,000 or 4,000 inhabitants, was looked after by Le Roy Robertson, a son of the superintendent.

The Mississippi was the only means of communication between La Crosse and the up-river country. In summer steamboats navigated the river to St. Paul, and in winter Burbank's stages took their place, running on the ice. There were no land roads, consequently during the freezing period in autumn and the spring thaws there was no means of transportation for freight, mails or human beings. As the telegraph line was invariably down at such times, St. Paul was isolated from the world for two weeks or more.

As warm weather approached, early in 1866, the spring floods around La Crosse swelled the two tributaries of the greater stream until our line was completely submerged. Accordingly, I procured a rowboat, and with a helper rowed over the line, lifted the wire from the poles and tied it to the treetops with pieces of rope for half a mile or more. When I left La Crosse the next fall that wire still hung in the trees!

*From *Postal Telegraph*.

But over that same old 400-mile line of No. 9 gauge iron wire the late Emil M. Shape transmitted to Ed. Curry from Milwaukee to St. Paul 2,731 words of press matter in one hour, without a break or an abbreviation of any kind. It was received in manifold by Mr. Curry, and the copies delivered to the *St. Paul Press* and *The Pioneer*, now united as the *Pioneer Press*. This performance was duly attested with affidavits which were filed at headquarters in New York.

Ideas were rather hazy in those days about some matters electrical which are now familiar to everybody; there were no telephones, codes, "wigwag" keys, typewriters, copper wires, dynamos or duplexes, but there were operators who could telegraph without them.

[Mr. Hinman is a well-known old-timer, and in the seventies and eighties was known all over the country as one of the most expert operators of that time. He was for some time a member of the famous force of experts in the Western Union office at Cleveland, Ohio. He also handled for many years some of the big circuits in Chicago and New York, and for the old New York Associated Press, and was in the George M. Eitemiller class. He excelled as a receiver and was a finished penman. In the eighties he entered the ranks of journalism in New York, continuing until a few years ago, when a physical break-down compelled him to relinquish the work. Mr. Hinman, whose health has become seriously impaired, is now with the Postal Company at 253 Broadway, New York.—EDITOR.]

Earth Resistivity.

Oil in sand or earth causes it to have a very high resistance to the flow of an electrical current, that is, speaking technically, to have a very high resistivity. Certain valuable ores in the earth cause it to have a very low resistivity. For any particular specimen of earth the resistivity varies with the moisture content. The damage to pipe systems on account of electrolysis by the return current of street railway systems depends, among other things, upon the resistivity of the earth around the pipes and near the tracks. There are therefore many reasons why we may wish to know the resistivity of certain very limited portions of the earth.

In a recent publication of the Bureau of Standards, Department of Commerce, Washington, D. C., a method for measuring earth resistivity which is free from some of the faults of methods which have previously been used is described. The method is particularly adapted to those cases in which it is important that the measurement be made without disturbing the earth, as is necessary where a sample is taken into the laboratory for measurement, and in those cases where it is desired to measure resistivity of a fairly large portion of earth, extending to a considerable depth.

To those interested a copy of the paper, Scientific Paper No. 258 will be sent on request, addressed to the Director, Bureau of Standards, Washington, D. C.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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 16, 1915.

Business Getting.

Obviously the best way for a telegraph company to secure business is to render rapid and reliable service and be courteous through its agents in its treatment of the public. A telegraph company is no different to any other business enterprise in the matter of building up trade, and a manager in the smallest hamlet, as well as in the largest city, can make friends or enemies for his company according to his attitude toward the public.

Much depends upon the manager and employees of a telegraph company, and the best of facilities and a reputation for fast service will avail little if the company's local representatives do not back up and safeguard its good name. Courtesy is one of the most important factors in dealing with the public, and frequently managers are put to sore trials by obstinacy and unreasonableness on the part of a few customers. These experiences test their manhood and control of self. In dealing with such people it is always best to pay no notice of their criticisms and perverseness, but keep in mind always that "a soft answer turneth away wrath," and practice it.

It takes a good judge of human nature to handle the all-important question of getting business. If a telegraph company is prepared to render satisfactory and reliable service that in itself is sufficient reason why the public should patronize it.

No artificial stimulus is necessary. Once a reputation for excellence of service and courteous treatment is established there need be no fear for the result. It is perfectly right and proper, where there is competition, to canvass for business, but it should be conducted along legitimate lines. The company's reputation should be always kept in mind and emphasized when dealing with prospects. Above all, honesty and fair dealing should never be forsaken, and a company's representatives should never be caught napping.

The Telegraph and Telephone in England.

The telegraph and telephone services in Great Britain have reached an acute stage in their economic existence, and have been the subject of severe criticism lately by the London press. We print on another page some plain talk on the subject by the London *Evening Standard*, revealing a very discouraging state of affairs, which has been emphasized by the war conditions.

The claims made by the post-office officials in 1870 that the telegraph service in government hands would yield a profit have never been realized. On the contrary, after two years of state operation all profits vanished. After 1871 the postal telegraph service failed to pay the interest on the capital advanced by the state, and a few years later the working expenses actually exceeded the gross revenues. This failure to meet expectations, it is said, is due to the habitual expensiveness of government work. According to a calculation of the postmaster-general recently presented to the House of Commons, the ordinary sixpenny telegram now costs on an average eleven pence to transmit and deliver.

These are impressive facts indeed, and constitute a wholesome object lesson to advocates of government ownership of telegraph and telephone facilities in this country, if they will be convinced.

Savings and Building Institutions.

One of the most gratifying and healthiest signs in the telegraph service at the present time is the reported growth of interest in telegraph savings institutions on the part of telegraph and telephone employees and the large expansion of their business. It indicates a better feeling among the employees regarding the security of their positions and a desire on their part to improve their general material conditions. Many of them are taking advantage of the opportunities offered by these institutions and are building homes for themselves and families. Activity in this direction, we are told, is very pronounced.

Some misguided individuals do not realize the advisability and necessity of making provision for their future welfare while they are able to do so. When the day of adversity comes they become dependents of society through their own folly and improvidence. There is no justification for such a practice and such individuals never get anywhere, only into trouble.

The building and savings institutions have done and are doing, more than ever before, excellent work in building up character and self-respect, and encouraging thrift and independence.

Vacuum Lightning Arresters for the Protection of Fire Alarm and Police-Telephone Circuits Against High Voltage.*

BY G. FRANCIS GRAY.

A lightning arrester designed to protect against high voltages is a sort of safety-valve set to discharge at a pressure sufficiently above that of the circuit itself to insure that the line voltage will never cause it to operate. The actual setting is seldom less than twice the operating voltage, and for very low voltage lines the nature of the device used leads to a setting several times the voltage of the line.

The function of the lightning arrester is then to prevent the voltage rising to a value that is dangerous to life or to apparatus. The simplest device for this purpose is of course a plain air gap. However, an air gap that will spark over at 500 volts is extremely small, in fact, no longer than .001 inch. With a gap as small as this, even small discharges cause the metal or carbon of the electrodes to bridge over the gap, resulting in noisy telephones, grounds on the signaling circuits, etc. Air gap arresters are widely used in telephone work, but as is well known, after every thunderstorm it is necessary to visit a considerable percentage of them to remove the short circuits and put the apparatus back into service.

In order to avoid this interference and maintenance expense, a way has been found to make a gap which is large enough to prevent short circuiting, yet still sparks over at a reasonably low voltage. If a gap between electrodes is placed in an enclosed vessel and the air gradually exhausted, as the air pressure decreases the voltage necessary to spark over the gap also decreases. The minimum voltage is determined by the kind of gas used and cannot be altered for any one gas. No matter what gap is used, practically the same minimum voltage will be obtained for the same gas, though it will occur at different gas pressures for different gap lengths, and depends, also, to some extent on the shape of the electrodes. Fortunately this minimum voltage is low enough to give good protection on low voltage circuits, and the scheme of using a long gap in low pressure air rather than a short gap in atmospheric pressure air is thus seen to be a solution of the problem.

Mr. Gray described a vacuum arrester developed by the General Electric Company. This arrester, he said, has been in successful commercial use for four years and has demonstrated beyond possibility of doubt that the composition seal is vacuum tight and that the protection given is much better than with any air gap arrester.

A lightning arrester, as its name implies, is made primarily to take care of lightning. While crosses with power circuits have some of the same properties as lightning discharges, the length of time which the discharge lasts is very different in the two cases. If a lightning arrester behaves as it should, it begins to discharge as soon as the cross occurs, and if the source of power is large enough, the arrester may continue to discharge indefinitely. The voltage drop in the arrester can never be less than the

arcing voltage, say twenty volts, and this voltage drop, even with a current of one ampere, means a power loss of twenty watts.

The use of a fuse protects the lightning arrester from over-heating only when the current is large enough to blow it, and since it is difficult to make fuses for currents below one ampere, a cross from a power circuit to a signaling circuit through a high resistance may lead to the continuous passage of a current too small to blow the fuse yet large enough to cause overheating if long continued. This condition is not met with when lightning alone is to be protected against, but during the early stages of a cross with a power circuit through a cross-arm, or other high resistance it may happen very frequently, and some sort of addition to the fuse or lightning arrester must be used to obtain satisfactory operation.

The proper construction and maintenance of ground connection is, as is well known, quite as important for lightning protection as the choice of the arrester itself. Without a good ground connection no arrester can give protection. In cities the best plan is always to ground to the water mains as close to the lightning arrester location as possible on account of the danger that any other ground will dry out and become insulating after the long continued passage of current from a cross with a power circuit. If it is necessary to run a considerable distance to reach a water main, an auxiliary ground connection should be constructed at the arrester location, and the two connected together. Many methods of making grounds have been advocated, but probably the best and cheapest is a simple iron pipe driven deep enough to reach permanently moist earth and, if conditions favor it, supplied with a salt basin at the top. In all cases care should be taken to avoid corrosion where the ground pipe is connected to the wire leading to the arrester, and it is desirable to inspect and test the ground connections at least once a year.

Arresters and fuses should be installed at the central signaling stations, at all fire stations, at the junction of cables with overhead lines and at all telephones. At fire-alarm pull-boxes where all external parts are grounded for safety to life, very high insulation to ground of the internal mechanism is provided and the apparatus is comparatively simple and inexpensive, the arrester may possibly be omitted, although the importance of maintaining service seems to demand them there also. If the protectors at each box are omitted, several, at equally spaced points on the circuit, should be installed to take care of crosses.

SWEDISH TELAUTOGRAPH.—A new telautograph, or telewriter, an instrument for telegraphic transmission of ordinary handwriting, has just been invented by two Swedish engineers. The apparatus differs entirely from the fundamental principles of other telautographs. The most characteristic feature of the apparatus seems to be that it can be used independently of the electrical resistance of the line. It can be connected alternately to a long or short line without any adjustment of the resistance, and used in connection with public telephone systems.

* Extracts from paper read at the Convention of the International Association of Municipal Electricians, Cincinnati, Ohio, August 24.

Efficiency Engineering in the Telegraph Service.

(Continued from page 511, November 1)

These are not the days when incompetent men or favorites are placed in responsible positions as are politicians who are rewarded for faithful service to certain interests as against other interests. A man to occupy a position of trust in the telegraph or telephone service must have behind him ability, integrity, resourcefulness and a clean life and habits. The largest industries in this country are managed by men who have risen from the lowest positions in their respective companies to high administrative offices. It is true that a comparatively few can reach the very top of the ladder of success for there are not positions enough to go around. It is equally true that there are thousands fully competent, but less fortunate, who nevertheless attain a very satisfactory degree of advancement in positions close to the heads. There are a large number of railroad presidents receiving from thirty to fifty thousand dollars a year who began their business careers as railroad telegraph operators at wages ranging from \$25 to \$35 per month. Sheer personal force, ability and hard work, coupled with the opportunities that the United States affords for the energetic man, will place any individual who wishes to adhere to these principles in the front ranks as captains of industry.

We are asked by a manager if it is good policy to spend personal money treating customers to obtain or retain their telegraph patronage. It is certainly not. It is degrading, and no self-respecting business man would expect the employe of a telegraph or telephone company to bribe him with cigars or dinners to retain his good-will. This would be the worst habit that a young manager could contract. Imagine what would happen if a dozen or more of such business acquaintances should be visitors at his office in one day. Gentlemanly qualities, self-respect and good service will retain customers, and the representative of the other company across the street cannot offer anything more than this in canvassing for business. We have in mind a case where a large business house which did an extensive telegraph service succeeded in exacting from the telegraph manager a regular cash bribe of \$10 per month. The telegraph manager was quite sure this was a club that he could hold over the customer and retain the business no matter how the service was rendered. What was the result? The inevitable parting of the ways was reached. Then the telegraph manager reported to the concern that its representative had exacted the bribe when, much to his surprise, he was told that they were well aware of it and the \$10 per month had been duly turned in to the company's treasury.

These articles on "Efficiency Engineering," it must be remembered, are to a considerable extent made up from suggestions sent in by managers and others interested, who are located in every section of the country. These contributions will prove an incentive to all who have ideas to make them public for the benefit of the service.

The manager of a small office writes that under this head it is well to impress upon all the importance of doing well and finishing the work in hand before their attention has been called to something else. In small offices, managers as well as wire chiefs, are frequently required to work wires. At the same time they have to keep their minds on various matters which do not require immediate attention. Before answering a wire call it is always well to jot down a few of the more important matters that have to be attended to. In this way it relieves the mind of unnecessary details so that an undivided attention can be paid to receiving or sending messages.

One writer states that while he was busily occupied in receiving an important message from a small suburban town which required quick action, numerous other matters of equal importance developed, but were mentally noted until the matter in hand was carefully disposed of. It transpired that there was an error in one of the messages and it required some time to secure a correction, but the work was finished in record time and the other matters that required attention and had been mentally noted were then disposed of in regular order to the satisfaction of all concerned.

In these days we read about great business men reaping fortunes as a reward for their painstaking endeavors in the transaction of various enterprises of great magnitude. The telegraph and the telephone do not differ from other lines of commercial activity, except in character. There is one head to a telegraph or a telephone corporation. He is known as the president. The vice-presidents, general managers or general superintendents report to him. The superintendents report to the general managers and the managers report to the superintendents. With an organization of this make-up, it will be apparent to all that quick action can be secured on any subject arising in a small town which is first brought to the attention of the manager of an office. This method of procedure is absolutely necessary to maintain an organization in a perfectly working condition, and there can be no excuse for going over heads or making short cuts from the lowest to the highest authority. If such action were countenanced it would destroy the harmony in the working of the corporate machinery. For instance, if a manager ignores his superintendent and short-cuts a subject to the general manager or general superintendent direct, the superintendent would know nothing of the transaction and would be likely, by some official act, to defeat the very object to be attained by the manager, who thought he was best serving the company's interest by ignoring his superior official.

Many persons imagine that they have in them the requisite timber to make a satisfactory president of a telegraph or telephone company. It is believed by a large number of persons that the only duties that a president of a corporation has to perform consists in looking over and approving or disapproving of the action of the vice-president and the general managers or general superintendent, as the case may be. The facts are that a president of a corporation

has thousands of duties to perform other than those bearing on the matter of management. The president of a corporation must be resourceful. If the emergency arises he must have sufficient standing with banking interests to be able to go to them and borrow on notes one, two or five million dollars. This actually happens occasionally and the money lenders must of necessity have great confidence in the borrower to accede to his wishes at a reasonable rate of interest. If the president of a corporation was *persona non grata* with the banking interests he could visit one institution after the other for months without succeeding in borrowing one dollar.

In addition to this the president of a corporation must be intimate with the presidents of other companies with whom he is closely allied in business. They must have his confidence. A promise must be as good as a bond. A president can no more succeed in the proper management of his office if he undertakes to misrepresent facts than can the manager of the smallest office deceive his customers, as has been previously pointed out. The president of a company must know something of the contracts in force and these sometimes run into thousands in number. He must be able to approve or disapprove within a reasonable time multitudinous propositions that are brought to his attention for action each day. It is out of the question for him to verify the details of each proposition. He takes it for granted that the official who has presented the matter to him is a man of integrity and he relies upon his statements.

The manager of an office makes a recommendation to his superintendent. The superintendent endorses it because it appeals to him as a good move and he has confidence in the judgment of the man back of the suggestion. The superintendent's endorsement is quite sufficient for the general manager, as he is known, as a painstaking and methodical official. The paper finally reaches the president of the company. After he has glanced over the subject and asked a few questions about it, he naturally has no hesitation in approving the recommendation. From what has been said it will be seen that confidence in each other is the main spring in the perfect and harmonious working of all corporate machinery.

As has been previously stated care must be exercised that efficiency engineering is not carried to extreme limits. This would mean false economy. As an example: suppose Chicago lost all of the direct wires to St. Louis. Cincinnati offered to relay the business. Would the chief in charge in Chicago be justified in refusing the offer because of the expense in rehandling the business in the Cincinnati office? Such an official would be unworthy of the position he held. Efficiency engineering is carried too far by many. A thirty-line letter written by a censor of letter-writing employed by a large corporation, to show how one of the employees could have saved three lines in a certain letter that he had written is classed as doubtful efficiency engineering. It frequently happens that those who have made a study of efficiency engineering place them-

selves on record by stating that certain propositions cannot be successfully carried out. The practical man is resourceful and accomplishes what the man of theory says cannot be done.

A good example of efficiency engineering is the concentration cabinets now found in all large telegraph offices. Formerly operators were called to wires to receive messages. Now the chief operator, noting an idle operator, transfers a call to the operator's desk and telegrams are exchanged without the necessity of the operator moving from desk to desk, which frequently occasioned moving his typewriter and naturally caused a loss of from five to ten minutes' time. Efficiency, in brief, means being constantly on duty and attending to business.

(To be Continued.)

British Telegraphs and Telephones.

Few people have any conception of the extraordinary waste of public money involved in the management of the State telegraph and telephone services, says the *London Evening Standard*. Both these services were originally established by private enterprise, but a section of the public, backed up by officials, conceived the idea that better results could be achieved if the State took possession of these means of communication. It was in 1870 that the telegraphs were taken over. The officials of the post-office had presented to Parliament glowing estimates of the profit that would be made by purchasing the property of the then existing telegraph companies. Not only were these estimates never realized, but after the first two years of State working all profit vanished. After 1871 the postal telegraph service failed to pay the interest due on the capital advanced by the State for the purchase of the undertaking; a few years later the working expenses actually exceeded the gross revenue.

Essentially, this failure is due to the habitual expensiveness of government work. As one of the more independent officials of the postoffice stated, the economic failure of government undertakings is due to the fact that government employees cannot be dismissed. "Railway servants," said this postoffice official, "have continuous employment as long as they are efficient, but our people have continuous employment whether they are efficient or not." It may be added that the government never, or very rarely, takes any steps to secure efficiency by appointing a business man to the management of a business concern. The actual results are very striking.

According to the last published accounts the telegraph service in 1913-14 involved a net loss of \$6,060,000, but this figure takes no account of the interest which ought to have been paid upon the advances made year by year out of the public exchequer to meet annual deficits. The true commercial loss is certainly not less than \$7,500,000. According to the calculation of the postmaster-general, speaking in the House of Commons, April 30, 1914, the ordinary sixpenny telegram now costs on the average of eleven pence to transmit and deliver.

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

Does it require any more current to operate telegraph lines in wet weather than in dry weather? (page 169)

What are the determining factors in the design and construction of a generator? (page 170)

If an armature is wound with fine wire, would the machine be capable of supplying a large quantity of current for the purpose of feeding several wires?

What is the general rule for determining the size of wire to be used in winding armatures of telegraph generators? (page 171)

If the house leads—that is, leads within the office connecting generators with switchboards, desks, etc.—are too small to carry the current, what will be the effect on the current?

What kind of wire should be employed for house wires?

Is there any advantage in using large conductors in this kind of wiring, and why?

Why will a wire system designed for use in connection with generator current answer as well for current supplied by a storage battery? (page 172)

Do generators and storage batteries possess much internal resistance?

What is the difference between these two methods of generating current and the gravity battery method as far as resistance and output are concerned?

After having decided upon the capacity of a generator, what is the next question to be settled? (page 173)

Why are various values of electromotive force provided in large offices?

What is the most advantageous method of connecting machines so as to get the various potentials?

Why is a sixth machine usually added to a series?

What is the term used to signify a series of generating machines?

Why are duplicate and triplicate sets of machines necessary? Study Figs. 81 and 82 in connection with the study of distribution of current.

How is current distributed from the machines to the main switchboard? (page 174)

What are the two cables from the generator room to the operating room called?

Why is it necessary to have two cables? (page 175)

Are these cables solid conductors? If not, how are they constructed?

Are the main leads, or cables, connected directly with the brushes of the generators?

What are bus-bars, and why are the brushes of the generators connected with them, and not with the main leads?

How many rows of discs on the switchboard are assigned to each potential, and why?

Study page 175 carefully as to the connection of the switchboard with the machines.

What is the rule governing the use of lamp resistance? (page 177)

What is the object of inserting lamp resistance between the generators and the wires?

What is the advantage of using lamps for resistance?

(To be Continued.)

The Other Man's Side.

A too common failing in the well-known human family is the tendency to settle all questions without taking the other man into consideration. What is fair and right for him is too often a matter of no concern to the man who is pronouncing the opinion. With warped judgment and biased viewpoint, Number One finds himself entitled to everything in sight and the other fellow entitled to nothing. Every time he gives public utterance to his ideas, he reveals his unspeakable narrowness. Men of real intelligence appraise him at his exact worth. One of the first signs of breadth and size is a disposition to see things whole and to take the rights of other people into consideration. The individual who looks only on his own selfish side of matters is generally lacking in breadth and intelligence. Ignorance and selfishness are generally the dominant traits of the man who overlooks the rights of others.

Fairness is a virtue that is possible of cultivation. The persistent practice of looking at both sides of a question tends to develop fairness of mind. The man who does not stop to consider anything but his own side of the issue is quietly but unmistakably tagged by his fellowmen and spends much of his time wondering why he is not more popular. Thirty days' practice in the art of being fair will do wonders for him.—*Railroad Men.*

THE TELEGRAPH BLAMED FOR THE WAR.—What a peaceful world this would be if the telegraph had not been invented. Lord Bryce, former British ambassador to the United States, attributes the European war to the invention of the telegraph. In the twelve fatal days between July 23 and August 4, 1914, things happened with a rush between the capitals of Europe. There was no time for reflection. "Had the communication passed by written dispatches as they would have done eighty years ago, it is probable that war might have been avoided," Lord Bryce told the British Academy.

Mr. C. M. Baker, general superintendent of plant, Postal Telegraph-Cable Company, Chicago, Ill., in remitting to cover his subscription for another year, writes: "No telegraph or telephone man can afford to be without the TELEGRAPH AND TELEPHONE AGE, if he wishes to keep up with the times."

Construction and Repair of Telegraph Lines.

(Continued from page 478, October 10.)

All river crossing poles should be thoroughly guyed back on the line and also on the upper side of the line, in order to hold the poles to their proper position when the flow of current, ice, etc., strikes them.

At all railroad crossings the poles at either side must be double-armed and of sufficient height to allow the arm in the bottom gain to carry the wires at least twenty-seven feet above the rail, unless otherwise required by law, or by the railroad company's regulations.

It is not necessary to use blocking bolts on double-arms when poles are in a straight line.

Poles on either side of a railroad crossing, if in a straight line, should be guyed on both sides to prevent the line from falling across the tracks if by reason of storm or decay the poles should break.

Where choice fruit trees are encountered poles of sufficient length should be set to carry the wires over them without seriously damaging the trees by trimming. Shade trees located near a residence should be trimmed very carefully, using a saw for taking off the large limbs and pruning shears for the light trimming. It is always desirable to trim shade trees from the bottom, thereby enabling the wires to be carried on short poles under the limbs and allowing the tree to grow and spread above the wires. Whenever possible, limbs should be taken off on all sides of the tree, thereby leaving it symmetrical. Employees desiring to trim shade or fruit trees should always endeavor to see the property owner and explain to him that we do not wish to injure such trees by trimming more than is necessary. This rule should be followed in all cases, even where the right-of-way and trimming privileges have been paid for, as it aids greatly in securing and holding the goodwill of property owners. In all cases where trimming is done in front of improved property the limbs and brush should be carefully gathered up and carried away and piled up in some place suitable for depositing rubbish, or burned. In no case should a hand axe be used in taking off limbs of any kind of a tree, as it usually leaves the remainder of the tree ragged and unsightly.

When brush or other rubbish is burned, the foreman must see that the embers are completely extinguished before leaving the place. All broken and discarded glass, fragments of guy wire, etc., which are worthless, must be carefully gathered up and buried. All old poles and cross-arms which are discarded must be taken from the highway, either by the abutting property owners who want them or by the foreman before leaving that locality. Open holes must be carefully covered up or properly protected before leaving them.

Hard drawn copper wire must be handled very carefully to prevent short bends or kinks and nicks or abrasions of the wire, and teams or vehicles must not be allowed to pass over it when stretched along the ground preparatory to placing it on the poles. It must never be thrown from a moving

train. All joints must be made with sleeves. In making these joints, pass each end of the wire through the sleeve until it extends one-quarter of an inch beyond the end of the sleeve, then place a steel tie wrench or connector on each end of the sleeve, the outside of the tool being placed at least one-quarter of an inch from the end of the sleeve. Three complete turns should then be made, using great care to keep the sleeve absolutely straight. Such joints do not require solder. Sleeves of the proper size to fit the different gauges of wire must be used in every case.

For tying copper wire a standard soft copper tie wire twenty-two inches long, of the same gauge as the line wire, must be used. The tie wire must be placed around the groove of the glass and the ends crossed under the line wire, giving each end as many complete spiral turns—with the fingers—as the length of the tie wire will permit. When using pliers or a tie wrench on the end of the tie wire for closing the tie wire on the line wire, the greatest care must be used not to cinch or injure the line wire. Foremen must instruct each lineman in his employ, and see that proper care is used in handling and tying copper wires.

In tying iron wire place the tie wire, which should be No. 8 gauge fourteen inches long, in the groove of the insulator; place the line wire on top of the wire and give each end of the tie wire one and one-half turns around the line wire.

When iron wires are to be soldered the two ends must be cleaned before jointing so that the bright metal is seen. A flux made from muriatic acid, killed with zinc, must be used to insure a properly soldered joint. When the joint is finished it must be wiped off with common machine oil, to neutralize the acid and prevent corrosion.

Wires on straight lines must be tied on the inside of the insulator (the side nearest the poles), except on curves or corners, where they must be tied so that the strain will be against the insulator. On the first pole at each side of a corner the wires must be tied on the same side of the insulator as the corner pole, to prevent the tie wires breaking and releasing the wires should the corner pole give way.

The following table shows in inches the sag of wires between poles at the different temperatures:

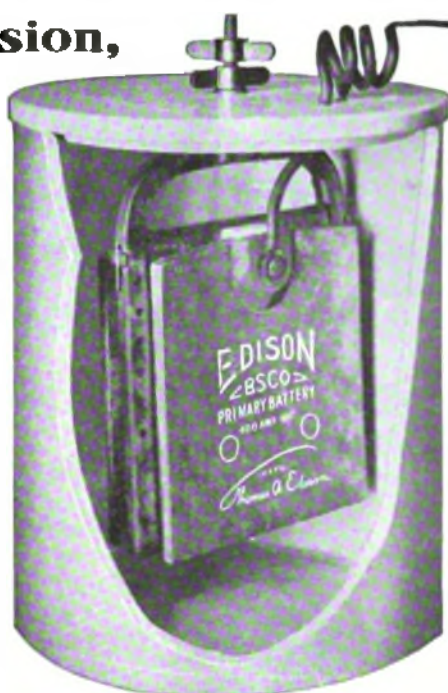
Temu.	SPANS.				
	75 ft.	100 ft.	125 ft.	150 ft.	175 ft.
0	1	2	2	3	4
20	2½	4	4	5	6
40	4	6	6	7	8
60	5½	8	8	9	10
80	7	10	10	11	12
100	8½	12	12	13	14

(To be Continued.)

APPEAL.—The Western Union Telegraph Company and the United Telegram Company has petitioned the Massachusetts Supreme Court for a review of the order of the Massachusetts Public Service Commission, issued September 7, requiring them to furnish ticken service to Calvin H. Foster, a Boston broker desiring New York stock exchange quotations.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

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"Seeing America," this most fascinating of all books, was ready for delivery on November 10. It describes every section of the country; 352 pages, 6½ x 9 inches in size, with 96 full-page, half-tone engravings. It is handsomely bound in cloth, with an attractive cover design.

"Lightning Flashes and Electric Dashes" is a book made up of bright, ably-written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 160 large double-column pages; profusely illustrated.

This offer is good for a limited time only and those who wish to obtain these valuable books for a little canvassing work will do well to take advantage of the offer now. Address all orders to JOHN B. TALTAVALL, Publisher, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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THE RAILROAD.

MEETING OF EASTERN RAILWAY TELEGRAPH SUPERINTENDENTS.—The Eastern Division of the Association of Railway Telegraph Superintendents will hold its regular meeting in New York, November 17, in the Young Men's Christian Association rooms at the Pennsylvania Station, Thirty-third street. The meeting will be called to order 10 a. m. Mr. J. H. Bell, of the Western Electric Company, New York, will present a paper on duplex telegraphy. Mr. W. H. Potter, superintendent of telegraph, Southern Railway, Washington, D. C., is chairman of the Eastern Division. He desires a large attendance.

MORSE RAILROAD OPERATORS IN DEMAND.—The use of the telephone for train dispatching is constantly increasing, says the *Railway Age Gazette*, and bids fair to become universal throughout the country; but if anybody thinks the Morse telegraph is dead and out of date, he is mistaken. The increase in business just now is such that the Pennsylvania is hiring additional operators; and its school for station agents, at Bedford, Pa., which gives instruction in telegraphy and in other station-office work, is still running, full blast, and looking for new pupils. The continued activity of this school is of interest, aside from any consideration of the technical differences between the telegraph and the telephone, in the evidence which it gives that the use of telephones is not to be made the occasion of a lowering of the grade of men (or women) to be employed for station work. It is not likely that the railroad company would be hiring many more telegraphers if satisfactory telephone operators could be hired at a much lower rate of pay. Looking only at the single task of sending and receiving messages or orders over the wire, the telephone makes it possible to use operators possessed of less intellectual ability than the telegraph requires; and in the first days of telephone dispatching this was suggested as a possible means of saving money. But, as every railroad man knows, a station agent ought to be a very versatile person; and the simplification of a single one of his many tasks affords no justification for reducing his pay. In a less degree the same is true of one who does nothing but handle messages. Ability as a telegrapher may indicate a better mentality than is necessary for speaking into a telephone; but it is a mentality none too high for the general duties of a station operator.

Honors for Prize-Winning Operators.

A recent news bulletin of the Pennsylvania Railroad contains, among others, the portraits of Messrs. Richard C. Bartley and George W. Smith, jr., telegraphers in the general office at the Broad Street station, Philadelphia, who took prizes at the recent telegraph tournament in San Francisco. Mr. Bartley sent forty railroad messages without an error, in twenty-eight minutes and thirteen seconds, breaking all previous records. He also won the contest of hand versus machine sending, beating the men who used mechanical senders. Mr. Smith won the receiving contest by taking, without

break or error, forty railroad messages in thirty-one minutes, twelve seconds. In honor of their success at the exposition, the two operators were given a dinner at Philadelphia, September 7, by the officers and employees of the telegraph department of the road, Mr. J. C. Johnson, superintendent of telegraph, acting as toastmaster.

Cipher Codes for Railroad Business.

At a special meeting of the American Association of Passenger Traffic Officers, held at French Lick Springs, Ind., October 26, Mr. L. W. Landman, general passenger agent of the Michigan Central Railway, presented a report from the executive committee on a universal telegraph cipher code for handling interline passenger traffic business, for the purpose of not only reducing the expenses of telegraphing for sleeping car reservations and similar matters, but also saving time in ciphering and deciphering and greatly improving the efficiency of the service. The code is the invention of J. Edwin Dempsey, of Chicago, a code expert.

The method employed in ciphering is unique, being in many ways a departure from the styles in general use. The plan includes the code book, which need be placed only in the hands of such officers as desired, the agents requiring only single sheets containing parts of the code used in their regular routine, and by its use the number of words in a telegram ordering reservations, etc., may be very greatly reduced, as single words are used to cover a vast amount of information. The plan was declared to be very simple and easy of manipulation. Illustrations were presented of the translation of ordinary messages into the code, showing in some cases a reduction from forty-two words into three or four.

Death of W. F. Allen.

William F. Allen, aged sixty-nine years, one of the most prominent authorities in the United States on railroad matters; secretary of the American Railway Association, and an expert on the standardization of railroad time, died at his home in South Orange, N. J., November 9, from the effects of a stroke of apoplexy. He was a former vice-president of the Gamewell Fire Alarm Telegraph Company as well as a large stockholder.

Mr. Allen was the author of the system of dividing the country into time zones. In 1875 he was elected general secretary and treasurer of the General Time Convention, composed of the principal trunk line railways, represented by their general managers and superintendents, which then met to determine upon schedules of through trains on the eastern and western roads. In the following year he was elected secretary of the Southern Time Convention, consisting of the leading southern railway lines. These conventions were consolidated in 1886 and from them the American Railway Association developed, and Mr. Allen became secretary of the association, a position which he held at the time of his death. He was also prominent in many other electrical and industrial enterprises.

Better Than Government Ownership.

In an article in the *Michigan Law Review* for November, entitled "A Bill for the Nationalization of Railroads," Mr. William W. Cook, general counsel of the Postal Telegraph-Cable Company, amplifies his proposal as set forth by him in *Harper's Weekly*, April 4, 1914, and in the *Yale Law Journal* of March, 1915, for applying to the railroads of the country the federal reserve bank plan. Mr. Cook also appends to his article a proposed bill which he has drafted in response to letters received from public men, as well as private individuals.

This proposal of Mr. Cook's is highly interesting to telegraph men as well as railroad men, because any solution of the problem to avoid government ownership in the case of the railroads would apply equally to the telegraphs, and in view of the many objections to government ownership, and the sad experience of the European governments in this direction, a proposal such as the one made by Mr. Cook, which will vest the control in the government, but leave the operation in the hands of the present operating officials, and the ownership in the public, would seem to be a big step in the combating of the government ownership problem.

Mr. Cook takes as the text of his article the words of John Finley, who has recently said that "Democracy in the Mississippi Valley is seeking now a perfect impersonal transportation machine." Mr. Cook points out that in the confines of the great Mississippi Valley are twenty-four of the forty-eight states, over one-half of the land area of the United States; that it has fifty million people, over one-half of the nation, and two-thirds of the railroad mileage of the country, and yet it has no control over these railroads, the control being vested in the East. He points out the difficulties the railroad men are now in, "being ground between the upper and nether millstones—between public demands and eastern investors." Their difficulties in raising money, the great percentage of railroads in receivers' hands, and "meanwhile the Interstate Commerce Commission, in a bewildered sort of way, is trying to keep the leaky craft from foundering, by granting a little increase of railroad rates here and refusing it there, because the public are against the railroads and will not tolerate the substantial increase that is imperative under present conditions." Mr. Cook goes on to say: "And all this will continue until the question of 'control' is settled." He asks, "Is not industrial peace better than such a conflict? Is it not better to let the control of its own railroads go to the Valley than to have government ownership? Would not the South have been better off if it had accepted the value of its slaves before the war? Would it not have been better for both sides?"

Mr. Cook then goes on to say:

"Various methods of handling the transportation problem have been tried. First we had free-handed railroading; then combination railroading; then forced competitive railroading, and at last regulated railroading, which is now breaking down under the load of public dissatisfaction and cripp-

pled railroad finances. The next experiment will be government railroading with all its attendant evils, unless legitimate public demands are met in some other way. Does anyone imagine that the American people will tolerate the present condition of affairs permanently? Certainly the 'Valley' will not stand it, and the 'Valley' has the power to enforce its just demands, for it has the votes which control legislation."

He says further:

"The time has come for a change. Commission regulation, as a complete and final remedy, is an absolute failure. Had not the public demanded that commission rule be given a trial, that kind of rule would have been declared unconstitutional long ago, as an illegal delegation of discretionary legislative power. The present system of controlling vast systems of railroads would be a joke were it not so tragic in losses to investors, disturbance to industry, and interminable conflict between the corporations and the public."

"By the proposed bill five 'Regional Railroad' corporations are incorporated by Act of Congress—one for New England; one for the district between New York and Chicago; one for the south; one for the district between Chicago and San Francisco, and one for the northwest. The New England Federal Railroad Company would acquire control, by purchase or condemnation, of the stock of the New Haven Railroad system and other roads in that district. The Central Federal Railroad Company would acquire control of the Pennsylvania, New York Central, Erie, Baltimore and Ohio, Chesapeake and Ohio, and local roads. The Southern Federal Railroad Company would do the same as to the Southern Railroad and local roads. The Northwestern Federal Railroad Company would control the Chicago, Milwaukee and St. Paul, the Chicago and Northwestern, the Great Northern, the Northern Pacific and local roads. The Central Pacific Federal Railroad Company would do the same as to the Union Pacific, the Atchison, Topeka and Santa Fé, the Southern Pacific and local roads.

"It is not intended that all this should be done at once. The first step would be to acquire control of eight roads only, namely, the Pennsylvania, New York Central, Illinois Central, Chicago, Milwaukee and St. Paul, Chicago and Northwestern, Union Pacific, Atchison, Topeka and Santa Fé, and Southern Pacific. The control of other railroad systems and companies would be acquired gradually. Some of them would be ignored until the market value of their outstanding stock reflected their earning capacity.

"A fixed dividend on the stock of these Federal Railroad Companies would be guaranteed by the United States government; the government owning all profits in excess of those dividends. This guaranteed stock would be issued from time to time, in large or small amounts, as suited the times. The rates of dividend on different issues would vary, sometimes three per cent, sometimes two and a half, or three and a half, or even four (the rate, of course, on each issue, when once fixed, not to

be varied thereafter on that particular issue), just as issues of railroad bonds vary in rates of interest and amounts issued, according to the needs of the times. Whatever the rate, it certainly would be much less than the railroad corporations now pay, because the government guaranty would be back of it.

"A Federal Railroad Board, not incorporated, is provided for by the bill, to consist of six members; five to be appointed by the President and approved by the Senate, and the sixth to be a member of the cabinet, a 'Secretary of Railroads.' This Federal Railroad Board would determine interstate railroad rates and service and pass upon all issues of stock and financial operations of the five Federal Railroad Companies.

"Such are the chief features of the bill. Its constitutionality is clear. Congress has power over interstate commerce and may aid interstate commerce in this way. That was precisely what it did for the Pacific railroads in the sixties.

"Each Federal Railroad Company, by owning a majority of the stock of the existing railroad corporations in its territory, would control the annual elections of those companies and could elect their directors. The Federal Railroad Companies could be relied upon to name proper directors of the existing railroad corporations. The control of those companies would accordingly be vested in a new body of men, namely, the directors of the Federal Railroad Companies operating under federal charters."

This idea advanced by Mr. Cook has apparently met with the approval of some of our most prominent railroad officials and bankers, including President Ripley, of the Atchison, Topeka and Santa Fé Railroad; Mr. W. C. Van Antwerp, banker and a governor of the New York Stock Exchange, and Mr. Frank Trumbull, chairman of the board of directors of the Chesapeake and Ohio Railroad.

Messenger Obeyed Orders.

A boy walked into the office of a telegraph company at Chicago and asked for a job. He said his name was Missouri. The manager happened to want a messenger boy just at that moment and gave him a message that had to be delivered in a hurry.

"Here's your chance, my boy," said the manager. "These people have been kicking about undelivered messages. Now, don't come back until you have delivered it."

A little while afterward the telephone rang. On the other end of the wire there appeared to be a building watchman, somewhat terrified.

"Have you got a boy they call Missouri?" inquired the watchman.

"We did have ten minutes ago," replied the manager.

"That Missouri feller," the watchman continued, "came over here and said he had to go to one of the offices. We don't allow no one up at that office at this hour, and I told him he couldn't go."

"Yes, yes," said the manager.

"Well," said the watchman, "he said he would go, and I had to pull my gun on him."

"But you didn't shoot him?" exclaimed the manager.

"No," meekly came back the response over the wire, "but I want my gun back."—*Philadelphia Ledger.*

SERIAL BUILDING LOAN AND SAVINGS INSTITUTION.—The prosperity of the Serial Building Loan and Savings Institution continues undiminished by the uncertainties of the great war or its possible effects. The savings of telegraphers deposited in this society increased from \$731,812 on November 1, 1914, to \$822,880 on November 1, 1915. Every month shows a steady gain in accumulations by the employes of the telegraph and telephone companies. This is but part of the benefit derived from this institution. These accumulations are loaned upon mortgages to these same employes who are building or buying homes. During the past three months over \$19,000 have been loaned to ten employes for home building purposes.

OBITUARY.

JOSEPH A. MINEY, aged forty years, a former operator for the Western Union Telegraph Company in Troy, N. Y., and more recently engaged in the stock brokerage business, died in New York October 27.

B. FRANKLIN LIEBER, aged sixty-three years, president of the Lieber Code Company, died in London, England, November 11. He was a native of Philadelphia and went abroad to live fifteen years ago.

INDUSTRIAL.

FARGO MANUFACTURING COMPANY, INC.—Owing to rapid increase in its business, the Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., has opened a general sales office at 52 Vanderbilt avenue, New York, to take care of the domestic and Canadian business. The general office and factory will remain in Poughkeepsie as heretofore. This company manufactures a complete line of connectors and electrical and mechanical appliances for line construction; electrical railways; power construction from a connection in circuits in house wiring to dead ends for mine cages.

PATENTS.—The Patent Department of TELEGRAPH AND TELEPHONE AGE is conducted by a patent expert who is an old-time telegrapher, and is thoroughly familiar with the patent situation in telegraphy, telephony, wireless, etc. Anyone having inventions to patent or to be investigated will receive the best attention through our patent service.

LETTERS FROM OUR AGENTS.

BOSTON WESTERN UNION.

Miss Lillie O'Connor, multiplex supervisor, has been married to Mr. Joseph Landers. Miss O'Connor had been in the automatic department since the installation of the Buckingham system eight years ago, and is well known to many officials of the company.

Miss Josephine O'Leary, clerk, was recently married to John J. Coughlin, western wire chief. Upon their return from a trip to New York they will be at home in Medford Hillside, Mass.

Mr. W. F. Horton has returned from the Pacific Coast, where he has been installing the multiplex system.

General superintendent of traffic W. N. Fashbaugh, accompanied by division traffic superintendent S. B. Haig, spent several days in Boston inspecting the office recently.

Chief operator J. B. Rex and the entire Boston staff have been highly commended upon the efficient manner in which the large file of press incident to the world series was handled.

NEW YORK WESTERN UNION.

An old-timer, who had not seen the inside of a large telegraph office in twenty-five years, paid a visit recently to this office. He was astonished to find the up-to-date methods of conveying the messages to and from the various desks. The check girls on roller skates also astonished him. He next found the messenger boys delivered telegrams to distant points using bicycles to expedite the delivery. He later found that the linemen went after wire trouble in automobiles. Then he asked what will be the development twenty-five years from now? Who can tell?

Edward J. Davin, aged sixty-nine years, a well-known old-time telegrapher, and an employe of this office for several years past, died of a complication of diseases October 25. Mr. Davin was a veteran of the Civil War. For many years he was an employe in Wall street broker offices and was known as the Beau Brummel of the New York telegraph profession. He was a brother of Mr. Thomas Davin, a prominent telegrapher of Boston, who died two years ago.

PHILADELPHIA POSTAL.

The sympathy of the force was extended to Mr. Wm. F. Murray, whose mother died recently at Atlantic City, N. J.

The football season at Franklin Field is on in full swing, with E. M. Price representing our interests there.

Messrs. Price, Riskie, Kurtz, Kauffmann, Goldberg and Hansbury assisted manager Dean at Princeton, N. J., Saturday, November 6, to handle the large press file due to the Harvard football game.

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.

CHICAGO WESTERN UNION.

The Testing and Regulating Efficiency Club held a meeting in room 605, Western Union Building, on the evening of November 9.

INDIANAPOLIS, IND., WESTERN UNION.

Mr. H. A. Hutton, manager at Crawfordsville, Ind., has been retired on a pension. He is succeeded by Mr. R. C. Dausman, of Auburn, Ind. Mr. H. A. Gossett, of Attica, has been transferred to Auburn to succeed Mr. Dausman, and Mr. M. F. Reaber goes from Salem to Attica. Mr. Ernest Mann, of Winchester, succeeds Mr. Reaber at Salem.

Mr. E. L. Johnson, formerly a clerk in the office of district commercial superintendent J. C. Nelson, at Indianapolis, has been appointed manager at Logansport, vice Mr. M. J. Doherty.

Mr. H. C. Pickett has been transferred from the traffic department at Lafayette to the managership at Culver, vice J. McBeth.

Mr. Ernest Grant, manager at Washington, Ind., has been confined to his home at Evansville for several weeks with typhoid fever. Mr. G. C. Purviance is acting manager at Washington.

ST. LOUIS WESTERN UNION.

Mr. A. Kern has been appointed chief in charge of the automatic department, vice E. L. Morgan, transferred to the division traffic superintendent's office, Western Division, instead of the Eastern Division, as first reported.

Mr. M. Tully, a well-known old-timer, retired on a pension, has had another severe paralytic stroke and has been unconscious for several days.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources	-	-	-	\$900,000
Surplus	-	-	-	35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 253 Broadway, Room 1030, 2.30 to 4.30 p.m.,
every Friday, 15th and last day of month.
Telephone Building, 24 Walker Street, Room 1129, Daily
9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 20 to 25, Full Grade, \$1.25; Half Grade, 62c. 25 to 30, Full Grade, \$1.50; Half Grade, 75c. 30 to 35, Full Grade, \$1.75; Half Grade, 87c. 35 to 40, Full Grade, \$2.00; Half Grade, \$1.00.

M. J. O'LEARY, Sec'y, P. O. Box 510, NEW YORK.

Telegraph and Telephone Age

No. 23.

NEW YORK, DECEMBER 1, 1915.

Thirty-third Year.

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Generating Electrical Energy by Machinery.

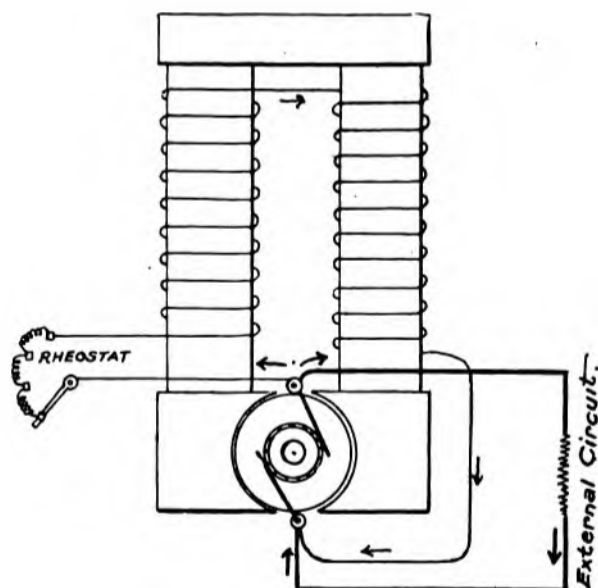
One of the most interesting facts in the domain of electricity is the generation of an electric current mechanically. When we look at a primary battery we can form some sort of an idea how electricity is generated within it. There are the chemicals and other materials visible to the eye, and with a little study we learn that the chemical reactions generate electricity and cause a current to flow through the wire connecting the opposite poles of the battery. Not so with the electric generator, or dynamo, as it is sometimes but erroneously called. There is the machine with nothing visible that would suggest to the uninformed mind the generation of electricity. In the battery we know that the chemical action is the source of electricity, but in the generator there is nothing visible but a mass of shaped iron and a lot of wires. Where, then, can electricity come from?

The real source of the electricity generated in a machine is magnetism. If we pass a wire across the field of a magnet a current of electricity is generated in the wire. There is nothing in the wire itself that will produce electricity, and magnetism alone will not create a current. It is evident, therefore, that the magnetism is the original source of the electric current in the wire. To hold the wire stationary in the magnetic field would do no good as far as production of electricity is concerned, yet when we move the wire through the field a current of electricity appears. From this fact it is evident that motion is an important factor in the production of electricity by machinery.

The power to drive the machine must necessarily come from some outside source, because the generator has no motive power in itself.

The usual definition of an electrical generator is, "A machine in which mechanical energy is converted into electrical energy by means of continuous relative motion of an electrical conductor or conductors and a magnetic field or fields, such motion causing the conductor to cut or traverse the lines of force of the field."

The armature of a generator is so well balanced that the mere force of the hand is sufficient to turn it, even in large machines. There does not appear to be any resistance to the motion, because the wires of the armature cut very few lines of magnetic force, for the reason that the motion is extremely



PRINCIPLE OF SHUNT WINDING IN GENERATOR.

slow when compared with that attained when the machine is running at full speed. To drive the armature at the speed required in practice a steam engine or other source of power is needed. Under operating conditions the resistance to the revolving motion of the armature is very great. This is due to the fact that power is required to drive the conductors of the armature through the strong magnetic field of the machine, the field actually opposing the entrance of the wires thereinto. This is a peculiar thing about electric generators, the more rapidly the armature revolves the greater is the power required to keep it revolving, and this explains why a comparatively small electric generator requires a large, powerful steam engine to drive its armature.

Another interesting fact in connection with generators is the production of magnetism in the field magnets. Permanent magnets are not employed at all in the manufacture of these machines, soft iron being generally used for the field magnets.

Books tell us that soft iron does not retain magnetism when the exciting cause of the magnetism

has been removed. Whence, then, comes the magnetism in the generators? As a matter of fact, soft iron does retain a slight trace of magnetism and this is used as a foundation upon which to build stronger magnetism. When the armature begins to revolve, a feeble current is generated by reason of the existence of the residual magnetism in the field magnets. The machine is so constructed that a portion of this small current is shunted through the windings of the field magnet, thus causing a slight growth of the original magnetism, and as the speed of the armature increases so does the current and, in consequence, the magnetism, until when the armature attains its normal speed, the magnetism and consequently the current reach a fixed definite value.

The accompanying illustration shows the principle of a shunt-wound generator. It will be seen that to each brush two wires are connected, one a terminal of the external circuit and the other a terminal of the field magnet winding. In the latter a rheostat is inserted for the purpose of regulating the current flowing through the field winding, thus controlling the output of the machine. Such machines are called self-exciting, because the reciprocal electrical and magnetic reactions take place entirely within the machine. Some generators are "separately excited"—that is, the current needed to build up the magnetism in the field magnets is supplied from an outside source, and not by the machine itself. Alternating-current generators are usually separately excited, and direct-current machines are self-excited.

It is evident therefore that in a generator the origin of electrical energy resides in magnetism. Magnetism can exist without the aid of an electrical current, but a current generated by a machine cannot exist without the aid of magnetism. Permanent magnets and natural magnets, such as lodestone, are instances of existence of magnetism independent of electrical current.

Telegraph and Telephone Patents.

ISSUED NOVEMBER 2.

- 1,158,636. Telephone System and Individual Transmitter Therefor. To C. L. Chisholm, Marysville, N. B., Canada.
 1,158,665. Electric Telegraph Apparatus. To J. A. Elms, Somerville, Mass.
 1,158,810. Inductance Coil for Telephone Lines. To S. B. Kent, New York.
 1,158,927. Automatic Telephone System. To W. Kaisling, Chicago, Ill.
 1,159,188. Intercommunicating Telephone System. To G. Deakin, Oakland, Cal.

ISSUED NOVEMBER 9.

- 1,159,595. Telephone-Exchange System. To F. R. McBerty, New Rochelle, N. Y.
 1,159,603. Telephone Device. To H. E. Shreeve, Millburn, N. J.
 1,159,714. Electrical Selective Mechanism. To A. H. F. Schaar, Oakland, Cal.
 1,159,855. Special-Service Telephone System. To T. G. Martin, Chicago, Ill.

1,159,969. Detector for Wireless Telegraphy. To C. O. Lorenz, Port Arthur, Tex.

1,160,097. Telegraph Repeater. To W. Finn, Bloomfield, N. J.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on November 27:

American Telephone and Telegraph Co.	128½
Mackay Companies	80½-82
Mackay Companies, preferred	65-66
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	4
Western Union Telegraph Co.	88¼

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to eight shares. For eight or more shares the commission charge is 12½ cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. B. M. DOWNES, of the Hemingray Glass Company, manufacturer of insulators, Covington, Ky., was a recent New York business visitor.

MR. W. H. SAWYER, of Providence, R. I., formerly identified with the telegraph and the American District Telegraph service, has gone to Pasadena, Cal., where he usually spends the winter months.

MR. CHARLES R. UNDERHILL, chief electrical engineer, The Acme Wire Company, New Haven, Conn., has completed his second lecture tour through the middle west this season, having lectured on "Electromagnets" at Purdue University, November 9; University of Illinois, November 10 and November 11; Ohio State University, November 12; Engineer's Club, Dayton, Ohio, November 15; Case School of Applied Science, Cleveland, Ohio, November 16; University of Cincinnati, November 18, and Engineer's Club, Cincinnati, November 18.

A GOOD WORD FOR PHILADELPHIA.—A western telegraph man writes us that "Philadelphia may be slow as a general proposition, but the Quaker City, to my mind, has more swift telegraphers than any other city I know of."

Postal Telegraph-Cable Company. EXECUTIVE OFFICES.

MR. W. I. CAPEN vice-president New York, is making an inspection trip throughout the South and will be absent about three weeks.

MR. CHARLES P. BRUCH, vice-president of this company, New York, was unanimously elected president of the Ohio Society of New York, at its annual meeting held November 29. The society has on its rolls many prominent men, including a number who are well-known ex-telegraphers, such as David Homer Bates, Frank N. Dowler, Thomas A. Edison, F. E. Herriman, Harry B. Logan, Ralph W. Wallace and Theo. N. Vail.

MR. C. F. LEONARD, superintendent, New York, has returned to his office from a business trip, visiting offices in Connecticut.

MR. E. Y. OUDERKIRK, manager of the Wheeling, W. Va., office, was an executive office visitor November 22. He was on his way to Wheeling from Saratoga, N. Y., his old home, where he spent a brief vacation.

MANAGERS APPOINTED.—L. R. McCall, New Castle, Pa.; J. E. Sands, Ishpeming, Mich.; William Flynn, Reed City, Mich.; J. E. Weber, Ann Arbor, Mich.; W. L. O'Keefe, Connersville, Ind.; R. W. Ledwith, Michigan City, Ind.; J. C. Christian, Bowling Green, Ky.

THE MACKAY COMPANIES have declared a quarterly dividend of 1 per cent on preferred stock and 1¼ per cent on common, payable January 3, 1916.

TELEGRAPH CODES OF THE WORLD.—Mr. Donald McNicol, of the engineering department, Postal Telegraph Cable Company, New York, is the author of an interesting article on "Telegraph Codes of the World," in the Railroad Man's Magazine for December. The alphabets considered are: Bacon's (1605); Rees' (1809); Swain's (1829); Schilling's (1832); Gauss and Weber's (1833); Steinheil's (1836); Morse alphabets (1838 and 1844); Bain's (1839); Austro-Germanic (1854); Continental (1851); U. S. Navy; Phillips' code punctuations; Japanese code; Turkish code; Phillips' proposed alphabet; printing-telegraph alphabet; Baudot; Morkrum; Western Union multiplex code; Buckingham or Barclay; Telepost.

METHODS OF ELECTROLYSIS MITIGATION.—A paper giving a brief general statement regarding electrolysis and corrosion, and presenting a detailed discussion of the various methods of electrolysis mitigation that have been proposed or tried for protecting underground structures, has just been issued by the United States Bureau of Standards. There is presented a discussion of the principles on which regulations concerning electrolysis mitigation should be based, and the responsibilities of owners of underground utilities as well as of the railway companies are emphasized. Copies of this publication, Technologic Paper No. 52, may be obtained without charge from the Bureau of Standards, Washington, D. C.

Western Union Telegraph Company. EXECUTIVE OFFICES.

MESSRS. NEWCOMB CARLTON, president; L. McKisick, assistant to the president; W. N. Fashbaugh, general superintendent of traffic; G. M. Yorke, general superintendent of plant; and W. C. Merly, secretary for the party, returned to New York, November 22, from a two-weeks' inspection trip through the west and southwest.

MR. J. C. WILLEVER, general commercial superintendent, New York, is absent on a two weeks' business trip through the Western Division.

MR. R. E. CHETWOOD, plant engineer, New York, has returned from a business trip through the west and south.

MR. R. J. MEIGS, valuation engineer for this company, New York, was among those who took part in a conference in Philadelphia, Pa., November 10, 11 and 12, on the valuation of public utilities, which was arranged by the Utilities Bureau.

MR. C. A. CRANE, manager of the St. Paul, Minn., office of this company, who has just been elected president of the Rotary Club of St. Paul, contributes to the *Saint Paul Rotarian*, of November 6, a short, inspiring article entitled "An Opportunity."

MR. C. E. JONES, manager for this company at Dayton, Ohio, delivered a series of lectures entitled "The Story of the Telegraph" before various institutions in that city, including public schools, during the week beginning November 14.

MR. EDWARD B. KING, one of the chief operators of the Havana, Cuba, office of this company, is in New York this week, and proposes to call upon many of his old-time friends.

Superintendent I. N. Miller Retires.

Mr. I. N. Miller, who has been superintendent of the seventh district, Western Division, of the Western Union Telegraph Company, with head-



I. N. MILLER

quarters at Cincinnati, Ohio, for thirty-four years, retired from active service on November 1, and was succeeded by Mr. A. A. Montgomery, formerly commercial manager of the district. The retiring

official bade formal farewell to his office force and local heads of the departments at a dinner given by him at the Business Men's Club in Cincinnati, November 8.

Prominent among those present were superintendent A. A. Montgomery; district commercial manager A. L. Buchanan; Lloyd R. Scholl, manager, Cincinnati office; W. E. Lukens, chief operator; W. J. Connolly, night chief operator; Mrs. Louis A. Ireton, L. S. Miller, Harry Driehaus, A. D. Hale, and others. A choice menu was enjoyed, music and flowers contributing to the pleasure of the occasion.

Mr. Miller was in a reminiscent mood and his story of the early days of the telegraph with the accompanying hardships and trials was extremely interesting. The veteran telegrapher said he was as old as the telegraph in Ohio, having been born in 1847, the year in which the first telegraph office was opened in Cincinnati. Entering the business as operator at Martinsville, Ohio, some fifty miles east of Cincinnati on the Baltimore and Ohio Southwestern road in 1863, he has been in continuous service until the day of his retirement. He stated that while glad to lay down the burdens and cares of the office, parting with his faithful employes caused a pang of genuine regret.

Feeling responses were made by superintendent Montgomery and Mr. Wolf. Mr. A. L. Buchanan read an appropriate poem. All referred to Mr. Miller's well-known kindness and fairness towards his associates, and to the unanimous sentiment of respect and esteem in which he is held throughout the seventh district, of which Mr. Miller is justly proud.

The editor and publisher of this journal wish to add their testimony to what has already been said concerning the valuable services of Mr. I. N. Miller in the development of the telegraph, not only in his own district but throughout the country. His educational articles have always been of great value to the student members of the profession, and his kindness and fairness to every employe was always a subject of commendation. The fact that he has managed the affairs of the company in such a masterly manner during the long period of his incumbency is indicative of his exceptional ability and judgment. Added to all this, Mr. Miller is a Christian gentleman and he carried into his business the precepts of religious teachings, which largely accounts for the splendid name and record that attaches to his administration.

A. A. Montgomery, Superintendent, Cincinnati, Ohio.

Mr. Albert A. Montgomery, formerly district commercial manager for the Western Union Telegraph Company at Cincinnati, Ohio, whose appointment to the position of district commercial superintendent at the same point was announced in our November 16 issue, was born in Montgomery, W. Va., November 17, 1862, and first entered the telegraph service January 25, 1875, as messenger for the Western Union Company at Ironton, Ohio.

Mr. Montgomery has been in the Western Union service continuously. He advanced through the positions of operator, loop chief, wire chief, traffic chief, assistant chief operator and in November,



A. A. MONTGOMERY

1910, received the appointment of district traffic superintendent for the sixth and seventh districts, later becoming commercial manager, which position he held at the time of his recent appointment as district commercial superintendent.

J. W. McMahon on Leave of Absence.

Mr. J. W. McMahon, manager of the Bridgeport, Conn., office of this company, has been granted a leave of absence of one year to enter the employ of the Remington Arms-Union Metallic Cartridge Company as manager of the employment bureau at its new plant soon to be opened at Hoboken, N. J.

Mr. McMahon says, in referring to his new position: "I will have no trouble in conducting my office, as the experience and training received in the telegraph service enables one to have confidence, pluck and ambition and I know that if I apply the same amount of energy, perseverance and ability in the new field as I have exercised in serving the interests of the Western Union company, I will succeed and perhaps be confronted with more opportunity than what is afforded a young man in the telegraph business.

"I believe that my experience may serve to illustrate to other young men in the telegraph that success can be acquired only by strong individual effort and knowing how to grasp an opportunity when it develops. I feel satisfied that there are many positions seeking the man to fill them rather than the man seeking the position. Big business requires able men, and I assure you that I owe much of my success, small that it is, to proper application and the resolution to perform my duty as well as I am able and with that resolution deeply affixed, every action and every pursuit brings satisfaction to the mind."

Mr. McMahon organized the Western Union Society of Connecticut and became its first presi-

dent, and was re-elected for another year. He was also elected a member of the Bridgeport Business Men's Association and had much success in developing the company's business in that city. He was agent in Bridgeport for TELEGRAPH AND TELEPHONE AGE and rendered efficient service in that line.

THE CABLE.

JOHN R. WHITE, aged forty-nine years, representative of the French Cable Company at Chicago, Ill., died on October 11 of heart trouble. He was born in 1866 at Penzance, England. He had been an employe of the French Cable Company for twenty-four years.

MR. HENRY H. OSBORNE, son of Mr. Hugh Osborne, superintendent of the French Cable Company at Orleans, Mass., has been appointed western representative of the French Cable Company with headquarters at Chicago vice John R. White deceased.

ITALIAN BUSINESS.—The Italian administration advises that on and after December 1 deferred plain language messages will be admitted to and from Italy.

SUBMARINE TELEGRAPHY.—Mr. K. C. Cox, of Norfolk Island, South Pacific Ocean, has been granted a patent on an improvement in submarine telegraphy. A selenium relay controls the movements of the moving coil of the receiving instrument, which in turn controls the movable beam of light. The inertia of the selenium is compensated for by means of one or more inductive shunts.

COMPLIMENT IN PIGEON ENGLISH.—Following is a literal translation of a circular printed in Chinese in reference to the Commercial Pacific Cable service in China: "My company let every China merchant know, may be some people want make telegraph go somewhere quick. Go San Francisco, Marysville, Portland, Sacramento, San Jose, Chicago, Philadelphia. Go ocean every country, East everywhere, all quick go in. Please some merchant want come deal my Company just write 'Pacific Postal Water Land New Telegraph Company.' Sure same you say, do. Not trouble my company. Also same have Mackay Bennett, telegraph all same back and forth, go Hong Kong, Shanghai and China. Come, go quicker. This company awful cheap."

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to November 26, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Paramaribo and Cayenne, November 13, 1915; Martinique and Paramaribo, November 23, 1915.

CANADIAN NOTES.

MR. F. P. GUTELIUS, general manager, Canadian Government Railways, Moncton, N. B., announces the appointment of the Grand Trunk Pacific Telegraph Company as supervisory agent of telegraphs on the trans-continental between Moncton, N. B., and Winnipeg, Man., including the Lake Superior branch to Fort William, having jurisdiction over all matters appertaining to the construction and maintenance of telegraphs and telephone lines and operation of railroad and commercial telegraphs. The following are the officers of the Grand Trunk Pacific Telegraph Company having jurisdiction: Mr. H. Hulatt, manager of telegraphs, Montreal, P. Q.; Mr. F. T. Caldwell, division superintendent of telegraphs, Winnipeg, Man.; Mr. Thomas Rodger, supervisor, Montreal, P. Q.

THE TELEPHONE.

TELEPHONE FOR AIRMEN.—Mr. M. K. Turner, of New York, has devised a special loud-speaking telephone for the use of operators of military flying machines, an instrument of extraordinary power, which has been recently adopted by the Russian and Italian air fleets. The invention is called the "aviaphone."

THREE-CORNERED DINNER BY TELEPHONE.—The alumni in New York of the Ohio State University dined at the Park Avenue Hotel on the evening of November 26, sitting at one corner of a three-cornered dinner in celebration of Ohio State University Day. The other corners were at San Francisco and at Columbus, Ohio. The American Telephone and Telegraph Company joined the three corners by wire, each diner being provided with a telephone receiver.

"Phonometer."

Dr. A. G. Webster demonstrated before the National Academy of Science in New York, November 17, the operation of a device invented by him for showing the direction of signals, which will be of particular value for navigation in foggy weather. The apparatus is called a "phonometer" and translates the intensity of sound into terms of light. A special form of telephone is employed. The vibrations of the diaphragm control a small electric lamp whose light is reflected by a mirror upon a scale. The scale shows the intensity of the sound as the image of the light widens or contracts.

Review of Principal Articles in Contemporary Telephone Publications.

G. A. R. ENCAMPMENT.—The part played by the telephone in the recent encampment of the Grand Army of the Republic in Washington is described in *The Transmitter* (November). A picture shows the veterans carrying the largest United States flag ever made. The issue contains much other interesting matter and is well illustrated.

AMONG THE MANY INTERESTING ARTICLES in the *Telephone Review* (November) may be mentioned "The Telephone Behind the Battle," referring to

the importance of the telephone in operations at the front; "Typical Heroism," describing the bravery of telephone employes at various places under stress of extraordinary emergencies; "Edison Day Celebration" at the San Francisco exposition, showing a picture of Mr. Edison talking by telephone for the first time in his life, and many others on telephone subjects written up in popular style. The number is well illustrated.

CONSTRUCTING A BIG CITY CENTRAL OFFICE is the title of a well-illustrated article in *The Telephone News* (November). The new Grant central office, Pittsburgh, Pa., is the subject. The article reveals the enormous amount of labor and material involved in the fitting out of a large exchange.

PHANTOM TRUNKS.—Mr. E. J. Sithens, equipment engineer, is the author of an interesting descriptive article in *The Telephone News* (November) entitled "The Phantom Trunk." It is a non-technical description of the circuits to which the terms "phantom" and "physical" apply.

TELEPHONE TRANSMISSION.—Mr. C. J. Larson, chairman of the service committee of the Eastern Pennsylvania Independent Telephone Association, made a report on "Improvement of Long Distance Telephone Transmission." This report is reprinted in *Telephony* (November 6).

TELEPHONE CABLE.—The London-Birmingham telephone cable is the subject of an illustrated article by P. E. Erikson, in *The Telegraph and Telephone Journal* of London (November). Several novel features were introduced in the construction of this cable, which are said to mark a big stride forward in the use of cable for long-distance telephony.

DRY CELLS.—An article in *Telephony* (November 6) by W. W. Kinsley, jr., presents some suggestions as to the proper care of dry cells. The points covered are, handling, storing and testing new shipments; testing by means of ammeter and voltmeter; emergency test; regular inspection of dry batteries in central offices and at subscribers' stations. The article is illustrated, and is of a practical character.

DEPRECIATION.—"Some Factors to be Considered in Fixing Depreciation," is the title of an article by E. C. Hurd in *Telephony* (November 6). The author describes methods of ascertaining the probable lifetime of a telephone property, and points out the difference between maintenance and depreciation.

NATIONAL ELECTRICAL CODE.—The 1915 edition of the regulations of the National Board of Fire Underwriters for electric wiring and apparatus has just been issued by the electrical committee of the National Fire Protection Association, Room 416, No. 141 Milk street, Boston, Mass. It forms a pamphlet of 224 pages. The next revision of the code will be in 1917.

RADIO-TELEGRAPHY.

Marconi Notes.

Mr. Frank P. Swann, of the English Marconi Company, who has been a member of the engineers' staff at Glace Bay, C. B., for three years, sailed from New York for England on the steamer "St. Louis," November 13.

Mr. F. H. Mason, superintendent of the Great Lakes Division, has been transferred to New York on special duty during the suspension of navigation on the lakes.

Mr. A. H. Ginman, general superintendent of the Pacific Division, is in New York for conference with the heads of the various departments.

Mr. Lee Lemon, superintendent of the Transoceanic Division, is at Port Arthur, Tex., arranging for a new station to replace the one demolished by the recent tornado.

Mr. J. de Jara Almonte, of the foreign department, is in Rio de Janeiro on business of the company.

Mr. E. E. Bucher, instructing engineer of the Marconi School, was married November 1 to Miss Emily Claire Randel, of New York.

The apparatus for the transatlantic stations at Marion and Chatham, Mass., which has been held up in Europe by the war, is now arriving and the installations will be completed in the near future.

The Marconi Company has recently shipped a large consignment of books to be added to employees' libraries at the high-power stations in Hawaii, Alaska, and on the Pacific Coast. The libraries are rotated from station to station twice each year.

DR. LEE DE FOREST, the well-known wireless inventor and engineer, has returned from England, where he spent four weeks in connection with wireless telephone matters.

ALASKA BUSINESS.—The Marconi Wireless Telegraph Company of America announces that it is prepared to handle business for Ketchikan, Alaska, via Astoria, Ore.

SAGAPONACK STATION CLOSED.—The wireless station at Sagaponack, N. Y., has been temporarily discontinued, and business is being sent by way of Sea Gate, N. Y., station which can now communicate with ships at sea ten hours from New York.

SWEDISH WIRELESS TELEPHONE.—Two Swedish army officers have invented a wireless telephone system by which messages may be dispatched from trains or automobiles traveling at high speed. It is stated that in one case messages were received intelligibly over a distance of 740 miles.

DEERING, ME., WIRELESS STATION.—The new wireless station, built by the Atlantic Communication Company, at Deering, Me., which was to be operated as a branch of the Tuckerton, N. J., station, will be operated under the supervision and control of the United States Naval Radio Service as is

the Tuckerton station. The station was built with the assent of the United States government. It was erected under the supervision of Dr. Emil G. Mayer, manager at Tuckerton for the Atlantic Communication Company.

Improvement in Wireless Telephony.

Prof. Michael I. Pupin, of Columbia University, New York, gave a lecture before the National Academy of Sciences in New York, November 15, in which he described the device recently invented by him for increasing the range of the wireless telephone. In general terms he has created a structure which will so select the waves which come to it, that only the message intended will be received. It will, he says, eliminate all disturbances and interruptions and the static or natural discharges of electricity which are the bane of wireless telegraphy and telephony.

Proposed Wireless Between New York and Buenos Aires.

Mr. Chauncey Eldridge, president of the Federal Holding Company, New York, which controls the Poulsen wireless telegraph patents in this country, announces that the company has obtained a concession from the Argentine government for the erection of a high-power wireless station at Buenos Aires. Stations near New York and Buenos Aires, with wireless towers 1,000 feet high, will be erected in a short time, and communication between this country and South America may be possible within a year, Mr. Eldridge says. The distance between New York and Buenos Aires is 4,600 nautical miles. A company is to be organized for the South American business and will build stations at Rio de Janeiro, Valparaiso, Montevideo and other smaller places, the latter to connect with the larger stations.

Wireless Injunction Denied.

In connection with the suit in equity in the United States District Court brought by the Marconi Wireless Telegraph Company of America against Emil J. Simon on Marconi patent 763,772, and in reference to the recent decision by Judge Hough denying the motion for a preliminary injunction by the Marconi Company, Mr. Edward J. Nally, vice-president and general manager of the Marconi Company, makes the following statement:

"It was conceded to the Marconi Company that its patent was valid and that Simon had infringed upon it, but it was contended that because Simon's infringement was only in connection with the United States government that therefore he was immune from all liability.

"This decision raises a question of interest to all manufacturers of patented apparatus which may be used by various departments of the United States government, and if Judge Hough's opinion is correct it is believed that it will have an effect not only on those engaged in wireless telegraphy but also in many other branches of industry. In order to have the matter finally determined, the Marconi Company proposes to carry it to the highest court, as it be-

lieves it will be of interest to many others besides itself to have this question finally determined."

Wireless Relay.

Dr. Ray E. Hall, of Portland, Ore., who has been conducting wireless experiments at the University of Michigan, Ann Arbor, Mich., announces the perfection of a device for receiving and relaying wireless messages automatically at a speed from 300 to 600 per cent. greater than the best attainable with present methods.

The new device, which operates on the principle of tone instead of wave-length tuning, makes possible the sending and receiving of two messages simultaneously on the same aerials. The device receives and records messages in ink on tape with a degree of speed and accuracy unattainable heretofore.

Dr. Hall's invention will automatically relay wireless messages to a wire telegraph line by the same instrument that records the message. The result is that a wireless message may be sent from a ship at sea to some point on land, and thence automatically relayed by wire to any point desired.

Review of Principal Articles in Contemporary Radio-Telegraph Publications.

WIRELESS TELEGRAPHY IN THE WAR.—A series of short articles, printed in the *Wireless World* (November) under the heading "Wireless Telegraphy in the War," is of special interest. On the purely scientific side the report of the committee of the British Association on radio telegraphic investigations is published in full, and makes valuable reading for everyone connected in any way with the subject. Among the items dealt with in the report is the question of the relationship between "Aurora Displays and Wireless Disturbances." The second technical article deals with the subject of the calculation of mutual inductance. This paper, which is contributed by a practical man who has constantly to make use of the calculations here set out by him, contains information of a most useful character.

SIR WILLIAM SLINGO is the subject of a biographical sketch in the *Wireless World* (November). An excellent portrait of that gentleman appears as the frontispiece.

NATIONAL AMATEUR WIRELESS ASSOCIATION.—The leading article in *The Wireless Age* (November) sets forth the aims, objects, officers and full details of operation and plans of the National Amateur Wireless Association, which body was organized in New York recently. Mr. J. Andrew White, acting president, delivered a very comprehensive address at the organization meeting, which address is printed in the same issue. Mr. William Marconi is president of the association, and a full length portrait of that gentleman, in the uniform of an Italian lieutenant, is shown.

KEY-BOARD RECEIVING SET.—Mr. Austin C. Lescarboursa describes and illustrates in *The Wireless*

Age (November) a key-board operated wireless receiving set invented by Mr. Walter Goodchild. The author doubts whether the new apparatus will have a greater field of application than that found on shipboard. When minutes count the set serves its greatest purpose, for every tuning operation, from the minimum to maximum values, can be covered in twelve seconds.

"RADIO FREQUENCY CHANGERS" is the title of a lengthy article by Dr. Alfred N. Goldsmith in *The Wireless Age* (November). This is a reprint of Dr. Goldsmith's paper read before the Institute of Radio Engineers, and the subject is dealt with in a very clear manner. Several helpful illustrations accompany the article. The second and concluding installment of the article will appear in a later issue of *The Wireless Age*.

New Book.

"How to Pass U. S. Government Wireless License Examinations," is the title of a pamphlet prepared by Mr. E. E. Bucher, instructing engineer, Marconi Wireless Telegraph Company of America, and published under the direction of *The Wireless Age*. The preface states that the book is not intended to equip the student for mastery of the technical applications of wireless telegraphy, but rather to aid those who contemplate taking the examination for a government license certificate and who, through lack of proper training, are unable to formulate complete explanations of the principles.

The volume contains 118 actual government examination questions answered for elementary students of radio communication, and bear on fundamental principles:

The subject-matter covers "Definitions," "Transmitting apparatus," "Motor-generators," "Storage battery and the auxiliary set," "Antennae or aerials," "Receiving apparatus," "Radio laws and regulations," "Practical equations for radiotelegraphy."

The book is very fully illustrated by diagrams and half-tone views of apparatus, the diagrams being particularly clear. It contains seventy-two pages.

The price is 50 cents per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

OBITUARY.

JACOB S. MOORE, aged seventy-one years, retired, a veteran telegrapher and an operator in the Confederate army in the Civil War, died in Houston, Tex., November 18.

JOHN J. GEISS, aged fifty-seven years, for twenty years with the Stock Quotation Telegraph Company, New York, and for many years chief inspector for the company, died in Brooklyn, N. Y., November 18.

MRS. EMMA CRANE, aged thirty-six years, daughter of Mr. Frank Ross, night chief operator for the Postal Telegraph-Cable Company, at

Memphis, Tenn., dropped dead of heart failure while viewing the "Liberty Bell" parade in Memphis, November 22.

MUNICIPAL ELECTRICIANS.

MR. ARTHUR L. TINKER, who has been associated with the Gamewell Fire Alarm Telegraph Company for the past nineteen years, has been assigned to look after the company's interests in the territory formerly covered by the late F. S. Peace, whose headquarters were in Pittsburgh, Pa. Mr. Tinker is one of the Gamewell company's most experienced and capable engineers, and is a son of Mr. Chas. A. Tinker, former general superintendent of the Western Union Telegraph Company, New York.

MR. THOMAS J. CUSACK, formerly operator in charge, Borough of Brooklyn, Bureau of Fire Alarm Telegraph, New York City, has been designated as superintendent of operation of the fire alarm system in all boroughs of New York City. Mr. Cusack was born in 1861 at Binghamton, N. Y., and has been in the telegraph service since 1877. He has worked for the Western Union Telegraph Company, the Postal Telegraph-Cable Company, the Gold and Stock Telegraph Company, the Continental Telegraph Company and the American Union Telegraph Company in different capacities, and was one of the organizers of what is now known as the Serial Building Loan and Savings Institution. He is well known to the older members of the telegraph fraternity, and took an active part in all movements made to advance the welfare of the craft. Mr. Cusack's many friends will be pleased to learn of his promotion to this important position.

MESSRS. JOHN J. WELSH and William G. Linson have been designated operators in charge, Boroughs of Brooklyn and Queens, respectively, Bureau of Fire Alarm Telegraph, New York.

OLEAN, N. Y.—A new fire alarm system is being installed in this city.

MERCED, CAL.—A new automatic fire alarm system of the positive non-interfering type has been installed in this city at a cost of \$3,746.

THE GAMEWELL FLASHLIGHT SIGNAL system is to be installed in Jersey City, N. J., in the near future.

THE GAMEWELL FIRE ALARM TELEGRAPH COMPANY has purchased those assets of the Star Electric Company, Binghamton, N. Y., which relate to the fire and police signal business.

New Edition of Phillips' Code.

The new edition of Phillips' Code has about 700 additions to the older code and is up to date. It meets every need in the various branches of the telegraph service, and no progressive operator can afford to be without a copy. As a shorthand system, it can be used in taking dictation, reporting meetings, etc., and is being widely used for these purposes. Although many new pages have been added the price remains the same—\$1.00 per copy. For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Aurora, Earth Currents and Magnetic Disturbances.

BY OTTO KLOTZ, DOMINION ASTRONOMICAL OBSERVATORY, OTTAWA, ONT.

Aurora, earth currents and magnetic disturbances may all be treated as a common subject or phenomenon. Let it be stated at the outset that our ignorance of them is still vast. The practical man does not observe these phenomena; he encounters them; they bar his way; they defy him; he gets mad, and then it occurs to him that the scientist must help him out, and explain what it is and why it is. That is about the position of affairs.

The following despatch from Winnipeg, on June 17 last, is so interesting that it is quoted in full, besides giving an opportunity for explaining some of the statements made therein:

"Winnipeg, Man., June 17.—Aurora: More mysterious than wireless telegraphy, less constant than the visible manifestations of electrical storms, is to-day tangling up all the telegraph wires strung across the top of the continent, more especially those along the north shore of Lake Superior. There has not been such a complete tie-up in the telegraph business between eastern and western Canada for a long time, and possibly records for the month of June might be searched for many years back without finding a parallel. In fact, well-conducted aurora confine themselves to the fall and winter months, and of all the months in the year June is most immune. The record of observations in Scandinavia and Iceland, as well as the Spitzbergen station, show no aurora at all in June, though on the North American continent it is not an unknown, though still a rare, June phenomenon.

"Aurora manifestations are almost entirely confined to night, and these manifestations, whether visible or not, are commonly accompanied by magnetic earth currents, and it is these properly that affect the wires. Usually with the morning sun the whole manifestation lifts, wires surcharged with excessive and varying currents are freed and released for their daily business, and the atmosphere, overloaded with electricity, becomes normal. But to-day the magnetic storm, potent though both unseen and unheard, is raging as furiously, to the tune of crackling wires, at noon as it was at midnight. The sky is heavy and overcast. When the clouds lift and sun breaks through, the whole trouble will vanish magically as it came. For generations scientists have sought the secret of aurora and earth currents but have learned little beyond the central fact of the inconstancy of all available data on the subject.

"Another peculiarity of the present visitation—a scourge alike to the telegraph companies and the daily newspapers—is that whereas usually it is only wires running east and west that are affected by the polar visitant, on this occasion wires running north and south, such as those between Winnipeg and Minneapolis, are affected to nearly the same extent. From the meteorological point of view, this magnetic storm adds one more to the queer performances of the current month of June."

The first and natural question that occurs to an observer beholding the aurora—a brilliant aurora with its dancing, shooting streamers; building, forming and dissolving; rushing from its northern arch to meet beyond the zenith; clothed, perhaps, in greenish gauzy drapery or yet in portentous red; ceaseless activity, a mysterious phenomenon, bewildering to mind and brain—is, what is the aurora? Beholding it gives no answer, but when we compare the phenomenon with associated ones we learn a little of its nature. We find it to be electric in its nature, an electric discharge. But here our positive knowledge about its nature stops.

We may mention the theories that have been advanced to account for the aurora. Birkeland attributes the phenomenon as due to cathode rays emanating from the sun; Nordmann replaces the cathode rays by Hertzian waves, and Arrhenius supposes negatively charged particles to be sent out by the sun and reaching the earth, ionizing the upper regions of the atmosphere and thereby making it a good conductor for electrical discharges. The cathode rays we know travel at about a tenth of the velocity of light, hence would take nearly an hour and a half to reach us from the sun; the Hertzian waves travel at the velocity of light, *i. e.*, 186,000 miles a second; and Arrhenius' particles would take about forty-six hours, about two days, for transmission. The transmission time forms an important factor when an attempt is made to associate particular sun spots and solar outbursts with particular auroras and magnetic disturbances. The solar effect is, that the discharge of the difference of potential on the earth is greatly facilitated; we have an electric current established with its consequent phenomena of auroras, earth currents and magnetic disturbances. These are all more or less influenced by local conditions on or in the crust of the earth, and hence vary in intensity at different places. However, the strong currents encircle the earth, as we see in some notable cases, and manifest themselves particularly in magnetic disturbances and earth currents.

The electrical discharges, for of such are the auroras; where do they take place? Many measurements and photographs (Störmer) have been made of the aurora to determine its position—height—in our atmosphere, and it has been found that the height, although varying considerably, is of the order of fifty miles. At that elevation the atmospheric pressure is only about 1/500 of an inch, about the pressure in a Geissler tube. The discharge of electricity through highly rarefied gases and vapors in the large tubes, with the accompanying glow, at the Centennial Exposition in 1876 impressed the writer at the time with its close analogy and resemblance to the aurora, or northern lights.

We may look upon the sun not as the source of the magnetic disturbances, but as the medium that sets loose the bound energy residing in and on the earth. In general it may be stated that frequency of sun-spots is accompanied by frequency of auroras, and vice versa paucity of the former is followed by paucity of the latter, but the definite relationship between the two is not known. It will

generally, although not always, be found that the centre of the aurora—arch, if there be one, is in the magnetic meridian. In eastern Canada and the eastern United States this will be west of the true or astronomic north, while west of Lake Superior to the Pacific it will be east of the true meridian. Furthermore, if the streamers ascend from the north towards the zenith or beyond it, it will found that their focus or meeting place is beyond or south of the zenith, and at a point approximately where the direction of the dipping needle intersects the celestial vault. We see here, then, a close connection between the aurora and compass and dipping needle, which we know otherwise to exist.

It is fairly safe to say that there is never a bright auroral display without an accompanying magnetic storm, and many cases might be cited. The inverse of the statement—that with every magnetic storm we have auroral display—is not so obvious, because the magnetic instruments are always at work, being self-registering, independent of day or night, while the aurora is a matter of visibility, and hence observations are relegated practically to the night. Here we may cite a most interesting case—that of the great auroral display and great magnetic storm of June 17 last. Professor E. E. Barnard in *Nature* of July 15, gives a vivid description of the aurora as seen at the Yerkes observatory. The maximum brilliancy was reached shortly after 2 a. m., central standard time, and shortly afterwards dawn blotted out further observation. While the aurora was pursuing its magic performances in the heavens, the magnetic instruments all over the world were mightily perturbed, and as we know from the Winnipeg despatch quoted and other press reports the telegraph lines were more or less demoralized by the atmospheric electric currents.

While dawn was breaking with us, night was approaching in New Zealand, so that this world-encircling phenomenon could be observed there after daylight had made it invisible in America, and this is what happened. While it was midsummer with us, at Dunedin, latitude 46° south, longitude $170^{\circ} 30' E$ or 11 h. 22 m. ahead of Greenwich, it was midwinter, and the sun set before 5 p. m. Standard time in New Zealand is fast on central standard time 17 h. 30 m., so that 2 a. m. noted by Barnard would be 10:30 or 7:30 p. m. in New Zealand.

Mr. W. E. McAdam, of Dunedin, writes: "Upon that day (June 17) there was an exceptionally fine display of the Aurora Australis visible all over New Zealand. Here at Dunedin it commenced at 7:30 p. m. and lasted till midnight. The glow in the southern horizon was quite uncanny in effect, producing the illusion that the sun was about to rise in an impossible quarter of the sky, and at an impossible hour. I have been resident in the southern hemisphere off and on for fifty years, and have never seen anything to equal the last display of the Aurora Australis, a somewhat rare phenomenon, in the latitude of Dunedin, 46° south." (*Nature*, September 30, 1915.) This is a most interesting case, showing that while the "movies" became invisible in Canada, the night of New Zealand revealed their continued presence.

The aurora does not distribute its favors equally over the earth. The tropics and semi-tropics are practically devoid of them. The curves of equal frequency dip considerably farther south in America than in Europe. No country is so favored by this ethereal visitant as is Canada. Some attraction!

From what has been said it is obvious that more auroras will be seen and are seen during the winter months than during those of the summer, simply because in the former case the nights are longer with consequent visibility of the aurora, if there is one.

The aurora has often the appearance of filaments or streaks of clouds, but the distinction is readily observed by the presence of a star or stars behind; for the transparency of the former dims but little, if any, the brightness of the star, which by the latter, even if filmy, would be more or less obliterated.

In tabulating sun spots and the frequency of auroras over a long period of years it is found that there is a very general agreement between the maxima of the one and the maxima of the other, and similarly between the minima. Auroras, magnetic disturbances and earth currents are simultaneous phenomena due to electric currents in the higher regions of the atmosphere. Their individual intensity is to a degree dependent on local conditions, such as difference in geological formations, and all follow in a general way the sunspot cycle of eleven years. In examining the spectrum of the aurora it is found that there is one rather prominent line in the yellow-green, wave-length 5.571, which coincides with a prominent line in the spectrum of krypton.

The writer has seen many auroras in our northwest, their home, and has conversed with Hudson's Bay Company officers and voyageurs, from whom information is said to have been obtained that noises have been heard during auroral displays, and which has been quoted in books and articles on the subject, yet the writer is convinced that there is no authentic record of any noise ever having been heard, although subjectively the "noises" may have been felt, as was the case, I am sure, with Ogilvie's man.

Earth currents interfere with the working of telegraph and cable lines, and the trouble is largely overcome by making a metallic circuit and thereby cutting out the earth. This, of course, reduces the capacity of the service.

Professor Barnard reports that signals on June 17 during the aurora display on the wireless receiver at the observatory were not affected, and that the static conditions were normal.

With reference to earth currents and cables, the writer may be permitted to quote extracts from his official report in 1892, in connection with the trans-Atlantic determination of longitude. At that time there were ten cables across the Atlantic, but when earth currents set in they are not all equally disturbed; in fact, sometimes some of the cables not at all. The French cable from Brest to St. Pierre seems to be disturbed the most, and again the disturbances are felt to a greater extent at St. Pierre than at Brest. It often happens that St. Pierre can send messages to Brest but cannot re-

ceive any. Long cables seem to be more affected than short ones, and, furthermore, the earth currents appear to travel mostly from east to west. When the aurora is visible, it is quite certain that earth currents will show themselves. Thunderstorms and they, however, do not seem to be so closely related, if at all. During the past season (1892), on July 16, there was a remarkable disturbance noticed at Canso, stopping all work completely. The greatest "kick," as it is called, was given at 12:20 p. m., eastern standard time, or 5:20, Greenwich mean time. Some weeks afterwards reports came in the technical journals, from Brest, Malta, Cairo, Madras and east to Singapore of a similar disturbance on that day. Cairo, Egypt, fortunately stated the time, and from it, it was found to have been simultaneous with that of Canso. On August 24 (1892), strong earth currents set in at Canso, and at the time there was a marked auroral display. The southern cable (Commercial Cable Company) was far more affected than the northern one. As most of the companies have two cables, they can generally get rid of the effects of earth currents by looping the cables together, that is, by making a metallic circuit. Sometimes the earth currents are so strong as to injure the condensers. From the direction of the cables it is noticed that cables running east and west are more troubled with these currents than cables running north and south. There is, however, a wide difference on east and west lines. The superintendent at St. Pierre told me that he had experienced more earth currents in the past two years (1891, 1892) at that place than in the preceding eighteen years at Torbay and Canso, N. S., and besides that they are felt more on the American than on the European side. And furthermore: "The cable is quite unprejudiced and shows equal favor to positive or negative gallantries. They are of the most erratic nature; sometimes they take off their things and make quite a visit, one, two or three days, varying greatly in their demonstrativeness during the time, but seldom getting so bad as to totally stop traffic. Sometimes they favor us with a two or three-minute call only, as if to remind us that they are still alive. They fluctuate in degree very greatly. The strength or electromotive force of these earth currents has run up to 500 volts."

We have now said considerable about the subject of this paper yet have undoubtedly failed to answer all the questions of the "practical" man. The practical man wants the aurora, earth currents and magnetic disturbances stopped, for they interfere with his work: the scientist does not want them stopped, for they are a stepping stone leading upwards toward unravelling the grand mechanism of Nature. All life, all activity, all energy of the earth we may trace back to the sun, and until his secrets are revealed we shall remain in ignorance of much that is going on on our globe. At present our hopes are especially centred upon Mount Wilson, where Professor Hale and his assistants are bending all their energies upon our central orb. They intercept every messenger coming from the sun and put him through a rigorous examination as to what his business is and what despatches were entrusted to him before

he left home. All these despatches are written in hieroglyphs, and only for a few as yet has a Rosetta stone been found for their interpretation. No gained ground is ever lost by the scientist, he is ever on the offensive. Of the messengers sent out by the sun, the earth intercepts but a very small portion, less than one two-thousand-millionth. Until some of these messengers have been made to reveal their secrets, until then we can only conjecture as to the why of the aurora, earth currents and magnetic disturbances.

MERCHANTS' ASSOCIATION OF NEW YORK.—The Year Book of the Merchants' Association of New York is now being distributed to the members. It is a volume of 240 pages as compared with 212 pages in the Year Book of 1914, the increase indicating the increase in the activities of the association. In the classified list of members are found the names of well-known electrical concerns and individuals as follows: J. H. Bunnell and Company, Inc., represented by John J. Ghegan, president; Kerite Insulated Wire and Cable Company, represented by Richard D. Brixey, president; John A. Roebling's Sons Company, represented by W. P. Bowman, treasurer; Western Electric Company, represented by H. A. Halligan, vice-president; G. C. Pratt, secretary; E. P. Clifford, manager, E. W. Rockafellow, sales manager, and Gerard Swope, general sales manager; Gamewell Fire Alarm Telegraph Company, represented by Wm. Gellatly, vice-president and general manager; J. S. McCulloh, general commercial superintendent, New York Telephone Company; New York Telephone Company, represented by F. H. Bethell, vice-president; James A. Scrymser, president, Mexican Telegraph Company, and Central and South American Telegraph Company; J. A. Stewart, general manager, New York Telephone Company; T. P. Sulvan, assistant to vice-president, New York Telephone Company; H. F. Thurber, vice-president, New York Telephone Company; Western Union Telegraph Company, represented by G. H. Fearons, general attorney; J. F. Nathan, commercial superintendent, J. Simmonds, division cable manager, and P. J. Casey, special agent; Jacob S. Wiley, general auditor, New York Telephone Company.

CURIOUS TELEGRAPH LINES.—The most original telegraph line in the world once extended from La Paz, the capital of Bolivia, to the neighboring town of Oruro, a distance of about 156 miles. There are no growing trees in this part of the world, and wood of any kind is so rare that the telegraph poles were made of the same material as the natives' household furniture—dried mud. The pillars were built on stone foundations and measured about five feet square at the base, with a tapering height of fifteen feet. They were placed about 360 feet apart. Another curious telegraph line was constructed in Uganda by a British engineer, who transported growing trees to the roadside and used them as poles, because he could not find any "dead" wood that would withstand the ravages of the white ants.

Magnetic Club Fall Dinner.

Among the few bright hours in the lives of telegraphers in New York and vicinity are those devoted to the enjoyment and relaxation afforded by membership in the fraternal social organizations. The Magnetic Club is one of these societies and its activities are of the most enjoyable and elevating character.

The fall dinner of this club was held at the McAlpin Hotel, Broadway and Thirty-fourth Street, New York, in the evening of November 17, and proved to be an event of exceptional interest and enjoyment. In the first place, the selection of this hotel was a happy one, inasmuch as it is one of the finest and most centrally located hostelrys in the city; the dinner was an excellent one and served in a manner beyond criticism, and the entertainment following the dinner was of sufficient variety to please everyone present.

The officers of the club realizing the weariness of general speechmaking wisely decided to eliminate that much-abused feature from the programme, and confined the oratory to one address, which in this instance was made by Mr. Minor M. Davis, electrical engineer of the Postal Telegraph-Cable Company, New York. The president of the club, Mr. C. F. Leonard, took occasion to speak a good word for the work of the club in crystallizing the spirit of fellowship and the upbuilding of individual character among its members.

In introducing the speaker of the evening president Leonard paid a high compliment to Mr. Davis' character, and briefly reviewed the history of his own acquaintance with that gentleman, which extended over a period of thirty years. He said Mr. Davis was one of the charter members of the club.

When Mr. Davis arose to speak he was greeted with prolonged applause. His topic was "The Quiet Life." He made some amusing references to changes and progress in the electrical arts that protect telegraph engineers from any approach of somnolence, and told why there can be no really quiet life in the engineering department of a big electrical corporation.

Mr. C. P. Bruch reminded the members that Mr. Davis was the first one to suggest the organization of this club.

At the conclusion of the speaking a recess of twenty minutes for social intercourse was taken, after which the entertainment feature of the programme was carried out. It consisted of high-class vaudeville. During the dinner there was instrumental and vocal music.

At the head table were seated Messrs. Edward Reynolds, C. P. Bruch, W. I. Capen, C. F. Leonard, E. Kimmey, H. D. Reynolds (of Buffalo); M. M. Davis and J. F. Skirrow, and C. E. Bagley (of Philadelphia).

Among those present were:

Albany, N. Y.—N. C. Pangburn and H. S. Mason.

Baltimore, Md.—J. A. Vogt.

Boston, Mass.—F. P. Brennan, E. McEachern and C. A. Richardson.

Bridgeport, Conn.—S. H. Flint.

Buffalo, N. Y.—H. D. Reynolds.

Harrisburg, Pa.—C. E. Diehl.

Jersey City, N. J.—A. C. Ackerman and F. W. Potts.

Meadville, Pa.—C. A. Johnson.

Newburgh, N. Y.—A. T. Post.

New Haven, Conn.—N. C. Hall.

New London, Conn.—Frank Orchard.

Philadelphia, Pa.—C. E. Bagley, W. M. Fitzgerald, R. C. Mecredy, E. W. Miller and J. H. Wilson.

Pittsburgh, Pa.—E. E. Heasley and G. Weider.

Poughkeepsie, N. Y.—H. K. Perkins.

Washington, D. C.—G. M. Foote.

Wheeling, W. Va.—E. Y. Ouder Kirk.

Woods Hole, Mass.—H. G. Hadden.

New York.—J. J. Alcock, J. J. Astegher, A. Auslander, J. M. Barry, J. R. Beard, F. J. Block, E. D. Brewster, C. P. Bruch, W. P. Bowman, W. I. Capen, J. J. Cardona, Fred Cleverdon, R. M. Cleverdon, J. F. Cleverdon, Walter Cleverdon, S. Cohen, J. Costello, Wm. Commerce, M. M. Davis, A. H. Davies, B. J. Dixler, J. J. Donoghue, R. J. Donovan, J. Doran, W. B. Dunn, J. A. Dupuis, Harry Egan, Wm. Ellis, J. S. Ellis, J. H. Evans, A. Finn, V. Fiore, J. H. Flood, A. A. Fraser, J. J. Fredericks, H. E. Funk, D. H. Gage, jr.; J. C. Geigle, M. F. Geigle, J. J. Ghegan, W. S. Hallett, T. E. Hammond, P. A. Hickey, Dr. L. R. Hallock, R. Jacobs, M. Jurist, W. J. Kavanaugh, A. F. Kavanaugh, F. G. Kernan, F. J. Kernan, E. Kimmey, M. Klepper, Wm. O. Kells, C. A. Lane, C. F. Leonard, Chester F. Leonard, H. D. Madden, D. F. Mallen, J. A. Manning, H. J. Marks, R. H. Miller, Wm. Mills, W. H. Michener, Wm. Mitchell, J. J. McCauley, M. A. McConnell, J. J. McDermott, C. P. McInerney, F. E. McKiernan, H. J. McNamee, J. F. McNeill, D. McNicol, D. J. McQuade, J. T. Needham, G. J. O'Brien, C. B. Obst, J. P. O'Donohue, M. J. O'Leary, F. G. Payne, M. Pertka, J. A. Pinto, R. G. Post, E. J. Rankin, D. F. Regan, E. Reynolds, L. O. Rogers, Chas. Ruffer, W. Scarborough, J. Shandley, C. C. Shelley, R. R. Shingler, C. Shirley, D. Shortell, T. G. Singleton, J. F. Skirrow, I. Smith, H. L. Stern, E. M. Sturgis, F. Sullivan, D. Sullivan, T. R. Taltavall, J. B. Taltavall, R. M. Telschow, E. P. Tully, J. H. Twyford, E. M. Underhill, J. J. Wallace, Albert Walsh, C. H. Wanamaker, H. R. Waterbury, J. J. Whalen, H. Weiss, J. Wildman, H. E. Wilson, W. K. Woodward, C. Yacht.

THE NEW YORK ELECTRICAL SOCIETY held its 341st meeting at the new Equitable Building, New York, November 13. An informal talk was given by Mr. C. T. Coley, operating manager of the building, upon some of the interesting features of its construction. The members were afterwards conducted on an inspection trip through the building, during which they visited the beautiful quarters of the Plankers' Club. Mr. G. H. Guy, 29 West 30th street, New York, is secretary.

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BOUND VOLUMES of Telegraph and Telephone Age for 1913 and 1914 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, 1915.

Aurora and Earth Currents.

Most every practical telegraph man has had some distressing experience with disturbances on the wires, caused by the aurora borealis, as it is commonly called. The trouble does not manifest itself on telephone lines, because they are metallic circuits, and are not grounded as are telegraph wires.

The aurora induces earth currents of varying intensity which find their way to the wires carrying currents of their own. The two classes of current clash and there is trouble, both contending for supremacy. The result is, the wires suffer and cannot be depended upon to do their legitimate work. Earth currents are arch enemies of the telegraph and submarine cables.

It is not known what causes auroral displays and consequent earth currents. One thing is certain, there is a close connection between these phenomena and the appearance of "sun spots." When sun spots are seen from earth there is always more or less trouble on telegraph wires.

Aurora "borealis" refers to the phenomenon in the northern hemisphere and aurora "australis" to that in the southern hemisphere. Both, no doubt, arise from the same cause. They are supposed to be due to the passage of electric currents through the higher regions of the atmosphere, and they seem to originate near the poles of the earth.

Aurorae occur more frequently in winter than in summer, and are only seen at night. But as magnetic needles and telegraph disturbances are noticed by day as well as by night there can be no doubt of the occurrence of the aurora at all hours, the intense light of the sun rendering the auroral light invisible during the day. The auroral disturbances attain maximum activity every eleven years in correspondence with the appearance of the sun spots.

According to De la Rive, aurorae are due to electric discharges which take place in the polar regions between positive electricity in the atmosphere and the negative electricity of the earth, electricities which themselves are separated by the action of the sun. Another authority advances the theory that the aurora is a luminous meteoric phenomena, supposed to be of electrical origin.

The study of the aurora is an interesting one although it has baffled scientists so far. Nature does not reveal her secrets very readily, but some day man may find the key to this and other phenomena which will let in light where darkness now exists.

The article in this issue by Prof. Otto Klotz, of the Dominion astronomical observatory at Ottawa, Ont., on the subject of aurora, currents and magnetic disturbances will be read with interest by all concerned in the study and effects of these mysterious manifestations. Prof. Klotz points out that practical men would like to have these disturbances stopped, because they interfere with business, and that scientific investigators do not want them stopped, because they are a stepping stone leading upward toward unravelling the grand mechanism of nature.

Contents of this Number.

This issue contains several articles of technical and educational value and interest worth calling special attention to, in addition to the one on aurorae and earth currents, which is referred to specifically in another editorial article on this page.

An improvement in the quadruplex is described and illustrated. It consists of a polar relay of a special form in combination with other features the object being to eliminate the old enemy to multiplex operation, namely, the false signal caused by the failure of magnetism in the neutral relay coils at the moment the direction of the current is reversed.

"Efficiency Engineering in the Telegraph Service," is continued in this issue. This subject which was begun several issues back has been received by our readers with great interest. It treats of a phase of the telegraph that is growing in importance every day, and every employee who follows the suggestions laid down in these articles cannot fail to broaden his mind and become more valuable to himself as well as to his company.

An abstract of an interesting paper by Mr. J. H. Bell on "Polar Duplex Operation," read at the meeting of the Eastern Division of the Association of Railway Telegraph Superintendents in New York, November 17, will be found in the railroad column of this issue. This paper is of particular interest to the railroad telegraph service.

The American Telephone and Telegraph Company and Its Relations With and Obligations Toward Wireless Communication.

BY THEODORE N. VAIL, PRESIDENT.

To make wireless communication understandable and to make plain both its possibilities and limitations, the governing conditions and principles, which to the layman are somewhat abstruse, must be explained.

There exists, through all space, some "ether" or other medium through which can be transmitted light, heat, and electrical waves or vibrations, or some such movement or activity as has all the manifestations of waves or vibrations.

Broadly speaking, the science of electricity is still undeveloped and unrevealed, but from its manifestations, laws or rules of action have been deduced, and its action and effect are calculable.

The wireless telephone and telegraph, or operating radiograph, is the "generation" and "control" of electrical vibrations of great intensity thrown out into space, which seem to proceed in every direction, seem to conform to the curvature of the earth, and seem to penetrate most material substances. They spread and fill space as do the waves of sound. Their intensity rapidly diminishes as do sound vibrations, probably in the ratio of the increase of the space filled by them as they pass out and onward, and like any sound, are intense or loud at the source, but fade away into silence as distance increases, so that at the distant receiving station they are of slight tenuity.

There is, as yet, no practical method of deflecting or reflecting these waves, as is done with light or sound, and probably because of their great length there never will be.

The existence of these waves has long been known, but until Hertz discovered or invented a practical "detector" it was impossible to convert them into any tangible form. Since then many methods have been discovered, some one or more of which is utilized in the various wireless telegraph systems.

These waves are of different lengths, frequency and intensity; can be controlled so far as impulses or variability are concerned; and can be used for telephonic or telegraphic or signaling purposes.

The wave length and frequency can be availed of to get a certain range of selection; but selection is not secrecy, as any receiver can be adjusted to all lengths and frequencies.

The intensity of these radiations is so great that any large number of sending stations erected near each other would seriously interfere with and confuse each other's outgoing transmission, and even a small number would absolutely destroy the tenuous incoming vibrations, and all could be destroyed by extremely high tension and high frequency radiation in close proximity.

The nearest thing that can be compared to such a situation is a steam engine blowing off steam at

high pressure when some one near by is trying to converse. Under such conditions conversation is impossible.

The most interesting and most useful characteristics of the radio vibrations—those which make possible distant telephonic communication—are that these vibrations, unlike the electrical speaking vibrations over the wire, retain their peculiar and essential speaking form even to the very faintest activity at the point of actual disappearance or loss to detection, and, therefore, when magnified by the telephonic appliances used by the Bell System, the speech is distinct whether it be in distant Honolulu or Hong Kong or Paris or Petrograd.

The great obstacles to dependable usefulness with commercial possibilities—the causes which confine this great achievement to particular undependable uses—are natural conditions as yet and probably forever uncontrollable.

In space, or through the "ether" and the earth, there seem to be continuous electrical "storms," activities or manifestations, which for the sake of clearness may be called natural disturbances. These natural disturbances are sometimes mild and not very serious, while at other times they are of such intensity and activity as to absolutely nullify and destroy the artificial vibrations of the wireless stations.

For long periods these natural disturbances will continue of sufficient intensity to make it impossible to send the artificial radiographs, or at least to receive or detect them. In the midst of these storms there will be lulls or moments of quiet or comparative quiet, and it is at these times that it is possible to use the wireless or radio for telegraphic or telephonic communication. In the quiet moments it is possible to communicate without much effort. In the less quiet moments, by repetition and continuous effort, messages and conversation can be got through. In the moments of great activity all effort is useless.

The coming and going of these natural disturbances are known only by their effect upon the artificial vibrations with which they come in conflict; no clouds or prevailing winds, barometer or thermometer, indicate their coming or enable a forecast to be made. They fill, or seem to fill, all space, and even if their origin and course were determined would probably be as uncontrollable as is the water in the midst of a great ocean when in its wildest moments you might float upon it, but not with confidence.

Wireless telephony can be compared to an attempt to carry on all telephone exchange business over one great conductor connecting everyone, and over which all telegraph, all artificial electrical disturbance caused by transmission or power lines, and all the natural electrical disturbances were in full play at the same time. These are the conditions that govern radiograph activity and limit its possibilities.

There are only two ways of carrying on wireless telephony; one, by getting far away from all artificial disturbing causes and having only natural disturbances to contend with; or by the use of one

of the limited selectives which have only the interference of the natural disturbances.

There are, however, uses, many and important, probably as many and as important, as can attach to any absolutely undependable thing. Distant communication will be possible some of the time. Short-distance communication will be possible sufficiently for communication with isolated places or things not otherwise to be reached.

The American Telephone and Telegraph Company has from its beginning been trying to build up an intercommunicating instrumentality, universal and interdependent, by which everyone could reach every other connected with it—a service so well adapted to the use of all and of such great pecuniary and other advantage to all, rendered at a price so well within its value to all and so well within the reach of all, that none are too poor to take advantage of it or too independent to get along without it. This is the Bell System.

Whatever there is to add to this use or to this value or to increase its universality, this company proposes to develop.

As fast as conditions make it possible, or potential business makes present extensions of prospective value to the system and to the public, either directly or indirectly, the American Telephone and Telegraph Company will extend, enlarge and amplify its system in every way that scientific research and development make possible and social or business demands make desirable.

To this end the American Telephone and Telegraph Company will, so soon as the necessary construction and equipment can be assembled, extend the universality of its system by wireless stations at selected points on the coast so located as to enable persons and places not able to be connected in any other way to maintain communication with the world through the Bell System.

There have been and will be many statements of what has been done and promises and prophecies as to what can be done, but so far nothing in the way of actual public communication has been done in wireless telephony except through the instrumentalities of this company, and the probable future of what can be done is subject to the conditions outlined in this statement.

Legal.

IN FAVOR OF WESTERN UNION.—The supreme court of Illinois has handed down an opinion in favor of the plaintiff in the case of the Western Union Telegraph Company vs. the Louisville and Nashville Railroad Company, et al., with directions to the county court to over rule all objections sustained for further proceedings in accordance with the views expressed in the opinion. The only question left to determine in the condemnation proceedings is the amount of damages to which the Louisville and Nashville may be entitled.

SUIT FOR RENT OF RAILROAD RIGHTS-OF-WAY.—The Louisville and Nashville Railroad Company on November 14 filed a suit in Lexington, Ky., against the Western Union Telegraph Company to

recover \$740,338.26 in rents for the use of the railroad company's rights-of-way in thirteen states. The petition also asks that the defendant be required to remove its poles and lines from the plaintiff's property.

Mr. Carnegie's Birthday.

On the occasion of the eightieth anniversary of the birth of Mr. Andrew Carnegie Mr. William Bender Wilson, president of the Society of the United States Military Telegraph Corps, and Mr. David Homer Bates, secretary, sent to that gentleman their greetings in a letter, as follows:

"Dear Mr. Carnegie:

"Once more upon the recurring anniversary of your birth your early associates of the United States Military Telegraph Corps send cordial greetings to you out of grateful hearts for the private soldiers' pension which, for eight years, you have granted to over one hundred of their needy comrades."

Closing of San Francisco Exposition.

The Panama-Pacific International Exposition, which was formally opened by president Wilson on February 20 this year will be closed at midnight December 4. An elaborate ceremony will mark the event, and president Wilson will respond to an international toast, typifying the world peace, world service and world patriotism for which the exposition has stood sponsor during the past year of war and turmoil.

Answers to Questions.

[Readers of TELEGRAPH AND TELEPHONE AGE are invited to ask questions on matters relating to telegraphy and telephony which they would like to have explained. Such questions must be bona fide and signed by the person seeking the information. These names, however, will not be published.]

(32) Q.—Can you tell me how many radio stations there are in the United States at the present time, and oblige. O. L.

A.—According to a list of radio stations of the United States, published by the United States Bureau of Navigation at Washington, there are 5,073 stations, divided as follows: Government and commercial land stations, 224; government and commercial ship stations, 895; special land stations, 118; general and restricted amateur stations, 3,836.

(33) Q.—(1) Is it necessary to transpose the conductors of rubber covered twisted pair wire when used for telephonic purposes to overcome electrostatic capacity?

(2) Two miles of No. 12 B. & S. rubber covered twisted pair was put into a telephone circuit temporarily and the foreman in charge claimed that it was impossible to talk through or ring through this twist until after he had cut in transpositions one-quarter mile apart, that is, cutting the twist and connecting the plain wire to the tracer. In cases of this kind has it ever been found necessary to transpose the conductors of twister pairs? P. F.

A.—(1) No, it is not necessary. (2) It is inadvisable to have long parallel runs that have all the transpositions at the same points.

Improvement in the Quadruplex.

At the very birth of the Morse quadruplex there was developed a fault in that type of telegraph apparatus which has ever since defied eradication. This fault is the well-known interval of no magnetism which many inventors have since vainly strived to eliminate from that otherwise extremely valuable piece of electrical machinery. The earliest and most enduring device to cure the fault was the repeating sounder on the neutral side, the so-called Edison "bug-trap," through the operation of which the effect of the last signal given by the departing main battery was supposed to lag a sufficient length of time to bridge over the interval of no magnetism. To this device was added later a holding magnet energized by condensers, and a legion of other devices were tried one after another only to be discarded since they but imperfectly reinforced the original "bug-trap" which, after all, did about all the work.

Activity in quadruplex improvements has not been pronounced in recent years among inventors, who appear to have transferred their energies to less discouraging and perhaps more profitable fields. A new and radical improvement in the old quadruplex has, however, just been patented by Mr. J. A. Elms, of Somerville, Mass., which promises to make that apparatus all that its original inventor intended it to be, and justify the belief of those who have all along contended that the logical energizer for holding magnets was a battery instead of a condenser. The invention is extreme in its simplicity and positively automatic in its operation. A modified polarized relay armature, a local battery controlled by that armature and a bit of novel wiring being all that is required to set it in action. The usual main wiring of the quadruplex set is left untouched.

The basis of the invention is the fact that the interval of no magnetism in the neutral relay practically coincides with the time occupied by the polar relay armature in crossing from one of its contact stops to the opposite one in either direction while responding to the movement of the distant pole-changer. The peculiarly constructed armature of the polarized relay causes this coincidence to be exact, with the result that a local battery current enters the holding magnet instantly whenever the relays lose magnetism and disappears instantly the moment the main-line current re-enters the relays. Besides this the local battery current energizes the holding magnet during the entire "interval of no magnetism," whatever its length, which is something a condenser discharge cannot do, the character of such discharge making it impossible.

The records of the patent office show that many attempts have been made to energize the holding magnet of a quadruplex set by means of a battery. The failure of these attempts was due to the fact that in spite of their claims to the contrary the energy of the holding magnet and that of the neutral relay took effect upon the neutral relay armature simultaneously and both magnets lost their attractive force at the same time, leaving the work of

bridging the interval of no magnetism to the original repeating sounder which was thoughtfully retained.

In the new invention just patented, the neutral relay magnet and its associated holding magnet cannot be charged or discharged together. Alternation of effect between the two magnets upon the neutral relay armature is positive and automatic, as will be clearly seen in the following description and accompanying illustration.

The armature of the polarized relay carries two contact members, each one having its own front and back contact stops, between which they oscillate in the usual manner. One of these members controls the local battery current which energizes the holding magnet. A wire which connects one side of the battery with the holding magnet is also connected

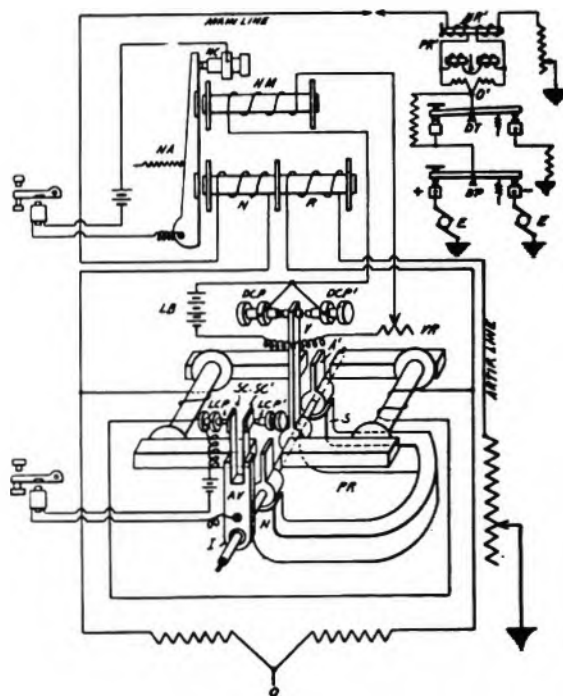


DIAGRAM OF CONNECTIONS.

intermediately with this member. The return wire from the holding magnet connects intermediately with both front and back contact stops associated with this member, thence closes the circuit at the other end of the local battery. This circuit never opens, but whenever there is battery of any strength on the line, the member on the polar relay armature short-circuits the local battery through either of its contact stops, depending upon the polarity of the main-line current, and the holding magnet receives no current. Whenever the polar armature breaks contact with either of its stops, as it must at each reversal of the main-line current, the shunt is broken and the holding magnet receives energy which it retains until again cut off by the arrival of the polar relay armature at its next contact stop. A polar relay armature ordinarily has no retractile spring; consequently it remains upon its last contact stop until pulled across the gap to its other

stop by the returned main-line current. Without an auxiliary device for accelerating the break of contact between the member and its last contact stop in advance of the incoming main-line current the interval of no magnetism would not quite coincide with the transit of the armature member; means to secure coincidence are therefore provided by a second member, also carried upon the polar relay armature. This member terminates in two spring contacts, which perform the double duty of operating the regular local on the polar side and causing the first member to break contact with either of its stops the instant the main-line current disappears from the relay magnets and in advance of the next main-current impulse, which will complete the operation of drawing the armature across to the opposite stop. These spring contact stops may also act as repeating contacts into another quadruplex set when required without interfering with their prime duty of reacting upon the member operating the battery that energizes the holding magnet, as described. The springs need not be very stiff, since they are only called upon to overcome the inertia of the armature when no magnetic force is exerted upon it. The strength of the holding magnet local must not be great enough in itself to draw the neutral relay armature away from its back stop when the neutral relay stands at "open," but be sufficient to hold that armature closed when it finds it closed in response to a signal from the distant long end of the main battery and during the brief interval of no magnetism.

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

How is the electromotive force of a generator, installed for the purpose of furnishing current to the local sounders, determined? (page 178)

Upon what two factors does the determination largely depend?

Why is a reasonably high electromotive force favored?

Why is it advisable to employ only one machine for all the local apparatus in medium sized offices?

How is it arranged to work in this way?

Why must the capacity of a generator furnishing current to local circuits be greater than that of the machine supplying main wires? (Page 179).

What is the modern way of arranging generator local circuits?

What is the rule for determining the required pressure?

What is the object of inserting non-inductive re-

sistance in local circuits supplied with current from a generator?

How may the artificial resistance be inserted?

How is the size and arrangement of house and floor conductors determined? (page 181)

How are the main leads connected in the operating department?

How are the wires laid in the floor?

What is the method of construction and arrangement of floor conductors? (page 182)

Are the two parallel feeders run in separate trenches or in the same trench in the floor of the operating room?

Study Fig. 83 on page 183 showing the method of connecting the local circuits to the floor conductors.

What are the cross trenches for and what wires do they contain?

After all the connections have been made, how are the desk wires protected from mechanical injury.

What provision is made for drawing new conductors from one point of the room to another.

How are cables and conductors drawn through the floor trenches? (page 184)

How are extension rods made?

How are the various conductors in the trenches identified?

What size wires are used in cables and what size for desk or instrument wires?

How are sounders connected in circuit? (page 185)

What is a fuse holder and of what does it consist?

Why is it advisable not to supply more than four or five multiple circuits through one fuse?

How is the size of a fuse, that is its current-carrying capacity, determined?

What size fuse is used for local multiple circuits where the number of sounders in each group does not exceed eight?

(To be Continued.)

Western Electric's Legal Home in New York State.

The Western Electric Company, previously an Illinois corporation, was incorporated at Albany, N. Y., November 17, under the laws of the State of New York with a capital of \$15,750,000. This change is merely one of incorporation from one state to another.

The stockholders of the company came to the conclusion that it was desirable that the company should have two classes of stock—common and non-voting preferred. As the statutes of Illinois do not provide for such classification, it was decided that the company should change its legal domicile. No change in the policies, operations or management is involved.

Mr. J. H. Baughman, of the Cleveland, Cincinnati, Chicago and St. Louis Railway, Bellefontaine, Ohio, in remitting to cover his subscription for another year writes: "You did perfectly right in renewing my subscription to the AGE, as I do not want to miss a single copy."

Efficiency Engineering in the Telegraph Service.

(Continued from page 528, November 16.)

Efficiency engineering as applied to the telegraph and telephone service means harmony, co-operation and the desire to do things and do them well so that there may be no cause for complaint. The measure of success of a telegraph company depends upon every employe contributing his share to the uplift of the service. In this connection uplift means harmonious working of the intricate machinery as well as satisfaction to the patrons of the telegraph. It must be remembered that every employe is a bread-winner in the service he represents, each with ideas and experiences of his own but all have the same aims and objects in view. In reaching for these aims and objects each person may perhaps travel along different roads in arriving at the one destination which is success. Those who deviate from the straight path encounter obstacles that make their progress more difficult, often resulting in failure. To meet the modern demand it should be the aim of all to do more by working less, to secure more by less effort, know more by suffering less, be more by wasting less, and all this can be accomplished by scientific and engineering principles.

Many employes figure that sound business principles mean that they should simply render to employing interests what they consider is a *quid pro quo* for the amount of money received. They are very careful to be exact in their measure of return and the employing interest naturally is equally as careful in paying for exactly the amount of service rendered and no more. One does not trust the other, and the employer and employe never reach a satisfactory understanding.

To save systematically is an important factor in the make-up of a young man. This is efficiency as applied to the individual. How can a young man take care of the property of others if he cannot or will not take care of his own? It should be a matter of education to him just as should be the care of the property of his employing interests. In other words, he must take care of the property entrusted to him or he will not long hold the position he occupies.

We have been asked several times if efficiency engineering as applied to the management of the telegraph cannot be worked out to simplify the intricate bookkeeping which is now considered necessary in making the proper records connected with each telegram handled. The reply to this is that no doubt simpler methods could be worked out to the advantage of the company as well as the employes. Every man has an equal opportunity to solve the bookkeeping problem, and we are quite sure that if anyone proposed a plan better suited to meet the bookkeeping requirements of the telegraph than the methods now in use, it would no doubt be carefully considered by the companies with a view of adopting it. Bookkeeping experts, who are better known as accountants, should study this problem. Simplification of methods, bookkeeping or otherwise, is true efficiency engineering.

New ideas and suggestions as to the conduct of the telegraph and telephone services ought to be encouraged on the part of all employers. Every employe should make it his duty to study how he can benefit the telegraph service. When he has worked out a plan that he thinks has merit he ought to be encouraged to write it up in a concise, clear manner and there ought to be some one designated to whom such suggestions may be addressed. After this is done the latter, if he thinks them worthy of further consideration, should refer them to a committee to pass on them finally. If the suggestions are found worthy of adoption, the employes should receive due credit. Many large manufacturing establishments have had receptacles placed where employes could deposit suggestions. The result has been that valuable ideas have been received from many occupying minor positions and men have been known on account of their ability displayed in this way to receive substantial recognition and promotion. In this way every employe has a chance to show what is in him.

Many telegraph officials do not favor the calling together of managers or chief operators periodically for the purpose of exchanging views as to the best methods to expedite telegraph business. We do favor such gatherings. Everyone present at such a meeting learns in an hour or two all that his associates located at distant points know concerning efficiency. Each one present is very careful thereafter to avoid the ruts that others have followed for so long a time. A man who attended such a gathering on one occasion remarked that he had the benefit of the experience of a hundred abler men than he and that he began his business career with their knowledge in mind and where they left off. He of course avoided the beaten tracks and found fresh fields to cultivate. This alone is compensation sufficient for calling together for an exchange of views those who can be benefited by meeting one another personally. Who is there who would advise that a new chief operator should follow in the footsteps of those who have gone before him in the working out of methods and policies which have long since been abandoned as inefficient and unsuited to meet the exacting requirements of the times? None of us in these days would think of using the same methods of letter-writing that were in common practice a hundred years ago. Who would think of closing a business letter to a customer with the words: "Your obedient and obliging servant" when "yours truly" is more dignified and to the point? Managers must study business management, man-handling, promotion-winning, accounting, credits, collections, salesmanship, letter-writing and all other vital and important functions of business. This knowledge is what makes an efficient manager. If a fair degree of these qualifications is attained by an individual possessing, in addition, a neat appearance and gentlemanly qualities, it is safe to say that his name is close to the top of the superintendent's list of names of persons qualified for promotion.

(To be Continued.)

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

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"Seeing America," this most fascinating of all books, was ready for delivery on November 10. It describes every section of the country; 352 pages, 6½ x 9 inches in size, with 96 full-page, half-tone engravings. It is handsomely bound in cloth, with an attractive cover design.

"Lightning Flashes and Electric Dashes" is a book made up of bright, ably-written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 160 large double-column pages; profusely illustrated.

This offer is good for a limited time only and those who wish to obtain these valuable books for a little canvassing work will do well to take advantage of the offer now. Address all orders to JOHN B. TALTAVAL, Publisher, TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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THE RAILROAD.

MR. L. M. JONES, superintendent of telegraph, Atchison, Topeka and Santa Fe Railway, Topeka, Kan., was a recent New York business visitor.

THE BLOCK SYSTEM has been put into operation on the Sandusky division of the Cleveland, Cincinnati, Chicago and St. Louis Railway, making necessary the opening of two telegraph offices and the employment of eighteen telegraphers.

NEW TELEPHONE SYSTEM ON ILLINOIS CENTRAL AT MEMPHIS.—The Illinois Central Railroad Company is making plans to construct a new telephone system from the Grand Central station, Memphis, Tenn., to the south yard shops and to Nonconah. The new system will cost \$18,000. A 125-line cable will be erected for the new service. The construction will be under the supervision of Mr. B. Weeks, superintendent of telegraph.

Death of G. L. Lang.

G. L. Lang, aged seventy-two years, a well-known railway telegraph superintendent, and a civil war veteran, died at Chattanooga, Tenn., November 13. He was at one time superintendent of telegraph of the New York and New England Railroad and after this road was merged with the New York, New Haven and Hartford Railroad he became identified with the Boston and Maine. Several years later he was appointed superintendent of telegraph of the Queen and Crescent Route, with headquarters at Chattanooga, Tenn. He held this position until a few years ago, when he entered the service of the Western Union Telegraph Company at Chattanooga. Mr. Lang was president of the Association of Railway Telegraph Superintendents during the year 1887-88. He had been in poor health for several years and in the past few months his feebleness increased every day. It is thought he died of hemorrhage of the brain. He was wounded during the war and the old wounds caused him trouble lately. He was a prominent Knight Templar.

Telephone Dispatching on the 'Frisco.

In regard to an article published in a western paper recently to the effect that the St. Louis and San Francisco Railroad is discarding the telephone for train dispatching, replacing it with telegraph, Mr. H. D. Teed, superintendent of telegraph of that road, Springfield, Mo., writes as follows:

"There is no foundation for the article. As a matter of fact, the extension of telephone service on the 'Frisco' has made it possible to consolidate several superintendents' divisions and dispatching territory, effecting a large saving.

"What, perhaps, gave rise to the statement was the fact that the consolidation plan necessitated moving one of the dispatchers' offices, which involved several circuit changes. In one of the dispatching districts to be consolidated, there was a ninety-mile iron dispatching circuit which did not extend to the new dispatchers' headquarters, and on account of lack of time and circuits we were obliged to Morse that short telephone circuit temporarily.

"Instead of abandoning any telephone circuits, we are expanding in that direction. As evidence of this, it will only be necessary to state that we have but recently completed one 161-mile circuit for dispatching purposes, one 144-mile circuit for dispatching purposes, one 200-mile circuit for message and conversation purposes, and another 240-mile circuit for trunking service; and we have authority to erect four telephone circuits for dispatching purposes with mileage as follows: 144, 127, 168 and 200."

Meeting of Eastern Division of Association of Railway Telegraph Superintendents.

The Eastern Division of the Association of Railway Telegraph Superintendents held its regular meeting in the Young Men's Christian Association rooms in the Pennsylvania station, New York, November 17, with a large attendance. Mr. W. H. Potter, of the Southern Railway, Washington, D. C., chairman of the division, presided.

The general officials of the Western Union Telegraph Company were not present, owing to their absence from the city, but they sent their regrets at their inability to attend.

Mr. W. P. Cline was appointed secretary of the meeting.

Mr. R. W. Meigs, valuation engineer of the Western Union Telegraph Company, New York, made a few general remarks on valuation work.

Mr. J. H. Bell, engineer, Western Electric Company, New York, read a paper entitled "Some Notes on Polar Duplex Operation." An abstract of the paper follows:

"For long distance operation," said Mr. Bell, "the only satisfactory type of signals are those in which positive and negative current impulses of varying lengths (time duration) are used, a polarized relay being employed for their reception and a brush distributor or some other form of transmitting device for reversing the polarity of the current with a minimum no-current interval at the sending end."

By the aid of illustrations he showed the results of some tests of a polar relay in which the operating current value was varied between five and forty milliamperes with three different adjustments of armature travel. The results were analyzed in order to determine duration of contact and time of transit.

Closer adjustment of receiving relays, he said, will render them more efficient for receiving signals of reduced strength of current. For transmitting purposes the value of a close adjustment lies in the assistance it gives towards eliminating the effects of inductive disturbances.

He discussed the subject of line insulation and its effect upon duplex operation. It has generally been accepted, he said, that the insulation of a telegraph line, having an average of forty poles per mile, can be maintained at not less than .25 megohm per mile, except in extreme cases.

It has been found experimentally that a certain amount of leakage is beneficial to high speed working, and that when the insulation resistance is not

less than the conductor resistance, the speed of work is closely approximating the highest possible speed. The limit for reliable duplex hand speed working is when the insulation is approximately twenty-five per cent of the conductor resistance.

Mutilation of signals results from inductive disturbances, unbalance and too wide contact travel of pole-changer, and this mutilation affects the signals mainly at the interval of reversal of current. By using a Gulstad vibrating relay of the simplified form it is possible to obtain an improvement of probably fifty per cent in the transmission of a land line.

He pointed out some of the advantages derived in the use of the vibrating relay.

On an actual telegraph circuit about 1,000 miles in length, with one repeater, and worked on the automatic system, the speed of working was raised over fifty per cent without difficulty.

There are no patents prohibiting the use of this type of relay, he said in conclusion, and with the spread of printing telegraph systems in the railroad service, the advantages to be derived from its adoption are worthy the consideration of all.

The paper created considerable interest among the superintendents and many questions were asked Mr. Bell on various points touched upon in his paper. Among those who took part in the discussion were C. S. Rhoads, A. D. Cardwell, J. O. Carr, N. E. Smith and E. A. Chenery.

Mr. E. C. Keenan, of Chicago, reported satisfactory progress in committee work.

Being called upon, Mr. L. B. Foley, of the Lackawanna Road, made a few remarks on the wireless telephone tests on his line, but could not add anything particularly new to what had already been said and printed on the subject. The experiments were still being carried forward.

The use of main line sounders on railway circuits came up as a subject for general discussion, and it was developed that this type of instrument was being quite extensively and successfully used in railway offices. Mr. C. S. Rhoads and others spoke favorably of the use of the instruments. Mr. Rhoads also said a few words regarding the use of dry batteries. On one of his branch roads a saving of \$650 a year was effected by their use.

Mr. W. A. Sawyer, district commercial superintendent, Western Union Telegraph Company, New York, who entered the room at this point in the proceedings, was called upon for some remarks. He spoke of the good results obtained through the co-operation of the railway telegraph superintendents with his company.

A communication from Mr. Belvidere Brooks, vice-president, Western Union Telegraph Company, was read by chairman Potter in which the former gentleman expressed his regrets at his inability to be present owing to great pressure of work, but invited those of the superintendents who could do so to call upon him at his office.

Typewriting telegraphs on railroad lines was discussed by Messrs. A. D. Cardwell, J. O. Carr, J. H. Bell, W. F. Williams and R. F. Spamer. Mr. Williams reported good results obtained by the use

of these machines on one of his wires between Norfolk, Va., and Jacksonville, Fla., and Mr. A. B. Taylor, of the New York Central, stated that he was getting good service from the typewriting telegraph now employed on one of his company's wires between New York to Buffalo. Mr. J. O. Carr spoke of the possibility of the use of typewriting machines in way offices. Their best work however was on trunk lines.

Mr. W. P. Cline desired to know the practice of superintendents as to the handling of messages by telephone and the reliability of such service. Messrs. C. S. Rhoads, G. A. Cellar, J. J. Ross, I. C. Forshoe and E. C. Keenan spoke favorably on the subject. Mr. Keenan stated that on his road the telephone was favored. It was used for local railroad business, also for the handling of Western Union messages. All the speakers emphasized the accuracy of the service.

Mr. C. S. Rhoads, in referring to the death of G. L. Lang, a former president of the association, and well known to the older members, paid a grateful tribute to the deceased's memory and character.

After passing a resolution of thanks to the Y. M. C. A. for the use of their rooms, the meeting adjourned.

Among those present were:

Angelica, N. Y.—C. L. Lathrop.

Boston, Mass.—F. P. Brennan.

Chicago, Ill.—E. A. Burkitt, J. O. Carr, J. H. Finley, E. C. Keenan, F. S. Southwick.

Cleveland, Ohio.—F. F. Riefel.

Detroit, Mich.—J. J. Ross.

Gibson, Ind.—W. L. Connelly.

Indianapolis, Ind.—C. S. Rhoads.

New Haven, Conn.—C. S. Dow, H. A. Shepard, N. E. Smith.

New York.—E. V. Adams, C. G. Baird, J. H. Bell, A. D. Cardwell, H. W. Drake, J. C. Enders, E. A. Everett, L. B. Foley, C. W. Frey, J. J. Ghegan, C. Gilman, E. P. Griffith, W. E. Harkness, J. B. Harlow, G. K. Heyer, P. J. Howe, B. A. Kaiser, D. C. Keefe, H. C. Law, L. G. Martin, R. W. Meigs, G. A. Nelson, J. A. Ritter, W. A. Sawyer, R. F. Spamer, T. R. Taltavall, A. B. Taylor, G. G. Volkmar, A. D. Walters, E. J. Wehrley, L. S. Wells, R. W. Whitehead.

Norfolk, Va.—W. F. Williams.

Orange, N. J.—P. B. Hyde.

Philadelphia, Pa.—I. C. Forshee.

Pittsburgh, Pa.—G. A. Cellar, L. A. Lee.

Roanoke, Va.—G. W. Jett.

St. Louis, Mo.—E. A. Chenery.

Washington, D. C.—J. A. Jones, W. H. Potter.

Wilmington, N. C.—W. P. Cline.

THE TELEGRAPH AND TELEPHONE LIFE INSURANCE ASSOCIATION has levied assessments 594 and 595 to meet the claims arising from the deaths of T. E. McAllister, at Rhinecliff, N. Y.; J. R. White, at Chicago, Ill.; J. U. Rust, at Nashville, Tenn.; E. T. Shaw, at Poteau, Okla.; C. A. Garland, at Mobile, Ala.; D. A. Laprette, at Albany, N. Y.; C. Potts, at Toledo, Ohio; D. S. McRae, at Fayetteville, N. C.; M. Tully, at St. Louis, Mo.

New York Telegraphers' Aid Society Entertainment.

The annual entertainment and reception of the New York Telegraphers' Aid Society for the benefit of the relief fund was held at the Lexington Opera House and Terrace Garden, Fifty-eighth street and Third avenue, New York, Tuesday evening, November 16. There was a large attendance of telegraphers and their friends and a very enjoyable evening was spent.

The entertainment consisted of a well-selected bill of songs, character dances, etc., supported by an excellent orchestra, followed by dancing. The hall was very attractively and tastefully decorated for the occasion, and the financial results were very gratifying.

Mr. Arthur M. Lewis is president of the society, and he deserves much praise for the excellent arrangements for the affair. Many handsome costumes were worn by the ladies.

Mr. R. J. Marrin was chairman of the entertainment committee, which consisted of thirty members.

The floor committee was headed by Mr. J. Williams, assisted by Messrs. F. J. Sheridan and A. F. Kavanaugh.

The reception committee consisted of eighty-two members, headed by Mr. W. J. Quinn, who was assisted by Messrs. J. F. E. Hopkins, H. T. Marks and J. C. Watts.

All of these committees performed their duties in a very creditable manner.

Among those present were: Messrs. A. G. Saylor, J. A. Hill, A. C. Kaufman, John Simmonds, E. B. Saylor, M. A. Lister, S. B. Haig, J. P. Edwards, G. E. Palmer, A. O. Wallis, Wm. Holmes, M. J. O'Leary, Mr. and Mrs. Gardner Irving, Mr. and Mrs. T. M. Brennan, Mr. and Mrs. E. T. Howell, Mr. and Mrs. C. B. McCann, Mr. and Mrs. James A. Berry and fully a thousand others.

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.

Following are the officers of the New York Telegraphers' Aid Society for the year 1915-1916: A. M. Lewis, president; W. E. Rath, 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. McSwyny, Miss S. Dougherty, J. L. Young, A. J. Fancell, H. T. Tepe, E. F. Howell, J. V. Riddick, F. J. Sheridan, H. T. Marks.

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.

LETTERS FROM OUR AGENTS.

NEW YORK WESTERN UNION.

Thomas M. Ragen, aged forty-three years, for the past ten years identified with this office as a chief operator in the Long Island division, died of cancer on November 18. Interment was at Allentown, his old home. He was born in Bethlehem, Pa., in 1872, and entered the telegraph service in 1889. He worked in the commercial, railway and newspaper fields at various times, being a train dispatcher in Mexico at one time. He was an entertaining writer, several of his contributions having been published in TELEGRAPH AND TELEPHONE AGE, during the past two years.

PITTSBURGH WESTERN UNION.

Mr. E. A. Baird, manager of the Pittsburgh office, made a very interesting address before the Pittsburgh Association of Credit Men, at the Fort Pitt Hotel, November 11, on "Commercial and Wireless Telegraphy and Wireless Telephony."

Mr. Ralph W. Carnahan has been promoted to the managership of the newly established office at Apollo, Pa.

Mr. P. H. Southworth has been appointed manager at Titusville, Pa., and Miss Olive McGee has been appointed manager at Weston, W. Va.

CHICAGO WESTERN UNION.

Mr. E. J. Dolin, who has been absent from the fold for nine years, recently returned, and is on nights. The roster of the Old Guard is slowly diminishing, and we welcome re-inforcements. However, it is justice to Mr. Dolin to say he is looking just as young as he did nine years ago, and in good health.

ST. LOUIS WESTERN UNION.

Quite a large party of company officials visited St. Louis recently on a business tour. It consisted of president Newcomb Carlton, L. McKisick, assistant to the president; W. N. Fashbaugh, general traffic superintendent; G. M. Yorke, general superintendent of plant, from New York; W. W. Ryder, general manager; T. W. Carroll, traffic superintendent, and M. B. Wyrick, plant superintendent, of the Western Division, Chicago. Mr. W. C. Merly, of New York, accompanied the party as secretary.

Michael Tully, sixty-three years old, who was in the telegraph service of the Western Union for forty-four years, and pensioned July 1, 1913, died at his home in this city, November 7, from a paralytic stroke, the fourth and most severe he had since his retirement. Mr. Tully, as agent of the Telegraph Mutual Benefit Association for many years, was well and favorably known by the telegraph fraternity throughout the country. "Mike," as his friends always called him, was an honest, hard-working and faithful employe, always ready to help a friend in distress and his death will be widely regretted.

Mr. Robt. J. Ludwig, automatic supervisor, is absent from duty, suffering with rheumatism.

CINCINNATI WESTERN UNION.

Mr. Henry Yeager, an operator in this office, has been retired after a service of forty years with this company.

SAN FRANCISCO WESTERN UNION.

Royal-L. Bailey is a recent addition to the automatic mechanical force here.

The multiplex is operating very satisfactorily, working three channels to Chicago and four each to Los Angeles, Seattle and the Exposition grounds.

W. F. Horton has returned to Boston after spending several months on the coast supervising the installation of the multiplex.

Harry H. Fisher is again with us in charge of the Barclay printers.

S. B. Mills has assumed charge of the automatic department, early night.

Arthur L. Fish, who assisted in the installation of the Barclay printers on the Pacific Coast, died in this city recently. The remains were taken to New York City for interment.

OKLAHOMA CITY WESTERN UNION.

Wheatstone relays are soon to be placed on two of our trunk circuits, presumably the first Kansas City and first Dallas locals.

Rex Snodgrass former wire chief at Shreveport, La., but recently of the traffic department at Oklahoma City, has accepted a position on the test board with the Pioneer Telephone and Telegraph Company of this city.

Mr. L. J. Tucker has gone to the American Telegraph and Telephone Company at Little Rock, Ark.

Mr. Henry Johnson has returned from a forty-five days' leave of absence to his Ozark homestead in Arkansas.

Mr. Fred Hearle is with us again after an absence of one year. Mr. Hearle has a claim in the Ozarks of southern Missouri.

Mr. Harrold D. Bell is back at work after a short absence.

Mrs. A. R. Jones, who was recently manager at El Reno, Okla., has accepted the managership at Woodward, Okla.

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.

Miss Grace Jackson has returned after a protracted absence travelling and visiting various parts of the country, and is now assigned to the extra list.

Mr. Ross Andrews, district foreman, has been re-assigned to the third district of the Gulf Division, with headquarters at Oklahoma City, succeeding Mr. W. L. Nolan, who was transferred to New Orleans, La. Mr. Nolan has been relieved temporarily at New Orleans and is in charge of the valuation squadron, which is now working in this vicinity, where it will probably remain the greater part of the winter.

Col. Frank J. Chopp, relief manager, recently at Perry, Okla., has returned to Oklahoma City and has been assigned to the extra list.

Several changes in the commercial department are noted, among which is the transfer of night manager Burton to the traffic department. He is succeeded by former assistant manager La Brin, who in turn is succeeded by Mr. L. Eppstein, formerly chief clerk to district commercial superintendent A. R. Lingafelt.

Mr. C. A. Bashford has been made manager of the West Second Street branch.

N. O. Kenner is temporarily relieving manager Cully at the stock yards.

Mr. A. J. Spaulding is taking a ten days' leave of absence and is visiting with his family and incidentally eating turkey at his farm near Vamoose, Okla.

Mr. J. W. Gillhan, of Fort Smith, Ark., was a recent caller, as well as Mr. J. W. Brooks, of the traffic department at Dallas.

30TH ANNIVERSARY

Serial Building Loan and Savings Institution

President, . . . Ashton G. Saylor
Secretary, . . . Edwin F. Howell

Resources - - - \$900,000
Surplus - - - 35,000

The Serial was established in 1885 by telegraphers and has faithfully served their interests as a

Savings Institution and Home Building Association.

You should have a savings account, but never will unless you begin NOW.

Western Union Building, 16 Day Street, 9 a.m. to 5 p.m.
Postal Building, 283 Broadway, Room 1030, 2.30 to 4.30 p.m., every Friday, 15th and last day of month.
Telephone Building, 24 Walker Street, Room 1129, Daily 9 a.m. to 2 p.m.

Close at 1 p.m. Saturdays

TELEGRAPH and TELEPHONE LIFE INSURANCE ASSOCIATION

ESTABLISHED 1867

FOR ALL EMPLOYEES IN TELEGRAPH OR TELEPHONE SERVICE

Insurance, Full Grade, \$1,000; Half Grade, \$500; or Both Grades, \$1,500; Initiation Fee, \$2 for each grade

ASSETS \$350,000. Monthly Assessments at rates according to age at entry. Ages 18 to 20, Full Grade, \$1.00; Half Grade, 50c. 20 to 25, Full Grade, \$1.25; Half Grade, 62c. 25 to 30, Full Grade, \$1.50; Half Grade, 75c. 30 to 35, Full Grade, \$1.75; Half Grade, 87c. 35 to 40, Full Grade, \$2.00; Half Grade, \$1.00. 40 to 45, Full Grade, \$2.25; Half Grade, \$1.12c. 45 to 50, Full Grade, \$2.50; Half Grade, \$1.25. 50 to 55, Full Grade, \$2.75; Half Grade, \$1.37c. 55 to 60, Full Grade, \$3.00; Half Grade, \$1.50. 60 to 65, Full Grade, \$3.25; Half Grade, \$1.62c. 65 to 70, Full Grade, \$3.50; Half Grade, \$1.75. 70 to 75, Full Grade, \$3.75; Half Grade, \$1.87c. 75 to 80, Full Grade, \$4.00; Half Grade, \$2.00. 80 to 85, Full Grade, \$4.25; Half Grade, \$2.12c. 85 to 90, Full Grade, \$4.50; Half Grade, \$2.25. 90 to 95, Full Grade, \$4.75; Half Grade, \$2.37c. 95 to 100, Full Grade, \$5.00; Half Grade, \$2.50.

M. J. O'LEARY, Sec'y, P. O. Box 519, NEW YORK.

Telegraph and Telephone Age

No. 24.

NEW YORK, DECEMBER 16, 1915.

Thirty-third Year.

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Adjustment of Telegraph Apparatus.

To be able to send and receive rapidly by telegraph does not necessarily constitute a first-class operator. There are many other things that an operator should know in order to really entitle him to such a distinction, and one of the principal of these is the adjustment and care of the apparatus that he has charge of.

Many telegraph people believe that a first-class operator should have some technical knowledge besides possessing the ability to send and receive rapidly, and it does not put any great strain upon thought to agree to this contention. A man who is a rapid operator alone is certainly not as valuable to his company as the one who is this and has technical knowledge and ability besides.

The adjustment of telegraph apparatus is one of the first technical requirements an operator should be thoroughly familiar with and it seems strange that there should be any whose knowledge on this important point should be deficient or lacking.

Before taking up the main subject of this article it would be well to impress upon all interested the fact that no one can learn too much about the business in which he is engaged, and the more he learns about it the more valuable his services will be to his employer.

The simple apparatus employed on single lines—key, sounder and relay—will form a good basis for our discussion on adjustment. Assuming that these instruments, together with the battery and other accessories are all in prime condition, the best work should be expected of them if they are properly cared for and handled.

There is one disturbing element, however, that is always present to a more or less degree, and it is

the control of this that calls for technical skill on the part of the operator—we refer to the effect of weather conditions along the line.

In wet weather the amount of current which flows through the coils of a relay is greatly increased at or near the battery station over and above that which normally flows in clear weather, while distant station instruments receive less than the usual amount. This condition is caused by the numerous "escapes," or side paths, down the poles along the route which draw additional current, all of which must necessarily pass through the relays inserted between them and the battery. Distant relays receive less than they are entitled to because much of the current on the wire escapes down the wet poles before reaching them. Now, a strong current in the coils means a strong magnetic pull on the relay armature, while a weak current, of course, causes a correspondingly weak attraction.

It follows from this that the wet weather method of adjusting a distant relay is directly opposite to that followed for the home relay at the battery end of the circuit. The operators at distant points must get the magnets closer and closer to the armature as the rain-fall increases, while the home operator is compelled to draw his relay coils away from it. This seems like a very simple operation to perform, but the manner in which most operators go about it explains why they fail to secure the best results.

Now, the first principle of adjustment lies in maintaining at all times, whether the current is weak or strong, a practically constant or normal tension of the retractile spring attached to the relay armature. The explanation is that a relay spring responds best to the magnetic attraction of the armature when the tension is such that the "curling" is not stretched to any great extent out of its original close-fitting form.

The adjustment should invariably be done by moving the magnet backward or forward by means of the thumbscrew. The tension of the retractile spring need not be altered perceptibly except to give the operation a finishing touch. The habit of stretching the relay spring to meet a strong magnetic pull not only causes the spring to work less efficiently at the time, but soon injures it permanently by destroying its elasticity and sensitiveness.

It frequently happens in very wet weather that a distant office cannot break the operator at or near the battery station on account of the difficulty the latter has in getting a fine adjustment. When informed by way of some other circuit that such is the case the best method to pursue is as follows: Make a few dots to attract his attention (he will hear you; the distant office has the advantage in this respect) and then tell him to dot. Then pull the magnets back from the relay armature until the circuit stands apparently just open. Next, turn down the retractile spring very slowly until the

signals are heard. If they cannot be heard in this way they may sometimes be caught by placing the forefinger on the lever of the relay and giving it a gentle pressure back and forth. If the operator is dotting, the impulses will be felt, thus facilitating a readjustment of the instrument.

The latter method is an excellent one to pursue on a way wire when in doubt as to whether anyone is using the circuit, for, by this precaution, one operator need never break in while another is sending. However, as it is only in very wet weather that an operator is bothered to any great extent by the relay, the real source of the annoyance usually lies in an improper adjustment of the sounder.

(To be Continued.)

Telegraph and Telephone Patents.

ISSUED NOVEMBER 16.

1,160,125. Dictograph Intercommunicating Telephone System. To W. P. Andrick, Jamaica, N. Y.
1,160,181. Machine Telephone Switching System. To F. R. McBerty and D. Koenig, Antwerp, Belgium.

1,160,294. Selective Signaling System. To O. M. Leich, Genoa, Ill.

1,160,447. Machine-Telephone Switching System. To L. Polinkowsky, Brussels, Belgium.

1,160,570. Prepay Box for Use in Telephone Systems. To O. Brisbois, Chicago, Ill.

1,160,951. Automatic Trunking System. To O. V. Olsen, Chicago, Ill.

1,160,994. Pay-Station Telephone System. To J. Erickson, Chicago, Ill.

14,010 (reissue). Selective Signaling System. To E. R. Gill, Yonkers, N. Y.

14,012 (reissue). Method of and Apparatus for Selective Wireless Telegraphy. To F. G. Sargent, Westford, Mass.

ISSUED NOVEMBER 23.

1,161,048. Telephone System. To H. L. Harris, Elyria, Ohio.

1,161,105. Printing-Telegraph Receiver. To C. G. Ashley, Chicago, Ill.

1,161,126. Selector for Telephone Plants. To G. Grabe, Nikolassee, near Berlin, Germany.

1,161,142. Wireless Communication. To C. V. Logwood, Palo Alto, Cal.

1,161,196. Telephone-Exchange System. To E. R. Corwin, Chicago, Ill.

1,161,214. Telephone-Exchange System. To E. E. Hinrichsen, New York.

1,161,411. Telephone Exchange System. To L. Polinkowsky, Brussels, Belgium.

1,161,608. Semi-Mechanical Telephone-Exchange System. To A. M. Bullard, New York.

1,161,639. Loud-Speaking Receiver. To H. C. Egerton, Ridgewood, N. J.

1,161,655. Automatic Telephone Exchange. To C. L. Goodrum, Urbana, Ohio.

1,161,783. Telephone Trunk-Release System. To J. L. E. Meyer, Chicago, Ill.

ISSUED NOVEMBER 30.

1,161,856. Telephone Receiver. To S. P. Grace and R. A. L. Snyder, Pittsburgh, Pa.

1,161,863. House Telephone Set. To R. R. Ireland, Chicago, Ill.

1,161,874. Telephone-Exchange System. To W. H. Matthies, Antwerp, Belgium.

1,161,909. Telegraphy. To P. B. Delany, South Orange, N. J.

1,162,069. Telephone System. To K. S. Johnson, Jersey City, N. J.

1,162,556. Automatic Telephone Exchange System. To G. A. Betulander, Sodertorns, Villastad, and N. G. Palmgren, Stockholm, Sweden.

Stock Quotations.

Following are the New York closing quotations of telegraph and telephone stocks on December 14:

American Telephone and Telegraph Co.	128 3/4
Mackay Companies	78-79 3/4 (ex. div.)
Mackay Companies, preferred	66-67 (ex. div.)
Marconi Wireless Tel. Co. of Am. (Par value, \$5.00)	3 5/8
Western Union Telegraph Co.	88 1/2

[This publication is prepared to purchase for its friends one or more shares of Western Union, Mackay, Marconi or any other stocks, either outright or on the installment plan. Remit \$10.00 per share as the initial payment if purchase is to be made on the installment plan. The stock will then be purchased at the market price and the balance due on the stock can be paid off at the rate of \$5.00 per month or in any other sum to suit the convenience of purchaser. In the meantime 6 per cent interest will be charged for the balance due on the stock. The purchaser, however, will have the benefit of the dividends, which, in many cases, will more than pay the interest charges. As soon as the stock is paid for, it will be registered in the purchaser's name and delivered to him. The commission charges on the purchase of stock is \$1.00 on transactions covering from one to eight shares. For eight or more shares the commission charge is 12 1/2 cents per share. In remitting to cover purchases of stock, name the price at which purchases are to be made.]

PERSONAL.

MR. THOMAS A. EDISON, who is chairman of the Naval Consulting Board, has opened a school of electricity at his plant in Orange, N. J., for the officers and men of the United States navy.

MR. JOSEPH A. ANDERSON, an operator in the Western Union Telegraph service at Youngstown, Ohio, has ended a forty-seven-day fast which he took to cure stomach trouble. He lost forty pounds during the starving process, but he believes that he has effected a cure which will be permanent.

MR. MANUEL DE J. POSADA, brother of the director-general of telegraphs and telephones of El Salvador, Central America, has arrived in this country, where he will remain some time, for the purpose of studying our systems of telegraphy, telephony and wireless telegraphy. His headquarters will be in New York.

MR. F. C. HACKETT, general manager, the Toledo Warehouse Company, Toledo, Ohio, accompanied by Mrs. Hackett, attended a convention of storage warehouse people in New York during the week ending December 4. Mr. Hackett was at one time manager and chief operator of the Western Union Telegraph Company in various western cities, and he made his visit to New York the occasion to call on many of his old telegraph friends.

MR. G. H. CORSE, JR., an old-time telegrapher, recently appointed foreign passenger agent for the Union Pacific System, with headquarters at Chicago, was a recent New York visitor. Mr. Corse is promoting American tourist traffic to Hawaii, Japan, China, Philippine Islands, Australia, New Zealand, Alaska, Cuba, West Indies, etc., and will be pleased to assist members of the telegraph or telephone professions who may be inclined to visit these countries on business or pleasure.

MR. E. H. HOGSHEAD, a well-known old-time and military telegrapher, of Meridian, Miss., and Mrs. Hogshead celebrated their golden wedding anniversary, December 1. One hundred friends attended the event. The couple were married in Pittshoro, Miss., December 1, 1865, and they soon after went to Meridian, where they have resided fifty years. They have five sons, all living. In the entertainment Mr. and Mrs. Hogshead were assisted by their granddaughters, Mrs. T. M. Foster, and E. A. Rainis, of New Orleans. Many handsome and appropriate presents were made to the happy couple.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

MR. C. P. BRUCH, vice-president of this company, New York, who has just been elected president of the Ohio Society of New York, is arranging a telegraph feature for the banquet of the society, which will be held at the Waldorf Astoria, January 15. Several former operators are members of the society, and it is proposed to seat these at one table, and connect the table by wire with the speaker's table, at which Mr. Thomas A. Edison will occupy a prominent place. During the dinner, telegraphic conversation will pass over the wire between the old operators and Mr. Edison.

MR. E. KIMMEY, superintendent, New York, is on a business trip to Albany, Gloversville and other points in his district.

MR. M. M. DAVIS, electrical engineer, and Mr. J. P. O'Donohue, division electrical engineer, New York, are in Washington, D. C., in connection with the plans for the new office at that point.

MR. WILLIAM LYLE, manager of the Natchez, Miss., office, has been appointed a member of the staff of governor-elect Bilbo, of Mississippi. He is now "Major" Lyle, instead of "Bill" Lyle.

MANAGERS APPOINTED.—R. McCurdy, Ashland, Ohio; R. C. Gillum, Sedalia, Mo.; E. L. Young, Rockford, Ill.; W. E. Lee, Marseilles, Ill.; Miss E. E. Powers, Evanston, Ill.; S. M. Pardee, Grants Pass, Ore.; W. H. Kelling, East Las Vegas, N. M.

LETTERGRAMS TO ALASKA.—This company is now accepting night lettergrams to various places in Alaska.

NIGHT LETTERS.—This company has extended the time for the reception of night letters from the public until 2 a. m.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

MR. J. C. WILLEVER, commercial general manager, New York, has returned from an inspection trip through the Western Division.

MR. J. W. REED, district commercial superintendent, Philadelphia, Pa., made an address before the Rotary Club, in that city, November 10, his subject being "Progressive Western Union Service of Today and Its Adaptability to the Requirements of the Business and Social World."

MR. H. F. DODGE, assistant general manager, Pacific Division, San Francisco, Cal., has been transferred to the staff of the commercial manager at New York.

MR. F. H. LAMB TO RETIRE.—Announcement is made of the retirement, on January 1, 1916, of Mr. Frank H. Lamb, who has been superintendent of the Western Union interests at San Francisco, Cal., for so many years that his name is interwoven with every telegraph pole and mile of wire in the Pacific Coast states. Mr. Lamb is a native of Massachusetts. He began his telegraph career in Brooklyn, N. Y., in 1850. He served through the Civil War and was twice confined in Libby Prison, being captured each time while in the discharge of his duties as a military telegraph operator. In 1865, while chief operator at Cincinnati, he was transferred to San Francisco as superintendent. Since that time his name has been indelibly impressed on everything telegraphic on the Pacific Coast.

MR. ALBERT F. ZINTL, district commercial manager, Philadelphia, Pa., has resigned to enter other business.

MR. G. C. WADDELL, manager of the Elizabeth, N. J., office, has been transferred to the management of the Waterbury, Conn., office, vice J. W. Gaffey, commercial agent, who has been acting manager at that point. Mr. Gaffey returns to the office of Mr. W. A. Sawyer, superintendent, at New York.

MR. A. J. COLLIER has been appointed manager of the Bridgeport, Conn., office to succeed Mr. J. W. McMahon, resigned, to engage in another line of business. Mr. Collier is succeeded as manager of the Jersey City, N. J., office by Mr. Harry Kramer, advanced from the position of book-keeper.

MR. J. Y. BYERS, chief clerk for the district commercial offices in the Gulf Division, Dallas, Tex., has been transferred to headquarters, New York, and has been assigned to the staff of the commercial general manager.

Mr. E. A. CASPER has been transferred to headquarters at New York from the Gulf Division. He will make a specialty of complaint cases.

Mr. J. D. FELSENHOLD, of the Glens Falls, N. Y., office, has been appointed manager of the Elizabeth, N. J., office. B. L. Carpenter, of Hudson Falls, N. Y., has been appointed manager of the Glens Falls office, vice J. D. Felsenheld.

Mr. W. A. LOGAN, chief operator of the Houston, Tex., office, has been advanced to the position of night chief operator of the Dallas, Tex., office. Mr. A. W. Craighead, of the Dallas office, succeeds Mr. Logan as chief operator of the Houston office.

Mr. GEORGE W. SILVERS, local claim agent, Philadelphia, Pa., has been appointed district commercial manager in the place of A. E. Zintl, resigned. Mr. Robert W. Shade, of the operating department, succeeds Mr. Silvers as claim agent.

THE DES MOINES, IOWA, office of this company has been moved into larger quarters and fitted up with modern equipment. Col. L. W. Ainsworth is manager.

EXTENSION OF NIGHT LETTER HOURS.—This company has extended the hours during which night letters may be received from the public, from midnight to 2 o'clock in the morning. The new service took effect December 10.

EXTENSION OF THE MULTIPLEX.—Arrangements are being made for the installation of twenty-five new multiplex circuits at various points throughout the country. When this work is completed the multiplex will be working in all divisions.

REGULAR AND EXTRA DIVIDEND.—A dividend of one and a quarter per cent was declared December 8, payable January 15, 1916, also a further dividend of one-half of one per cent payable on the same day, the latter dividend being declared in order to make the total dividend for the fiscal year ending December 31 five per cent.

HIGH UP.—A gentleman, one day recently, stepped into an elevator at 195 Broadway and asked the conductor to let him off at Mr. Newcomb Carlton's office. Twenty-sixth floor was the reply. The gentleman remarked: "Mr. Carlton is quite high up, isn't he?" The conductor quickly rejoined: "Yes, sir; he is on top. He is president."

VACATIONS FOR ALL EMPLOYEES.—This company has announced that after January 1, 1916, employees of the commercial, traffic and plant departments will receive annual vacations, with pay, at their regular ratings. All regularly assigned employees who have been in the service of the company continuously for two years or more will receive two weeks' vacation, and those who have been in the service continuously for one year and less than two years will receive one week's vacation. Unassigned employees of the traffic department, without other employment, who have worked for the company the equivalent of full time for the periods named, will also receive vacations subject to the same regulations as the regularly assigned employees. Messengers are included in this order.

THE CABLE.

THE COMMERCIAL CABLE COMPANY has issued a circular of additions and corrections to its 1915 book of cable rates.

Cable Interruptions.

Interruptions to submarine telegraph cables are reported to December 13, as follows:

Azores and Emden (two cables), August 5; Shanghai and Tsingtau, and Tsingtau and Chefoo, August 24; Sweden and Germany, September 30; Almeria and Melilla, October 1; Penongomera and Alhucempas (defective cable), October 1; Yap and Menado (offices closed), October 7; Obock and Djibouti, November 6; Constantinople and Tenedos, November 6, 1914; Paramaribo and Cayenne, November 13; Martineque and Paramaribo, November 23; Manila and Iloilo, December 5; Oran and Tanger, December 8; Tanger and Cadiz, December 8, 1915.

CANADIAN NOTES.

MR. H. HULATT, manager of telegraphs, Grand Trunk Railway System, Grand Trunk Pacific Railway and Grand Trunk Pacific Telegraph Company, Montreal, Que., was a New York business visitor on December 7.

OTTAWA OFFICE.—Work on the new office of the Great North Western Telegraph Company at Ottawa, Ont., will be completed about Christmas. Morkrum printers will then be operated between Ottawa and Toronto and Ottawa and Montreal.

SASKATOON GREAT NORTH WESTERN.—Chief operator A. L. Mallory is one of the latest recruits from the fifth district to go to the war. He is attached to the engineers corps at Rockcliffe Camp, near Ottawa, Ont. He was a valuable employee, and he is sure to make good. Freddie Oates and Edward Payne, two more of the Saskatoon operators, went at the same time.

New Office of Great North Western Telegraph Company at Saskatoon, Sask.

Since the amalgamation of the Canadian Northern and Great North Western Telegraph companies there have been many marked improvements in the service and equipment at Saskatoon. The office has been moved from its cramped quarters in the Canadian Northern depot to a splendid corner on the main thoroughfare, and the new equipment installed places that office in the ranks of the most efficient.

A power plant consisting of five motor-generators with steel and slate control panels supplies the current for operation of the lines. Latest type standard steel furniture is used throughout. The multiplex sets are the best that can be secured.

Saskatoon is the principal relay point for Saskatchewan and a part of Alberta, and is a repeater point for all through west wires, except those to Regina and Moosejaw. The installation was not made any too soon, as it has been taxed to its capacity from the day it was put in.

The enormous grain crop harvested this season is estimated to be sufficient to keep the railroads haul-

ing it out until next May or June, and between two and three hundred million dollars will be distributed among the farmers to pay for it. This money is already beginning to get into free circulation and the effect is being felt in the increase of all classes of business.

The city of Saskatoon is a striking example of what faith and perseverance will accomplish. Thirteen years ago it was a little country village on the banks of the South Saskatchewan, with a population of 113, while to-day the population of 27,000 is claimed. The city has beautiful business blocks and homes, and miles of paved streets. It is a great distributing centre for every class of merchandise and machinery, and most of the well-known business houses have warehouses here. It owns the street railway, water system and electric light plant and is a "live" place. The provincial government has established a university here and also an experimental farm, which are second to none in the Dominion.

Mr. J. F. Middlemiss, the local manager at Saskatoon, started with the Great North Western at Toronto, Ont., as messenger, in 1886, being gradually promoted, finally becoming traffic chief. He left Toronto in 1910 to take the position as manager for the Canadian Northern Telegraphs at Saskatoon, which position he still holds for the Great North Western.

Mr. A. E. Holmes is the chief operator and Mr. A. Rogers night chief. The office of the district superintendent, Mr. Geo. H. Stead, is also located here, his territory covering Alberta and Saskatchewan. He is another old Great North Western man, starting as a messenger under Mr. T. W. Goulding in Winnipeg, in 1887. He gradually rose to chief, and took the position of local manager in Winnipeg for the Canadian Northern Telegraphs when that company was organized in 1902. On November 1, 1910, he was promoted to be superintendent of western lines, and when the two companies amalgamated last January, was placed in charge of the fifth district.

THE TELEPHONE.

TELEPHONE BETWEEN BERLIN AND SOFIA.—Direct communication by telephone between Berlin and Sofia, Bulgaria, has been opened.

THE ROANOKE TELEPHONE AND TELEGRAPH SOCIETY held a banquet at Roanoke, Va., November 6, at which nearly 200 people were present. The attendance included J. W. Crews, vice-president of the Chesapeake and Potomac Telephone Company of Virginia; G. W. Jett, superintendent of telegraph, Norfolk and Western Railroad, and many others prominent in telephone and business affairs.

Dinner and Reception in Honor of Mr. J. J. Carty.

On November 7 a dinner and reception was tendered to Mr. J. J. Carty, chief engineer of the American Telephone and Telegraph Company, at the Lotos Club, New York, in recognition of his achievements in wire and wireless telephony.

In responding to the enthusiastic greetings of the

320 members and guests present, Mr. Carty gave his associates much credit for the wonderful developments in wire and wireless telephony during the year 1915. He mentioned particularly Messrs. B. Gherardi, Dr. F. B. Jewett and others who participated in the work.

Referring to wireless telephone communication Mr. Carty said that its use would be supplemental to the wire system. Its greatest use would be to establish communication between ships at sea and points not accessible by wire lines to shore stations.

Demonstrations were given of the operation of the transcontinental line from New York to San Francisco, also of wireless telephony between New York and Washington.

Remarks were made by Mr. Theo. N. Vail, secretary of the navy Josephus Daniels, captain W. H. G. Bullard, Mr. U. N. Bethell and colonel Samuel Reber.

Mr. Vail said: "I cannot refrain from saying a few words in appreciation of this most delightful and considerate tribute to the foremost genius in electrical personal intercommunication—Our Carty. We, that is, all of us associated in that organization called the Bell System, associates who act and think and work together, are very proud of our Carty and are honored by anything that honors him.

"Our Carty came with the telephone while it was yet being taught to speak, and has been either a co-laborer or leader in the development of that perfect comprehensive world-wide electrical conversational intercommunication which is rapidly bringing the whole world and all its people within speaking distance.

"While in the establishing of the methods for bringing all people together for electrical speech, our Carty has been the most useful and constructive, and is now considered by all the foremost genius in this work, his work has by no means been confined to that branch, for all other and collateral electrical development, whether affecting his particular work or not, he has been recognized as having a grasp of conditions to be overcome and a vision of what may be accomplished which few possess.

"This tribute, from this club, is unique in that it is not a scientific tribute from fellow scientists; it is not a commercial tribute from corporation or association, but it is a layman's tribute, to one who is recognized and acknowledged as having made their business and social intercourse more easy, more comfortable and more agreeable and contributed so important an element into their daily life."

Among those present, in addition to the gentlemen named, were Samuel Insull, Frank J. Sprague, Melville E. Stone, T. Commerford Martin, N. C. Kingsbury, B. E. Sunny, H. B. Thayer, Angus S. Hibbard, Thomas D. Lockwood, Frank H. Bethell, T. B. Doolittle, George T. Manson, F. A. Pickerrell, A. L. Salt, C. E. Scribner, Gerard Swope and H. J. Pettengill.

Letters and telegrams were received from Dr. Alexander Graham Bell, Thomas A. Edison, and others.

Review of Principal Articles in Contemporary Telephone Publications.

FIGHTING FOREST FIRES.—The use of the telephone in safeguarding and fighting fires in the national and state forests is described and illustrated in the November number of the *Telephone News*. The mileage of national forest telephone lines now runs into the tens of thousands.

TELEPHONE TALKS.—Some practical information for all telephone workers is given by G. W. Cummings and A. Kneisel in an article in the *Telephone Engineer* for November. The subject of the present instalment is cable splicing, which is discussed in detail in the form of answers to questions. The article is extremely instructive.

PUBLIC UTILITY COMMISSIONS.—The *Telephone Engineer* for November prints a lengthy article, giving reports concerning the activities of various state regulating bodies in the telephone field. The states covered are Michigan, New York, New Mexico, Illinois, Washington, Oklahoma, Minnesota, Oregon, Missouri and Maryland.

"TELEPHONE TRANSMISSION AND ITS RELATION TO A PLANT," is the title of an instructive address made by Mr. H. D. Currier before the Ohio Independent Telephone Association, and printed in *Telephony* for December 4. The importance of this subject may be appreciated when it is pointed out that it was the one element of the telephone problem which awakened sufficient interest in the mind of the director of the Bureau of Standards at Washington to cause him to have the studies being made along this line investigated. The investigations made by the United States Bureau of Standards have caused it to approve the idea of meeting in Washington to discuss this problem, and a meeting will be held there soon. The reason the Bureau of Standards is interested in the subject of telephone transmission is because it is the most important element of service which the public buys, and the government is interested in seeing that a man receives full measure for money paid.

RADIO-TELEGRAPHY.

Marconi Notes

MR. E. J. NALLY, vice-president and general manager, New York, spent several days in Washington and Chicago recently on business of the company.

MR. A. WILLIAMSON, of London, recently arrived on the steamer "Orduna," and Messrs. G. H. Bryant and Chas. C. Hall, of London, on the steamer "New York," and the party is now in Chicago on business of the English Marconi Company.

MR. LEE LEMON, superintendent of the Marconi Wireless Telegraph Company of America, New York, is returning from a protracted business trip to the Southern and Gulf Divisions of the company, sailing from New Orleans on the steamer "Proteus," December 11.

THE TRANSATLANTIC WIRELESS CIRCUIT between Louisburg, Cape Breton and Clifden, Ireland, is being operated automatically as a duplex, the Wheatstone being used for transmission and the dictaphone for reception.

OWING TO AN INCREASE in telegraph rates in Great Britain and Ireland, enforced by the British Government from December 1, an additional six cents per message is now charged on night and week-end Marconigrams destined to places other than London or Liverpool. The "extra word" rate is also increased one cent per word on all Marconi lettergrams to the British Isles. There is no increase in full rate (seventeen cents per word), or half rate deferred (eight and a half cents per word) Marconigrams.

THE PROCEEDINGS of the Institute of Radio Engineers, dated December, 1915, have been issued. The book contains several interesting papers and discussions thereon, and the index to volume 3.

SHIPS' WIRELESS SEALED.—According to a dispatch from Galveston, Tex., December 6, United States customs authorities sealed all the wireless telegraph sets on foreign ships in that port as a precaution, because of the presence of a British cruiser just outside the three-mile limit.

LONG-DISTANCE WIRELESS TELEGRAPHY.—On November 29 an operator for the Federal Wireless Telegraph Company, at Honolulu, Hawaii, picked up messages being transmitted from Nauen, Prussia, to Tuckerton, N. J., approximately 9,000 miles away. It is stated that the signals as received were very clear.

New Book.

WIRELESS TELEGRAPHY, by Dr. J. Zenneck, professor of physics at the Technical High School, Munich. Translated from the German by A. E. Seelig. New York: McGraw-Hill Book Company, Inc. 442 pages; 467 illustrations. Price \$4.00.

Dr. Zenneck's original work on the subject of wireless telegraphy has been considered a classic, but owing to its having been printed in the German tongue, the information could not be freely availed of by English-speaking people not familiar with the German language. It was for the purpose of presenting to the latter the benefits to be derived from the original that the translation was undertaken.

The scope of the book is broad, running from elementary treatment of condenser and antenna circuit currents through the important measurements of the art and explanations of coupled-circuit phenomena, into technical descriptions of sustained and damped-wave apparatus.

The work is mathematical in its treatment, but there is enough information of a practical character to make it a valuable addition to the average library on wireless literature. It is well illustrated, and the mechanical work in the production of the book is of a high order.

Copies may be obtained of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Differential and Bridge Duplexes.

The use of duplex telegraph apparatus makes possible the simultaneous transmission of two sendings, one in each direction, over one wire. To accomplish this the apparatus should fulfill the following conditions:

(a) The receiving instruments at both stations must remain in the circuit all the time, ready to respond to signals from the distant station.

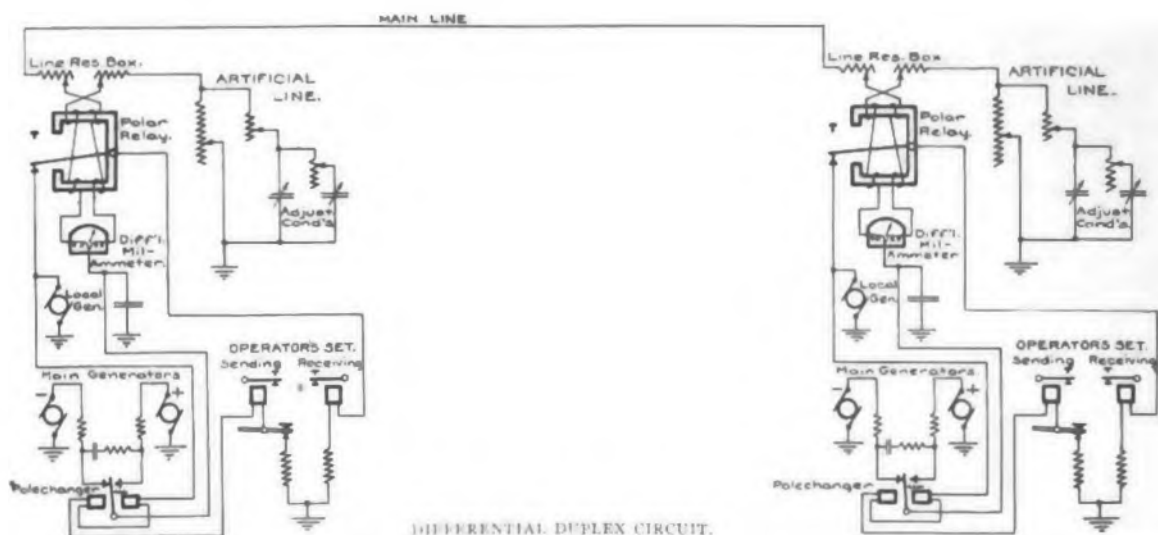
(b) The receiving instrument at each station must not respond to any signals made on the sending key at that station.

One of the best ways to meet both of these conditions is by the use of differential relays and the resulting system is termed the differential duplex.

In a differential relay there are two magnet windings. If currents are passed through the two windings in the same direction, they assist each other in developing magnetism and thus attract-

current. It is evident that the receiving instrument in this case must be one in which the movements of the armature depend on the direction of the current passing through the coils. Such an instrument is the polar relay, which is so constructed that a current flowing through it in one direction will tend to move the armature to the right, and when the current is reversed the armature will tend to move to the left. If the armature is already on the side toward which a current of a certain direction tends to move it, there is, of course, no actual movement of the armature, which remains banked tightly against the stop at that side.

The balancing scheme of the double-current duplex is the same as that of the single-current duplex, that is, an artificial line at each station is adjusted to equal the resistance of the real line and the apparatus at the distant station. By having the polar relays equipped with differential windings and



ing the relay armature. Currents may, however, be passed through the two windings, in opposite directions, in which case the resulting magnetic effect, or pull upon the relay armature, will correspond to the difference between the strengths of the two currents; hence the name differential. If the two opposing currents are of exactly the same strength their magnetic effects will neutralize each other and they will cause no pull on the armature.

Under these conditions two messages may be simultaneously transmitted, in opposite directions, over one wire. In fact, the "Single Current Differential Duplex," as this scheme of connections is termed, and particularly a slightly modified form of it known as the "Stearns Duplex," is capable of giving fairly good duplex service under favorable conditions.

In actual practice, however, there are many conditions under which the efficiency of the single-current duplex is greatly reduced. Very much better results can be obtained by the double current system, which is therefore almost exclusively used. In this system each marking signal (a dot or a dash) is made by sending out a negative current, and each spacing signal by sending out a positive

using proper connections the artificial line at each station permits signals to be sent out from that station without affecting the relay there. In the double-current system, however, the current in the artificial line does not, as in the single-current system, neutralize the magnetic effect due to the main-line current in the relay at that station when the distant key is in the spacing position. This will become evident when it is remembered that in the single-current system, the spacing position of the key connects the circuit to ground and removes the source of current, while in the double-current system the spacing position of the key connects the circuit to a source of current equal to that used for the marking signal, but opposite in direction. The function of the artificial line in this case, therefore, is to prevent the operation of the key at the same station causing any alteration in the amount or direction of the current in the relay.

In addition to the differential polar duplex system another system, known as the "Bridge" polar duplex, is also used to meet certain service conditions. In the latter system, the outgoing current at each station is caused to divide between two "bridge" arms or branches of the circuit instead of

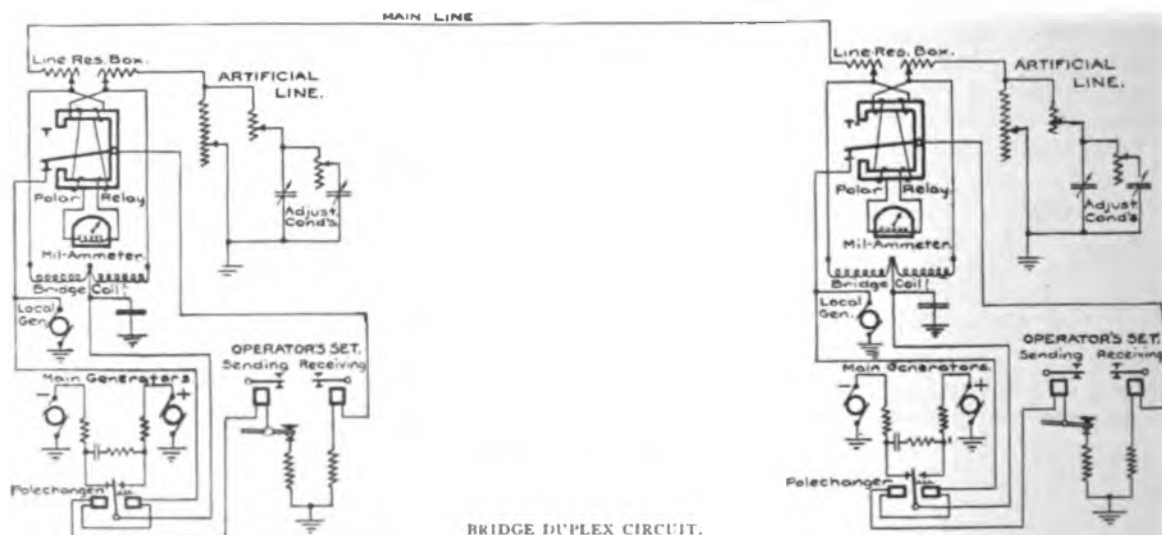
between the two windings of the relay as in the differential arrangement.

ADVANTAGE OF THE DIFFERENTIAL DUPLEX.—The principal advantage of the differential over the bridge duplex is the lower voltage required for the operation of the former. In most cases, for equally satisfactory results on a line wire of given resistance, the voltage used with a bridge duplex will be from fifty per cent to eighty per cent higher than is necessary for the differential duplex.

ADVANTAGE OF THE BRIDGE DUPLEX.—If a line wire assigned for polar duplex service is also simultaneously used to form a part of a telephone circuit, or if it runs closely parallel to a telephone circuit for a long distance, it is usually necessary that the duplex sets be of the bridge type, to prevent interference with the telephone service by the telegraph currents. This advantage of the bridge system over the differential system is due to the arrangement of the bridge arms. Instead of being ordinary non-

circuit has a marked effect in graduating the rise and fall of the current flowing over the line.

ARTIFICIAL LINE.—So far it has been assumed that it is merely necessary for the artificial line at each station to have a resistance equal to that of the main line plus the apparatus at the distant station. This is seldom, if ever, the whole truth. Every line wire, in addition to its current-carrying qualities, is able to hold upon itself a quantity of electricity in the form of a stationary electric charge. This quality is known as the electrostatic capacity of the wire and manifests itself by a tendency to delay the travel of the current over the wire, because the wire must become fully charged with electricity before the full strength of the current can reach the distant end. It also permits a rush of electricity into the wire at the beginning of each positive current to assist in the charging mentioned and at the beginning of each negative current the same quantity of electricity rushes out of the wire.



inductive resistances, the two bridge arms for each duplex set are wound upon a ring-shaped core of soft iron wires, the entire combination being known as a "retardation coil." Because of its closed magnetic circuit, and correspondingly high inductance, this coil offers great impedance to any current passing through it from one outer terminal to the other. The effect of inductance in a circuit is to slow down the rise and fall of current in that circuit; consequently, in this case, a current coming in over the line wire at first meets with great opposition in its attempt to flow through the bridge coil, and as a result almost all of the incoming current rushes into the polar relay. This effect lasts only for a small fraction of a second, during which time the opposition to the current in the two arms of the bridge gradually disappears and the currents in the various branches reach their steady values. The brief initial rush of current through the polar relay is, however, sufficient to throw the armature of that instrument over, with a speed and precision out of all proportion to the smaller steady current passing through the relay during the remainder of the signal. The presence of the retardation coil at each end of the

These charging and discharging effects must be reproduced in the artificial line, so as to resemble as nearly as possible those occurring in the main line. This is accomplished by the addition of adjustable condensers to each artificial line, by means of which the latter can be given an electrostatic capacity corresponding to that of the main line. Each condenser used for this purpose consists essentially of two conductors of such form as to have very large superficial areas, separated from each other by a very thin insulating material. The two conductors are usually of tinfoil, the insulator being paraffin paper. By rolling or piling up a large number of sheets of these substances in the proper order, and connecting together the alternate sheets of tinfoil to form the two terminals of the condenser, it is possible to build up in a small box, a capacity equal to that of many miles of line wire. The condensers connected to the artificial line must not only accumulate a quantity of electricity corresponding to the static charge of the main line, but must accept this charge at the same rate as the similar charge passes into the main line, and in discharging, must also act in unison with the main line capacity. To ensure

this, each of the two or three condensers of the artificial line is connected to it through an adjustable resistance, generally termed a "retarding" or "timing" resistance. By varying these resistances, the speed with which the condensers are charged and discharged can be regulated to correspond with line conditions.

SPECIAL EQUIPMENT FOR "INTERCHANGE" WORKING.—"Interchange" duplex sets can be utilized for operating either over the ordinary telegraph wires, or over wires for the work of simultaneous telegraphy and telephony, suitable voltage and other requirements being necessary to obviate interference with the telephone service.

The following apparatus is included in each Interchange set:

(a) A triple-pole, double-throw knife switch for simultaneously changing the line and main battery or generator connections.

(b) A single-pole double-throw knife switch for inserting or removing from the artificial line the retardation coil and condensers required to balance the "composite" apparatus when that method of simultaneous telegraphy and telephony is used.

(c) A small triple-pole double-throw switch for changing the set connections from the differential to the bridge plan of duplex working.

Loquacity.

BY J. V. RIDDICK, NEW YORK.

"Learn," says the venerable Fuller, "to hold thy tongue." Five words cost Zacharias forty weeks' silence. It is really wonderful how much mischief has been caused in this world through an unguarded tongue. Too true it often is that—

"Many a shaft at random sent

Finds mark the archer little meant."

"Mere words are of little moment. The man or woman who brags most does least. The deep, strong flood flows with almost noiseless course, but the tiny brook loudly asserts itself."

Shakespeare's definition of the valiant wind-bag is one who "speaks an infinite deal of nothing; his reasons are as two grains of wheat hid in two bushels of chaff; you shall seek all day ere you find them, and when you have them they are not worth the search."

The man who is lavish in words is too often but a niggard in deeds. As it has been shrewdly put—

"The man of words and not of deeds

Is like a garden full of weeds."

Of course, we are not bound to develop a Quakerish taciturnity, and to answer all remarks in curt monosyllables. The ability to converse gracefully and fluently is a gift well deserving of being cultivated, but we should bear in mind the old apothegm, that, while we have two eyes and two ears, we have only one mouth, reminding us to see and hear much, but to speak little. Much grievous wrong and unavailing regret have arisen from a few words hastily and heedlessly spoken. "Things better left unsaid."

Prudence is an estimable virtue, and in nothing is its value more prominent than in controlling that "unruly member," the tongue.

In all our conversation we should avoid repeating anything unkind or spiteful. It is not enough that some one told us. Even if we have the strongest reasons for believing it to be true, we should ask ourselves, is it prudent, generous, kind, to spread statements that can do no good, and are almost certain to do much harm? A moment's calm reflection will, in such cases, inevitably show us that while, "speech is silver, silence is golden."

Relation of Earth Resistance to Electrolysis.

A paper on "Earth Resistance and Its Relation to the Electrolysis of Underground Structures," published by the United States Bureau of Standards, deals with the factors which influence the resistivity of the soil and with the effects of soil resistance on the leakage of currents from street railway lines using the rails as return conductors.

Three methods of determining the specific resistance of soil are given and the results of a large number of measurements are tabulated. The principal factors which influence soil resistance are described and their effects on the results of electrolysis surveys and on the escape of currents from street railway tracks are discussed.

Copies of this publication may be obtained by applying to the Bureau of Standards, Washington, D. C.

Line Construction.

In this country practically all telegraph lines consist of either iron or copper wire supported on glass insulators attached to wooden poles by means of pins and cross-arms. The size and material of conducting wire vary from small iron wire, No. 14 B. W. G. (Birmingham wire gauge) for unimportant lines to No. 4 iron for multiplex circuits. No. 8 B. & S. (Browne and Sharp) gauge copper wire is now generally used for important long-distance lines over which automatic or quadruplex equipment is to be operated. In the United States insulators are almost invariably made of glass. In Europe the use of porcelain insulators is common, and some are now being used in Canada. Hard-drawn copper is now extensively used for telegraph circuits in place of iron wire on account of its lower specific resistance combined with high tensile strength. The resistance of copper wire varies with temperature, purity of metal and degree of softness of the metal. In general, the construction of telephone lines is the same as that of telegraph lines.

NEW BOOK FOR TELEGRAPHERS.—"The Wonders of the Telegraph" is the title of a unique and interesting book soon to be published by Mr. Jeff W. Hayes, editor and publisher of *The American Telegrapher*, Portland, Ore. It will be essentially a telegrapher's publication, and will contain interesting stories and information of value. Some of the stories will be illustrated. Among the features of the book will be pictures and autographs of representative telegraph men, particular attention being given to the autograph feature. The price of the book will be \$2.50 per copy.

The Relation of the Law to the Telegraph *

BY FRANCIS RAYMOND STARK, ASSISTANT GENERAL
ATTORNEY, WESTERN UNION TELEGRAPH
COMPANY, NEW YORK.

Telegraph law of course covers a rather wide field, but by far the most important part of it, and certainly the part which is of the greatest practical interest to us, relates to the liability of a telegraph company to the public by reason of the conduct of its agents. In other words, to a certain extent, we are interested in a branch of the law of master and servant, or employer and employee. Perhaps the first question which will suggest itself in this connection to those of us who are not lawyers or law students is why one person should be responsible for the acts of another person at all. Why should an employer be responsible for the act of an employee which he has, for instance, forbidden and made elaborate rules to prevent? Of course, nobody has any difficulty in understanding why, if I wish to assault Jones and am afraid to do it myself because Jones is larger than I, and I employ a professional bully to do the assaulting and pay him for his services after the assault is complete, I should be responsible for the conduct of the professional bully. That is simply plain common sense. But suppose I employ a truckman to deliver my goods, and I caution him never to drink while he is on duty, never to drive more than eight miles an hour within the city limits, and never under any circumstances to drive on the wrong side of the street; and he goes out and gets drunk, drives eighteen miles an hour, and drives on the wrong side of the street, and while so doing runs over a child. The law is that I have to pay damages to the child, and at first sight that seems a little unfair, does it not? I say to myself, I could not have helped this accident. I picked out a truckman with a good record—one who never had an accident before; I instructed him very carefully what to do and what not to do, and I gave him a perfect truck. What happened is not my fault. And that is true, perhaps, as far as moral fault is concerned. But if that were true legally there would in most cases be no chance for those of us who, like the child, are injured by the carelessness of others without fault of our own, to recover even the poor satisfaction afforded by money damages for our injuries. Truckmen are not always, or even generally, financially able to pay a substantial money judgment; the employers of truckmen usually are; and they can, if they will, protect themselves against such liability by insurance, for instance, regarding the premium paid for the insurance as simply another item in the cost of their product, and thereby distribute the burden, practically, over a large part of the community, instead of leaving it, whole and entire, on the injured child. So the law says and has always said that when the employee is actually doing the work of his employer—and, of course, only then—he is the employer's other self; he is, in fact, the employer, as far as the law is concerned, and as far

as the situation may involve the rights of third persons. It is really rather a striking thing, when we stop to think about it. It is something more than a mere metaphor, it is really an actual legal fact. When the president of a corporation signs the company's name to a contract it is not the individual president but the corporation which holds the pen that signs the paper. When the messenger of a telegraph company starts out to find an unknown addressee and some one offers to show him the addressee's house, but he goes instead to the ball game and forges the addressee's name on the delivery sheet, in the eye of the law it is the telegraph company that goes to the ball game and the telegraph company that forges the receipt. And this is true with all of us, as long as we are doing our special work for an employer—managers, operators, line-men, chiefs, superintendents—yes, and for that matter, lawyers.

And this brings me to what was really my principal idea, and that is to suggest a certain test as to when an employee, in the conduct of his work, has so fully discharged his legal duty that there is no danger of his employer becoming liable to any one else on the employee's account. There is such a test, and it is a practically infallible test and it applies to every kind of employee and to the employee of every kind of employer, and it is after all simply this: How would I act if this were my own personal matter? Now, of course, there are people who do not care very much about their personal matters—men who do not care enough about their own business to try to make it a success—who perhaps have a sufficient income outside of their business—but I am not speaking of that kind of men. I am speaking of the ordinary man who has to work for a living and who gives his best and most serious attention to making his own business a success. When we are doing the business of another that is the way the law requires us to do it; if we are sure that we are doing it in that way there is no great danger of any legal difficulty for us, or for our employer on our account.

Take the case for instance of a telegram received at a small office addressed to an unknown addressee. The manager of the office makes a report that he has been unable to find the addressee in spite of the most elaborate efforts and his report looks very well perhaps on paper. He has asked at the post-office and hotels, sent a service message without result and mailed a notice. But before we can be quite sure that that manager has used the degree of diligence which the law requires in order that the telegraph company, his employer, may escape from the imputation of negligence, let us for a moment put ourselves in his place and make sure what he would have done if that message had been his own personal matter. Suppose he had had some private reason for wishing to find the addressee of that message and for wishing to find him quickly? Suppose somebody had offered him a \$100 bill if he should succeed? Suppose he had known that if he did not find the man, and find him promptly, he, the manager, would personally be sued, and that the lawsuit would cost him perhaps

*Year Book of the Western Union Educational Society of New York.

\$500 or a \$1000, besides his lawyers' fees? Do you think he would have found the man? Unless you can answer that question in the negative you have not a case of perfect service, or even of reasonably diligent service, as the law understands reasonable diligence; and when you apply that test to service that looks perfect sometimes on paper the results are apt to be as astonishing as they are disconcerting. You are as likely as not to find, as we found in one case, that the addressee keeps an "Owl" lunch wagon across the street from the telegraph office and that the manager who reported making such a strenuous effort to locate him had for weeks been accustomed to go there for his lunch; but although he knew him very well as "Bert Brown" it never occurred to the manager that he might be the "Herbert Browne" of the message. In a matter of his own it is not likely that he would have overlooked the chance.

Part of the telegraph law, and a very interesting part, is devoted to the question whether and how far a telegraph company can limit its liability for the mistakes of its employees. There are certain limitations of liability contained in the ordinary telegraph blank, and if the sender writes his message on a blank he is regarded in law as having agreed to those conditions. That of course is the origin and the real reason for the rule which has existed from almost the beginning of telegraphy and still exists that messages must be written on the usual blanks or attached to those blanks by the sender before being accepted for transmission. Of course in the case of messages accepted over the telephone that is not possible; but in the case of any message filed at the counter there is no reason that I have ever been able to discover why the rule should not always be observed. Yet it is very frequently violated, and it is a singular thing how little the meaning of the rule and the reason for it seems to be understood. Very often the original message involved in a claim or suit is found to have been written on plain paper and pasted with great precision, you might almost say art, on a sending blank; but it develops on investigation that instead of being so attached by the sender it was attached by the telegraph operator or receiving clerk after the sender had left the office, or at the close of the day's business, or even by the manager—when and not before—the original message was called for by his superintendent after the investigation had commenced. Of course such a performance as that is not merely no compliance with the rule; it is not merely a meaningless ceremony unworthy of an intelligent grown-up; it is also a positive and indefensible waste of good Western Union stationery. The object of requiring the message to be written on the blank is to make a contract with the sender. You cannot make a contract with a man without his knowledge and after he has left the room. If he writes a letter to you asking for a loan of money you cannot tear off the signature of the letter and make him liable to you by pinning it or pasting it to a promissory note. There is a classical story or fable of a cross-roads sign reading "Four miles to Mogg's Grange; if you can't read ask the blacksmith." The author

of that sign was no more unreasonable in what he expected to those who could read than the telegraph clerk who thinks he can bind the sender of a message by the conditions on a blank which he does not produce until after the sender has left the office.

Once in a while the question in a telegraph case is not what the law is but which of two witnesses is telling the facts as they happened. Did the sender really tell the receiving clerk when he filed the message that the addressee lived three miles from town and had a telephone? Did the receiving clerk really tell the sender that the message could not be delivered that night because the addressee's telegraph office was probably closed? Most witnesses who do not tell the truth under oath are not intentional liars; a very large proportion of all mistaken testimony is the result either of poor observation at the start or more frequently still of imperfect recollection. When there is a conflict about a point like this between the sender of a message, for instance, and the telegraph clerk an ordinary jury is very apt to believe the sender and not the clerk. That is not because a telegraph man is regarded by the average jury as in any respect less reliable, less intelligent or less trustworthy on the witness stand or off it than the average member of the general public, but because the jury will reflect that the telegraph man handles hundreds of messages a day and thousands of messages a month and so is apt to confuse one particular message with some of the others, while the sender, who perhaps sends two or three messages a year, regards each message an event, if not actually an epoch, and so the surrounding circumstances with respect to each message are more or less clearly differentiated in his mind from the circumstances of the others. Now there is a remedy for that. To a certain extent the remedy is indicated in various of the telegraph company's rules; but it is not a bad thing, apart from telegraph matters, to bear in mind in connection with our own business. If the jury thinks both the sender and the telegraph agent are equally capable and intelligent and equally desirous of telling the truth, and there is no corroboration of either, they will nearly always, as I have said, believe the sender. But if the telegraph agent, at the time of the conversation, has had the forethought to make a note, no matter how brief—even if it amounts to hardly more than a hieroglyphic—of the important fact about which the dispute has arisen, then even though it may be months, or years, afterwards when he is called on to testify to it he will find that his recollection is refreshed by his note, and not only will he give his own testimony more positively on that account but in nine cases out of ten the jury will then believe him and not the sender. Of course there is nothing peculiar to telegraph law in this. It is just as true about any dispute of fact that any of us may have in his private affairs. As between two men equally honest and conscientious, of equal intelligence and with equal powers of memory, telling different stories about a past event which they both witnessed, the man with the memorandum wins.

Remarkable Career of Mr. John W. Lewis, Sixty-Two Years in Telegraph Service.

Mr. John W. Lewis, manager of the Western Union Telegraph office at the Astor House, and general post-office, New York City, is rounding out his sixty-second year of uninterrupted service for the Western Union Telegraph Company and its predecessors. Out of the 30,000 commercial telegraphers in this country, Mr. Lewis holds the record of being longest in continuous telegraph service. During his sixty-two years' connection with the telegraph within the confines of one city block, Mr. Lewis has never been absent from his office longer than a week at a time and those short vacations have been exceedingly few. The last vacation enjoyed by Mr. Lewis was in 1876, when he spent a week at Philadelphia, visiting the Centennial Exhibition. Another remarkable thing is that Mr. Lewis has enjoyed the best of health during his en-



JOHN W. LEWIS

tire career. He is hale and hearty and is in excellent working condition.

Still another unusual thing regarding Mr. Lewis is that, ever since he commenced telegraphy in the year 1854, he has stood all day, every day, while in his office, believing that standing was more healthful than sitting while at work, thereby giving natural freedom to all muscles of the body.

Of the proprietors, the employes and guests in the Astor House, when Mr. Lewis began his work there as a telegraph office boy, he was the only survivor there when that world-renowned hotel closed, and he was helpful in furnishing the full names of eight changes of its proprietors in succession from the year 1854 until the hotel closed. The names furnished were printed on the souvenir bills of fare of the last day, May 29, 1913, for presentation by the proprietors, A. H. Thurston and Company, to the guests.

Mr. Lewis has some choice bills of fare printed on fine silk and are very clear yet, some one of them having been used over sixty years ago at the great society dinners given at the Astor House, as follows: Pilgrim dinner, New England Society;

banquet to Archbishop Hughes, of New York, on his return from Europe; banquet to Henry Grinnell, Esq., and the officers of the American Arctic expedition; St. Nicholas Society anniversary dinner; press dinner to governor Louis Kossuth; banquet to George Law, steamship pioneer, also dinners on other occasions to societies and gentlemen of prominence.

Mr. Lewis has spoken very highly of the courtesy and kindness shown him by the various proprietors of the Astor House, and of having a very pleasant, life-long acquaintance with Mr. Warren Jones, the gentleman who opened the doors of the Astor House to receive its first guests, in the year 1836.

We can readily imagine Mr. Lewis' feelings when the hotel closed its doors for the last time.

Telegraph Oddities.

A woman in one of the New England cities is suing a telegraph company for \$7,000 damages, claiming that she fell over a telegraph pole, and received injuries as well as a nervous shock, and it will require this sum to mend matters.

Mr. Edison has a scheme for telegraphing with his eyelids—a quick wink signifying a dot and a long one a dash. That may be all right for a man of Mr. Edison's age, but don't ask the pretty girl to change her system of eye telegraphy.

A group of ladies were visiting one of the functional telegraph offices. The attendant remarked on passing through a spacious room that this was the plant department. One of the ladies observed that there were no plants in sight. The attendant, not to be outdone, promptly replied, "These people are pole planters."

In one of the smaller cities recently an Italian was hired to convey on his wagon two forty foot telegraph poles through the streets. There is a trick in carting poles and this was the first time the owners of the wagon were confronted with such a proposition. Every time the wagon got twisted while proceeding through the streets the poles side-swiped automobiles and destroyed show cases on the side walk. The result was several bills for damages.

The article in the November 1 issue to the effect that a trouble shooter employed by the Postal Telegraph Cable Company in Kansas, while removing a snake which had crossed two wires, found that the reptile was alive and before he could help himself it had curled itself around one of his arms, causing him to fall to the ground. The snake was then killed by companions and the lineman was uninjured by the fall. This tale caused a Texas lineman to write us that they have stiffer brands than this in the Lone Star state.

Mr. J. S. McIntire, manager, Postal Telegraph-Cable Company, Elmira, N. Y., writes: "Thank you for renewing my subscription to TELEGRAPH AND TELEPHONE AGE. Don't believe I could get along without the AGE, there being something new to learn in each issue."

Telegraph and Telephone Age

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BOUND VOLUMES of Telegraph and Telephone Age for 1913, 1914 and 1915 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, 1915.

Vacations for Western Union Employees.

The decision of the Western Union Telegraph Company to grant annual vacations, with pay, to all of its employes after the new year is one of the most radical and far-reaching steps ever taken by an American telegraph company, and, it is safe to say, will be hailed with unbounded delight by the thousands of beneficiaries. This determination is in line with the spirit of modern business and will go far toward advancing and cementing the amicable relations between employer and employe. On the company's part it, of course, means a large increase in expenses, but the good-will of the employes is a greater asset to the company than the mere money value of the time given them for recreation.

On the part of the employes, who are already receiving liberal benefits in the form of insurance against sickness, pensions, etc., there will be increased incentive to render the best of service, and they will feel more than ever before that they are part of the company and that its welfare is theirs.

The employes are to be congratulated on their good fortune, and while they are deserving of this consideration, they will, no doubt, show their appreciation in many ways that will aid in strengthening the company's position before the public.

Ten Cent Telegrams.

A prominent southern newspaper is clamoring for ten-cent telegrams. From the standpoint of the editor he cannot see how it is not possible for a telegraph company to make large dividends on the ten-cent telegraph rate, the same as do the telephone companies. The editor, like tens of thousands of others, because he has not given the subject any study whatever, reaches false conclusions. The average ten-cent telephone message is all revenue to the telephone company, less, of course, the cost of equipment and maintenance. A ten-cent telegram to a telegraph company would be a loss on account of the expensive messenger problem. As a general thing, it costs a telegraph company from three to six cents to collect a message and another three or four cents to deliver it. This messenger work is absolutely necessary for a telegraph company to perform. The man who telephones a ten-cent message does the work himself, and thus relieves the company of the burden as well as the responsibility for errors, etc. There is no comparison between the two services and the editor of an influential newspaper who writes an article on this subject is either ignorant of the facts or is willfully guilty of intentionally misleading his readers.

Loyalty of Telegraph and Telephone Employees.

The success of telegraph and telephone companies is to a very large extent due to the loyalty of their employes, and when the causes and means of promoting loyalty are considered in each case we find divergent conditions. Loyalty depends upon mutual understanding between the parties concerned, and any means that will promote such understanding must necessarily be beneficial.

In a recent communication received at this office the writer makes some interesting observations on the subject and emphasizes the loyalty on the part of the telephone employes.

"The loyalty of the telephone employes is, to a great extent," he says, "the result of existing conditions. The telephone is a wonderful agent in bringing people of different positions into closer relationship and better understanding, while the telegraph apparatus is a mere mechanical contrivance with no social value whatever. It is simply a commercial device, and can never be anything else."

"By means of the telephone the official and his subordinates are brought into closer touch. For instance, if a plant superintendent desires to correct an error in the management of one of the local exchanges, he simply places a long distance call, and in two or three minutes he has the district manager on the line and instructions or explanations follow and the matter is adjusted to the mutual satisfaction of both. On the other hand, the telegraph official would probably send his manager a sharp telegram and, in the majority of cases cause that individual to nurse a "grouch" for some time, with no adequate means of getting it out of his system. There is no practical way of changing this condition.

"Another reason for the difference in loyalty is the attitude of the officials toward their subordinates. The telephone official by reason of his free and unhampered means of direct communication, becomes much better acquainted with his subordinates. He knows his people and they know him.

"Again, the telephone people, male and female, take a greater interest in the educational and social welfare of their workers. They are ever on the alert to educate the man or woman for the position higher up. The great Bell system spends hundreds of thousands of dollars yearly in holding meetings and conferences, in order to educate and develop its employees and this is returned to it tenfold in efficiency.

"I do not mean to say the telegraph companies do none of these things for their employees, but they do not bring into play the wholehearted spirit in so doing that the telephone company uses, hence the results are not so beneficial.

"Furthermore, the telephone company has not been disturbed with labor troubles so extensively as have the telegraph companies during the strike some years ago and the feeling, perhaps, created at that time still exists to a more or less extent with the telegraph people.

"Another reason, which perhaps has influence toward loyalty is the system of paying employees. The telephone company so far as it is possible, pay on a monthly basis and if an employee loses a few hours time his pay still goes on and when he is called upon to work a little extra time he does so cheerfully; while on the other hand the telegraph companies pay their operators for the actual time worked.

"In nearly every instance you hear the telephone employee speak of his superior as a good fellow or a prince. There is to the best of my knowledge and belief no corporation on earth that deals as fairly and conscientiously with its employees as does the great Bell telephone system. Then the thought just occurs to me that perhaps the emblem itself plays no little part. "The Bell," is so universally known that the employees have a feeling of loyalty and pride that they are a unit in this wonderful wheel of progress.

"To sum it all up—loyalty begets loyalty."

It is undoubtedly true that where an official talks over the telephone with some one else to give instructions etc., he naturally paves the way to have his instructions carried out in a very satisfactory manner without any friction whatever, while cold stereotyped letters often lead to misunderstanding because of the peculiar wording of the instructions, when really there is an entire absence of anything that should cause friction.

New Features for 1916.

Beginning with the new year, TELEGRAPH AND TELEPHONE AGE will start as new features special departments to take care of the interests of broker operators, the press service and all other concerns employing telegraphers, outside of the commercial, railway, wireless, telephone and cable companies. Taking all together, the number of operators em-

ployed by stock brokerage houses, the various press associations, etc., probably approximate very closely the number engaged in the service of any one of the commercial companies. Their interests, therefore, are deserving of special attention in the columns of their fraternal journal, and we hope that our efforts in these directions will receive proper appreciation and support.

Government Ownership of Telegraphs and Telephones.

In his annual report, postmaster-general Burleson renews the recommendations made in his previous two annual reports, that early action be taken by Congress declaring a government monopoly over all utilities for the public transmission of intelligence.

"As soon as practicable, the telephone and telegraph systems of the United States should be incorporated into the postal establishment," Mr. Burleson says.

"The private ownership of telephone and telegraph utilities," he says, "places in private hands the control of important vehicles for the transmission of intelligence, and therefore infringes upon a function reserved by the Constitution to the national government. Operation of these facilities inherently, as well as constitutionally, belongs to the postal service."

THE AUDION.—At the meeting of the New York Electrical Society, December 10, Dr. Lee De Forest described his audion-amplifier, which, in certain connections, emits musical tones in melodic and harmonic sequence. The effect is produced by varying slightly and continuously the capacity of a small variable condenser in one of the circuits associated with the audion while the note is sounding.

NEW ZEALAND.—The telephone system of New Zealand is being rapidly developed by the national government with up-to-date material and appliances and much of it is now coming from the United States. Twelve new exchanges were opened, and the number of exchange connections increased by 4,846 during 1914. A length of 390 miles of pole line and 2,136 miles of wire were added to the telegraph and interurban telephone system, and 515 miles of pole line and 34,325 miles of wire to the telephone exchange local system, while 1,637 miles of telegraph and interurban telephone lines were overhauled and reconstructed. The telephone service in Auckland is being changed to the automatic system. The instruments are all manufactured in the United States.

Mr. Ben C. Wilkins, retired manager of the Western Union Telegraph Company at Ashland, Wis., in remitting to cover his subscription for another year, writes:

"It's glad that I am to greet you again,
And thus preventing a dun,
That's why I'm enclosing a couple of bucks,
And my good-will goes with the mon."

The Morkrum Printing Telegraph System.

It is proposed to print in a series of articles under this heading, a description of the Morkrum telegraph printers in detail. All the circuits and mechanisms to be described in these articles are fully covered by patents granted, by patent applications allowed and applications pending, and the rights of the Morkrum Company under the same will be fully protected.

The intent of these articles is to present the theory of the transmission and reception of signals in the operation of the Morkrum telegraph printers and to show the sequence of operations. A careful study of the following diagrams and the accom-

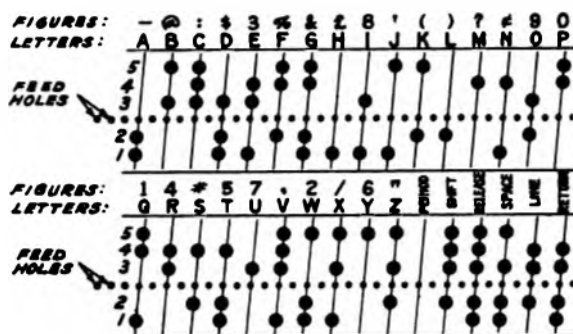


FIG. 1—MORKRUM CODE

panying explanations will greatly facilitate the work of handling the printers.

In the Morkrum tape system, a message which is to be transmitted is first prepared on a tape by means of a keyboard perforator. The message is then automatically transmitted over the line by means of this tape, and is received directly on a paper printer.

The tape perforator has a keyboard similar to that of a standard typewriter. There are six rows of holes on the tape. The continuous row is used to feed the tape in the transmitter. The letters and signals are formed by different combinations of holes in the five remaining rows, which are placed two in front of and three behind the feed row. The arrangement of the holes in these five rows controls the polarity of the five selective impulses which are sent over the line for every signal.

There are five contact pins which rest on the tape, one for each row of holes. These contact pins operate relay pole-changers the tongues of which are connected to five of the buttons on the transmitter disc. The position of each relay pole-changer will determine which pole of the local battery will be connected to the corresponding button on the transmitter disc. Therefore, as the transmitter brush revolves, it will send through the coils of the main-line pole-changer a series of impulses, the polarity of which is determined by the setting of the relay pole-changers. The setting of the relay pole-changers will, of course, depend upon the arrangement of the holes in the tape.

In addition to the five buttons on the transmitter disc, which are used for sending out the selective signals, there are two buttons which send out the

synchronizing pulses, one connected permanently to the negative and the other to the positive pole of the local battery. There is also one button connected to the tongue of the break key which operates the lamp signal at the distant end. The polarity of the impulses sent out from the buttons will determine to which side the armature of the main-line pole-changer will be moved and which pole of the main-line battery will be sent to the line.

At the receiving station there are five lock relays which are connected to the buttons of the receiver disc. By operating different combinations of these locks the printer is made to perform its various functions.

The tongue of the main-line relay is connected to the local battery and its marking contact is connected to the receiver brush. Therefore, when negative or marking impulses are received by the main-line relay the locks will be operated; but if positive or spacing impulses are received the local battery will be disconnected from the receiver brush and the locks will not be operated.

When there is no tape in the transmitter all the five pin contacts are closed, hence all the relay pole-changers will send out positive pulses to the coils of the main-line pole-changer, which will send out to the line positive or spacing current. This will move the main line relay armature at the distant end to its spacing contact. Since the receiver brush is connected to the marking contact of the main-line relay, none of the locks will be operated.

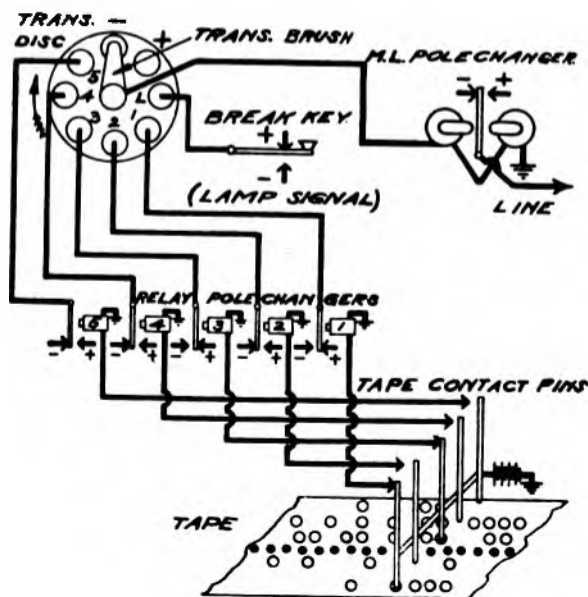


FIG. 2—LOCAL TRANSMITTING CIRCUITS

If a piece of tape, in which there are no holes except feed holes punched, is put into the transmitter, all of the pin contacts will be opened and the relay pole-changers will send out negative or marking pulses and the armature of the main-line relay at the distant end will be against its marking contact, and the battery will be connected to the receiver brush. Therefore, all the locks will be operated.

It will be seen from this that whenever the tape is left intact, negative impulses are transmitted to

the line and the locks at the receiving station will be operated. Wherever the tape is perforated, positive impulses will be transmitted to the line and the corresponding locks will not be operated. In this manner the perforations of the tape determine the combinations of the locks to be operated, which in turn control the printer actions.

The signal lamp relay is operated in the same manner as the five lock relays. At the transmitting end the tongue of the break key is connected to a button on the transmitter disc and normally sends

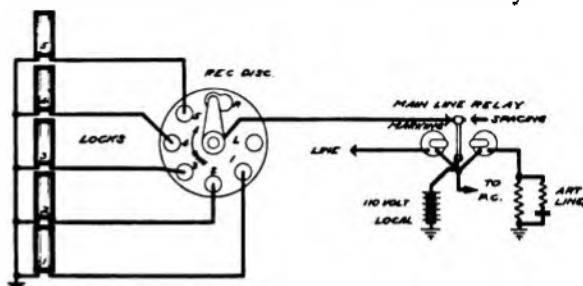


FIG. 3.—SELECTING CIRCUITS.

out positive pulses. If the key is depressed, negative pulses are sent out and the lamp relay will be operated and light the lamp.

Fig. 4 shows the line signals for the word "THE." The transmitter brush makes one revolution for every letter sent out and the tape-feed wheel is geared so it will advance the tape one feed hole for every revolution. The diagram shows the holes punched in the tape for the word "THE," the polarity of the segments of the disc, and also the signals sent out by the main-line pole-changer. It will be noticed that where impulses of the same polarity follow one another the main-line pole-changer joins them into a continuous current in that direction.

Fig. 5 shows the operation of the main-line relay in receiving the word "THE." As the receiver brush is connected to the marking contact of the

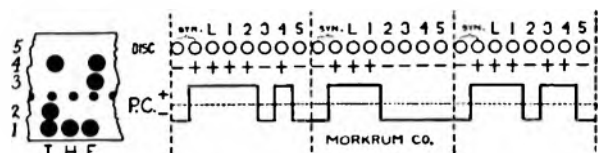


FIG. 4.—TAPE AND LINE SIGNAL.

main-line relay, only negative pulses will close the circuit from the local battery to the receiver brush. The negative portions of the received signal are therefore shown in solid lines and the positive portions in dotted lines. In the letter "T" the third and fifth impulses are negative. Therefore, the main-line relay armature will be against its marking contact when the brush passes the third and fifth buttons of the receiver disc and will operate the third and fifth locks. The main-line relay armature is always against the marking contact when the receiver brush passes the restoring button, owing to the corresponding button on the transmitter disc being permanently connected to negative.

It is apparent that the brushes of the transmitter

and of the receiver must be over corresponding buttons at the same instant. To accomplish this, means are provided for keeping them in unison.

In order to maintain proper relation between the transmitting brush at the home end and the receiving brush at the distant end, the receiver shaft is geared to run slightly faster than the transmitter shaft and the correcting mechanism retards the receiver brush every time it gets slightly ahead of the transmitter brush at the other end.

The transmitter disc sends out every revolution a negative pulse followed by a positive pulse. These pulses actuate the main-line relay at the far end. The marking contact of the main-line relay, besides connecting to the brush of the receiver disc, also connects to a contact operated by a cam on the receiver shaft and through this contact to the coils of the correcting magnet. If the receiver brush and the transmitter brush are running exactly in step, the relation of the cam contact to the receiver brush is such that when the marking pulse is received by the main-line relay the cam contact will just be on the point of closing and connecting in the correcting magnet, but it will not close quite soon enough. The receiver brush is geared to run a little faster than the transmitter brush at the other end. Therefore, a time will come when the receiver brush is enough ahead of the transmitter brush at the other

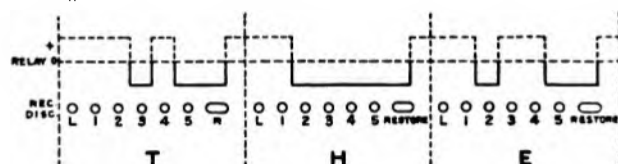


FIG. 5.—MAIN LINE RELAY AND RECEIVER DISC.

end for the cam contact to close at the same time that the marking pulse is being received by the main-line relay. When this happens the correcting magnet will operate and will interpose a pin in the path of the revolving star wheel on the main shaft, which will, through a system of gears, shift the position of the receiver brush slightly back. In this way the position of the receiver brush is corrected every time it gets ahead of the transmitter brush at the other end. This correction is, of course, very slight.

(To be Continued.)

ANNUAL MEETING OF SERIAL BUILDING LOAN AND SAVINGS INSTITUTION.—A meeting of the shareholders of the Serial Building Loan and Savings Institution, New York, will be held at 195 Broadway, Tuesday, December 21, at 5 p. m., for the purpose of nominating officers and directors. The annual meeting of the shareholders will be held at the same place at 5 p. m., Tuesday, January 18, 1916. Polls for the election will be open from 2 p. m. to 5 p. m.

Mr. J. F. Slack, night wire chief of the Western Union Telegraph Company, Oklahoma City, Okla., writes: "Please renew my subscription for another year. My 'age limit' will never be reached as long as the paper keeps coming."

Efficiency Engineering in the Telegraph Service.

(Continued from page 554, December 1.)

Manager "So and So" is a live wire. This is the expression contained in a recent letter. We at once focussed our glass on manager "So and So" to ascertain what was the reason for this very satisfactory reputation. When we visited his office we found his desk clear of papers. This indicated method and the prompt transaction of all matters brought to the attention of the manager. He was a man of good appearance, about fifty-five years of age, and never hesitated to call on the leading bank presidents, the presidents of railroads or even the chief executive of the nation. He was proud of the fact that he was the spokesman of a large telegraph corporation. This gave him assurance in an abundant measure, which went far to make the duties of his office a pleasure rather than a burden. While in the presence of the manager he received from the cashier a memoranda that three bills against as many customers were overdue and should be collected. He turned in his chair to the stenographer and dictated this note to one of the firms. "Dear Mr.——: Our cashier calls my attention to the fact that your account for last month, amounting to \$86, has not yet been paid, no doubt an oversight on the part of your treasurer. Will you kindly remind whoever has overlooked this matter that our cashier is obliged to make his remittances to the treasury department before the twentieth of the month? If it is possible, therefore, for your treasurer to hand the check to the bearer, one of our competent messengers, it will facilitate our work very materially.

Yours truly,

.....Manager."

The messenger returned with the check. The manager, however, knew his customers and realized how best to effect collections. He showed very plainly that he was going to considerable trouble to assist the cashier to collect the bills.

One of the greatest sources of complaint respecting the adoption of efficiency engineering to meet individual conditions springs from the lack of system. The question is, how can I adopt a simple system that will meet the individual conditions regarding the expenditure of the monthly salary. There are several ways of accomplishing this, but the simplest is probably what is commonly known as the envelope method. Many methodical individuals have a number of envelopes marked "Rent," "Household Expenses," "Loan Association or Bank Account," "Entertainment," etc. Into these envelopes is placed the proper proportion of the weekly wages, where it is kept until bills have to be paid. It may seem at first sight almost impossible for the average person to change from a method of living up to one's income to a method of having money on hand. The change, however, can be made very effective by those who wish to introduce method and system into their ways of living. One man puts it in this way: He first cleared up his old indebtedness, then made a list of the calls upon the family purse in the form of en-

velopes, as previously mentioned. The total was then ascertained and then, comparing this with the amount of salary received, commenced the distribution to every item on the list, of one-twelfth of the annual amount allotted for it, out of each month's salary, depositing in each envelope the proper amount. With a little time for things to adapt themselves this will work into a smoothly running plan, demonstrating that income must exceed outgo, the margin being the measure of prosperity in money matters: "If you pay as you go, then you won't owe," and that to depend upon money unearned, "yet to come," spells trouble.

And, now, just a word as to the benefit of all this. The outing in August was paid for from money accrued and distributed August 1 and before. Upon the return from vacation, a tax bill was received, the size of which, under other circumstances, would have been troublesome, but the money for it was in its place, so also was that of the winter's coal; "balance in the treasury," no debts. All this is done on an income probably far less than that received by many who will read this. It is not the amount involved, it is the method of doing it. So much for individual efficiency.

A Canadian manager desires to take issue with the author of the statement that appeared in these articles, printed November 1, wherein it is stated that "Jawbone" is sufficient to secure business, while the opposite, he declares, is true, and the manager has at his command much more than "Jawbone" to offer a prospective customer, even though the said customer has always done business with the other company.

Telegraph companies are sometimes too lax in their methods of delivering important dispatches at night to business houses. How to accomplish this object has caused many managers considerable uneasiness, but as there are no two cases alike, no general rule can be laid down to follow. A record of each individual case should be made and this record should be followed, and if so followed deliveries are not effectually made after business hours, the company cannot be blamed for any shortcomings. It has done its whole duty toward the customer.

The delivery of messages to transients is also a very difficult problem. A customer enters the office and instructs the manager that he is going to Chicago and to have all messages forwarded to him, care of the Great Northern Hotel. He goes to the Auditorium instead. The telegrams go astray.

The treatment of customers at the office counter is also a very important matter. Be sure that when a customer leaves the office he carries away with him a favorable impression of those with whom he came in contact while transacting his business. If he received cordial treatment, it will be a pleasure to him to continue to transact his business with the company. If he did not, it is certainly natural for him to try the other concern.

(To be Continued.)

Start the New Year right by subscribing for TELEGRAPH AND TELEPHONE AGE.

Questions to be Answered.

[The following questions are based upon the contents of Jones' "Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," and have been prepared for the study of this book. The asking of questions to be answered by the student is an excellent method of acquiring information, besides cultivating the habit of concentration of thought which is so essential in the study of any subject. Every telegrapher who is desirous of learning the technical side of telegraphy should follow this method of instruction diligently. He will be surprised to note from time to time how his knowledge is increasing, and this almost without effort on his part. This book is sold by TELEGRAPH AND TELEPHONE AGE at \$2.00 per copy.]

What is the local circuit arrangement employed on pony wires and other conductors, which are grounded at the distant end? (page 187)

What size (resistance) sounders are used for such circuits?

What is the advantage of using twenty-ohm sounders on circuits of this class?

Is there any difference in the plan of house wiring and size of conductors for the leads in a series system to that arranged for multiple circuits? Study Fig. 85 in this connection.

Point out the differences in the two plans.

How are the desk connections of duplex apparatus made? (page 190)

How is uniform resistance for multiplex loops secured? (page 191)

What should be the resistance of the lamps employed for this purpose?

What is a repeater and what are its uses? (page 192)

What is the simplest form of a repeater?

What is the feature of automatic repeaters?

Describe the Wood's button repeater, and point out its special features.

Is this type of repeater a true automatic repeater?

What is the advantage of the Wood device?

What is necessary to be done at the repeaters in case one side of the circuit desires to break the other side?

What is the principal advantage of automatic repeaters compared with instruments of the Wood type?

What is the means employed to hold closed the contact points of the transmitter or repeating sounder, which is controlled by the circuit into which an operator is repeating?

In the Milliken repeater, how is the transmitter held in a closed position?

What is the purpose of the extra magnet in the Milliken repeater, and what is the resistance of the magnet?

Does the Toye repeater require any extra magnets?

What means are employed to prevent the relay from being demagnetized?

Why are repeaters of this type not economical? (page 194)

Study Figs. 89 and 90, which are illustrations of the Toye repeater.

What is the chief advantage of the Nielson repeater?

Study Figs. 91 and 92 in connection with this question.

In the Nielson repeater, what is the object of having the magnets of the repeating sounder wound to a high resistance?

Where gravity battery is employed for the local circuits of this repeater, how many cells should be used, and how should they be connected.

Where generator local circuits exist, how is the strength of the current reduced to its proper value? (page 199)

Study Figs. 93 and 94, showing the Weiny-Philips repeater.

What is the aim of this particular type of repeater?

What improvements were made in the Weiny repeater by the Postal Telegraph-Cable Company? Study carefully the chapter devoted to this repeater.

What is the resistance of the main-line magnets, and of the holding magnets of the Weiny repeater? (page 205)

How do the extra magnets of this repeater exert their magnetic strength?

(To be Continued.)

News Censorship.

In a letter by Mr. Charles Bright, to the *London Times*, regarding the censorship of news of the war to neutral countries, that gentleman pleads for the development of this service on a properly organized basis.

"Surely the Eiffel Tower wireless station," he says, "should be turned to the fullest possible account for disseminating war reports broadcast. Again, with regard to your natural objection to divided responsibilities, by present arrangements, whereas no less than five government departments are concerned with our telegraphic communication systems, no board has ever yet been established whereby representatives of each department can meet together to discuss and settle issues concerned with this highly important subject. The value of speedy and uniform action during warfare," he says in conclusion, "can hardly be over-estimated here, and surely it is high time we remodelled our arrangements in this connection."

Report of Old Timers Reunions.

The thirty-third and thirty-fourth annual reunions of the Old Time Telegraphers and Historical Association, which were to have been held at Kansas City, Mo., 1914, and New York, 1915, but abandoned on account of war conditions, have been covered in a report just issued in the usual pamphlet form.

The report of secretary-treasurer Mr. F. J. Scherrer shows the condition of the association, and the reasons for the abandonment of the two meetings are stated. Portraits of Mr. George M. Myers, president, 1913-14, and of Mr. Andrew Carnegie, president, 1914-15-16, are embodied in the pamphlet.

New York has been selected as the place for the 1916 reunion, the present officers holding over until the next annual meeting, the date of which will be decided upon later.

Clear Transmission, Always Necessary, Warrants Use of the Highest Grade Battery

A low internal resistance battery that will not polarize, and maintains constant voltage, is sure to give better results in telephone work than a set of cells whose voltage constantly drops when on discharge, or in which the voltage is high or variable.



The Edison Primary Cells

maintain a lower uniform internal resistance than any other primary type; they furnish constant voltage and do not polarize at normal discharge rates; the 400 ampere hour size has a life greater than twenty single sets of dry cells and they require no attention between recharges, even though the service is such that a period of years is required to consume their capacity.

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Improve Your Service by Installing Edison.



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Winter battery troubles are unknown to the offices equipped with the



Diaphragm Telegraph Sounder

Works independently of local batteries. Attaches to any relay without disturbing electrical connections, or impairing the finest adjustment.

Works perfectly on a relay wound to standard or low resistance. Has no moving parts to wear, and no other adjustments than that of the relay.

Produces a dull, non-vibrating tone that is clear and far-reaching. Can be plainly read from a distance where other sounders could not even be heard.

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Saves the annoyances and delays caused by battery failures. Saves every item of expense for battery maintenance. Provides a service of the highest efficiency. In use in every state in the Union.

The Diaphragm Sounder is attracting the attention of telegraph officials everywhere. If you would have no more battery troubles this winter install the **DIAPHRAGM TELEGRAPH SOUNDER**.

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West African Telegraph Company, Limited.

Western Telegraph Company, Limited.

African Direct Telegraph Company, Limited.

London Platino - Brazilian Telegraph Company, Limited.

Pacific & European Telegraph Company, Limited.

River Plate Telegraph Company, Limited.

West Coast of America Telegraph Company, Limited.

TELEGRAMS for

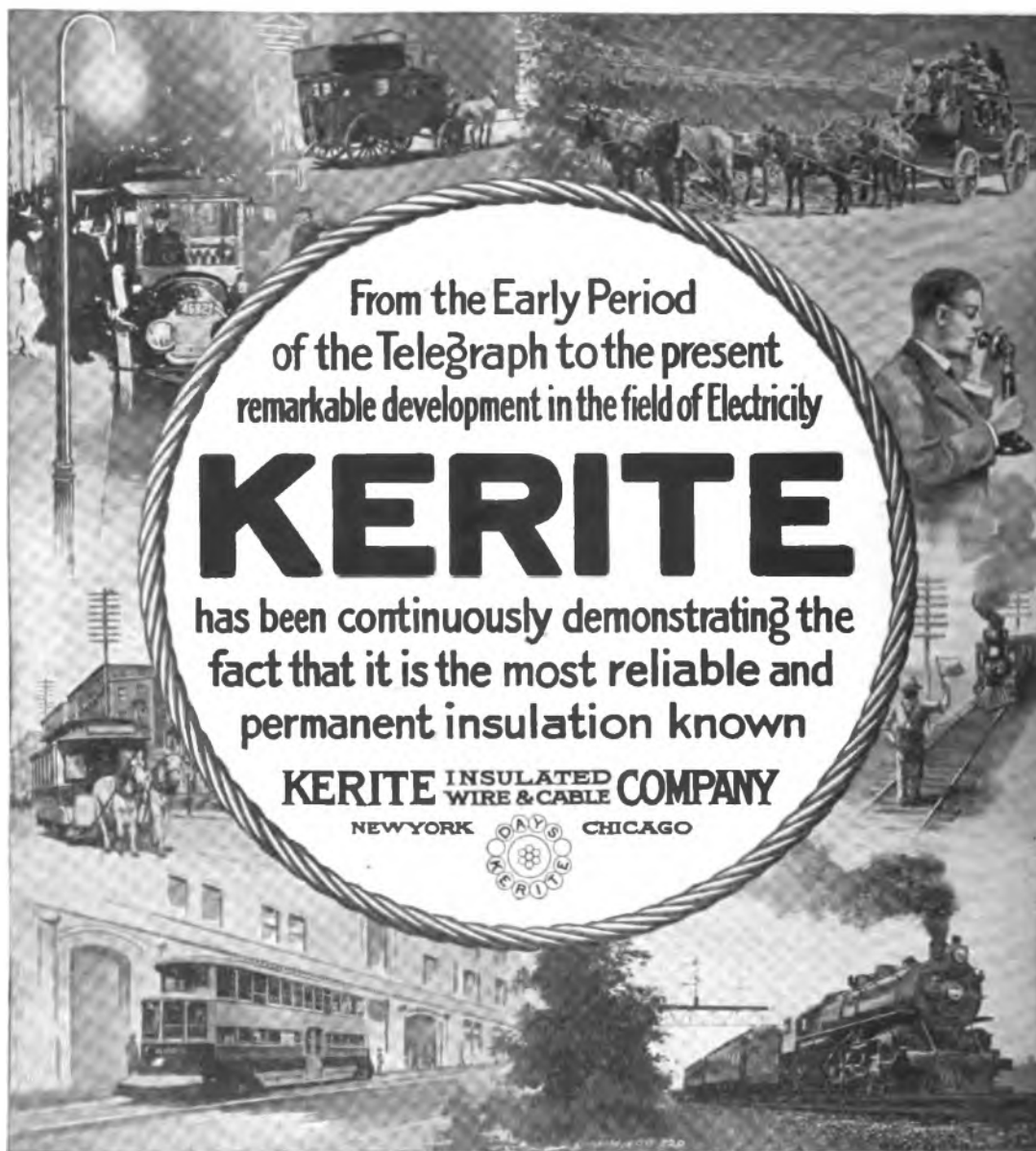
Australasia, China, Japan, Dutch Indies, Africa, India, Spain, Portugal, the Mediterranean and South America.

"VIA EASTERN."

18



50

A detailed black and white illustration depicting various scenes of early 20th-century technology and industry. It includes a streetcar, a horse-drawn carriage, a man using a telescope, a factory building, a steam locomotive, and a ship. A large, thick rope is coiled around the central text.

From the Early Period
of the Telegraph to the present
remarkable development in the field of Electricity

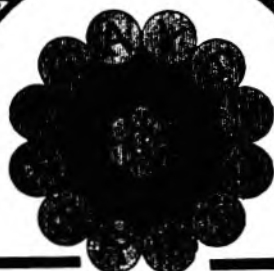
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19



15

THE RAILROAD.

MR. J. B. MURPHY, superintendent of telegraph, Mobile and Ohio Railroad, Jackson, Tenn., was struck by a street car recently and seriously injured.

MR. B. A. WORTHINGTON, formerly president of the Chicago and Alton Railroad, and an old-time telegrapher, has been elected president of the Cincinnati, Indianapolis and Western Railroad.

DRY CELLS VS. PRIMARY BATTERIES ON RAILROADS.—In our report of the meeting in New York, November 17, of the Eastern Division of the Association of Railway Telegraph Superintendents, the statement was made that a saving of \$650 a year was effected by the use of dry batteries on one of the branch lines of the Cleveland, Cincinnati, Chicago and St. Louis Railway. Mr. C. S. Rhoads, superintendent of telegraph of that road, informs us that this is an error. The fact is, he says, we are making this saving by installing primary batteries to take the place of dry cells on the main line between Indianapolis and Cincinnati, 110 miles.

The Field for Printing Telegraphs in Railroad Work.

BY J. O. CARR, CHICAGO, ILL.

There has been considerable talk of the need of a printer for railroad way wire work. There are several reasons why such a printer has not been immediately forthcoming.

To work several printers in series on a wire, and make it possible for each station to break in and send, it has been considered necessary to use a current-no-current signal. This signal is not good for printer operation. The characteristics of the line tend to make the current impulses string out and run together, thus making the no-current periods not sharply defined. Such operation is similar to single line Morse operation, and it is well known that single Morse wires do not work well in bad weather. In order to secure polar operation for a way wire printer the apparatus would be greatly complicated and it would be perhaps impossible to secure the line battery necessary at the way stations.

There is also the question of the expense of such a printer. Can a printer be furnished at a price which will make it profitable for the railroads to use it in this class of service? It is not likely that the railroads will pay more for printer operation than for Morse operation. Unless a way wire printer can be furnished at a cost of less than five dollars per month per station it would not pay railroads to install it.

Telephone message circuits are being extended to such a degree that it seems reasonable to suppose that in the not very distant future the message work of these way stations will be handled by telephone, and done much cheaper than is possible by printer.

It is probable that the future development in railway telegraph work will tend towards the establishment of a few large relay points which will be fed by telephone message circuits. The heavy traffic between the relay stations will then be handled by printers.

A printer operating duplex at a speed of sixty

words per minute in each direction should handle as much traffic as a Morse quadruplex. Of course, the greatest economies can be shown on circuits where the load is very heavy and the hours of operation are long. However, it has been proven that printer operation can compare favorably with Morse operation on circuits where the load is as light as 500 messages per nine-hour day. There are several Morkrum installations working duplex with only one operator at each end, which easily handle 600 messages per nine-hour day.

There is some question about the relative advantages of direct keyboard and tape transmission. Tape transmission has many advantages over direct keyboard. In all direct keyboard systems, the frequency with which the keys are struck and the corresponding letters sent over the line is limited by the speed of the receiving printer. In the Morkrum system, this limit is from sixty to sixty-five words per minute. Even the best operators do not write with machine-like regularity. They try sometimes to write at a speed as high as 100 words per minute, and the keys are locked out. Then they will drop to a speed of twenty words per minute, and the result is low efficiency. The action of a tape perforator is very fast, being governed only by the speed of the punch magnet, which can work more than a thousand times per minute. Therefore, the operator can write as fast as desired. The tape passes through the transmitter at a steady, uniform rate, and is not affected by inequalities of speed of the keyboard operator. Thus the receiving printer is operated at an even maximum speed; and although this maximum is not greater than with direct keyboard transmission, the steady working allows it to accomplish much more. It has been stated—and confirmed by results—that an operator can handle forty per cent more messages on a perforator than on a direct keyboard, with no additional strain.

There is another advantage of tape transmission in railroad work. Frequently there are no spare wires between the points where the printer is used, and if a wire fails another one cannot be immediately substituted. When this happens the operators need not sit idle. They can perforate the business on hand and when the circuit is restored these tapes can be transmitted at maximum speed. Take, for example, a printer operating duplex with only one operator at either end. In case of line failure both of these operators can perforate the business on hand, and when the wire is restored they can each start these tapes into the transmitter and both receive at the same time. With direct keyboard operation, these operators would be forced to remain idle while the line was out, and would have to start in on the accumulated business when the line was restored.

Tape transmission also allows a lower frequency of line signal, because with direct keyboard operation the transmission must be speeded up to allow a certain number of words per minute to be transmitted, because the operator on a direct keyboard does not take advantage of every revolution of the transmitter; but with tape transmission every revolution of the transmitter sends a letter over the line.

MUNICIPAL ELECTRICIANS.

MILWAUKEE, WIS.—A new fire alarm system is being installed here and will soon be in operation.

ROANOKE, VA.—The fire alarm system at Roanoke, Va., is under the management of fire and police alarm superintendent F. W. Bladon. The apparatus at headquarters is of the automatic type and Gamewell make, installed in 1907. The total number of fire alarm boxes is eighty; all are non-interfering, spring, actuated, trigger pull type. One private box is auxiliarized and has seven auxiliary stations distributed in one plant.

OBITUARY.

CHARLES H. DUBOIS, aged ninety-one years, a manufacturer of electrical instruments many years ago, died at Ocean Point, N. J., December 3. He made instruments for Prof. S. F. B. Morse at the time the latter was developing and establishing his telegraph. He was also inventor of a fire alarm and police system.

MARSTON R. COCKEY, aged fifty-one years, for many years connected with the John A. Roebling's Sons Company, and well known in telegraph circles, died at his home in New York, November 29. He was a vice-president of the Magnetic Club for ten years and was prominent in masonic affairs.

CORNELIUS J. SHEEHAN, aged sixty-eight years, a veteran telegrapher, died December 3, at Winthrop, Mass., after a long illness. His first service was with the Western Union at Providence, R. I., in the late sixties. He did the wiring in that city for the first Bell telephone experiments in the opera house. In 1888 he was appointed New England superintendent for the Baltimore and Ohio Telegraph Company, with headquarters in Boston. Later, and for many years, he was connected with the Postal Telegraph-Cable Company in Boston in various capacities.

FRANK A. ARMSTRONG, aged seventy-six years, formerly, and for many years, manager of the Western Union Telegraph Company at Cincinnati, Ohio, died in that city December 1. In his day Mr. Armstrong was one of the most prominent Western Union officials. He occupied the position at the head of the Cincinnati local office for many years. He retired from the telegraph service a quarter of a century ago with an enviable managerial record. After leaving the employ of the telegraph company, Mr. Armstrong became a grain and provision broker, and later held an important position in the Cincinnati post-office. At the time of his death he was connected with the city government, and had been for years a member of the Board of Review. Old timers will recall Mr. Armstrong as a man of fine ability and high character, popular with the public and much esteemed by his employees. He was a gentleman of the old school.

THEODORE E. MORELAND, aged seventy-two years, a well-known old-time and military telegrapher, of Pittsburgh, Pa., died at the Allegheny General Hospital, December 6, from the effect of a fracture of the thigh. Mr. Moreland served the Western Union Telegraph Company continuously for almost fifty years, retiring from active service two years

ago. He learned telegraphy under Mr. Andrew Carnegie, when the latter was superintendent of the Pittsburgh division of the Pennsylvania Railroad in the early sixties. In 1861 Mr. Moreland joined the United States Military Telegraph Corps, and served at Fort Lyon, near Alexandria, Va., Yorktown and other places, and before Richmond during the siege of that city. He was at the second battle of Bull Run as an operator at the headquarters of general Fitz John Porter. Mr. Moreland was captured by the confederates at Catlett's station, but was held in captivity only twenty-four hours. He was afterward employed at the war department. Mr. Moreland rendered efficient service to his country during the war period and was regarded by his contemporaries as a skilful and resourceful telegrapher and a brave man.

Entertainment of St. Louis Electrical Society.

The St. Louis Western Union Electrical Society gave an entertainment and dance, Friday evening, December 3. The affair was a success in every way and great credit is due the officers and members who had the plans and arrangements in charge. There was a large attendance of members and their friends.

The entertainment consisted of a programme of recitations, songs, character dances and instrumental music, which was rendered in a very creditable manner. This was followed by a short intermission, during which refreshments were served by the ladies of the society, who had made and furnished the cake for the occasion. While the refreshments were being served a drawing took place for three valuable prizes. Those holding the lucky numbers were Miss Kohlman, who drew a diamond laval-lière; Chas. McDonald, a diamond stick pin, and John Bohan, a beautiful reading lamp. After the drawing it was found that there were several fine cakes left over, and they were auctioned off by Mr. Joe Berry to the highest bidders. Mr. Berry made a very good auctioneer, and through his efforts the cakes brought fancy prices.

The intermission was followed by dancing until a late hour. Many of the young ladies looked charming in their pretty gowns, and everybody looked happy and "traded their smiles," declaring they had enjoyed the evening very much.

Handy Electrical Dictionary.

Every telegrapher and student should familiarize himself with the technical terms and expressions he comes across in the course of his daily work and in his studies. Such a book should be so compact that it can be carried in the pocket with ease. The "Handy Electrical Dictionary" fulfils this requirement. It is very handy and has a marginal index. It also contains several pages of conventional illustrations so that the student can easily recognize an instrument or circuit when he sees them in technical publications. The book is of vest-pocket size, and is for sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at 25 cents per copy for cloth binding and 50 cents for leather binding.

INDUSTRIAL.

Loud-Speaking Telephone for Window Demonstrations.

A loud speaking telephone equipment has been developed to enable window demonstrators to talk to their sidewalk audiences instead of using lettered cards to impart information.

The equipment consists of a special transmitter and a pair of loud speaking receivers and horns. The demonstrator connects the horns and receivers on both sides of his window, just high enough to be outside the reach of mischievous youngsters. In series with the transmitter, which is placed inside



WIN-DOW DEMONSTRATION BY TELEPHONE.

the window, is wired the battery of six dry cells connected in series and the receivers. The system is then ready for operation. As the demonstrator wishes to bring out each point, he simply speaks into the transmitter and his voice is magnified by the receivers and horns, and carried to the audience outside.

This apparatus was developed by the Western Electric Company.

Use of the Telephone in Bridge Construction.

The telephone played a very important part in the work of joining the two opposite arms of the great steel railroad bridge of the Pennsylvania railroad Company, spanning Hell Gate, New York harbor. As the travelling erectors slowly crept out over the river, putting girder after girder into place, immense hydraulic jacks kept pace by lifting the arms inch by inch. The movements of the jack attendants, as well as the movements of every man on the work, were controlled by a simple telephone system. Standard Western Electric telephones were located in the power houses, the offices, in the erector cabins, at the jacks, at the compressor house and on the structure in close proximity to the boss riveters. All the stations on the Ward's Island side

were connected to one line and all the stations on the Long Island side to another. A central telephone was put in the Long Island power house and a submarine cable run from there to Ward's Island. When any station on either side wanted to communicate to any station on the opposite shore, it could do so by signaling the Long Island power house, where the engineer in charge, by the use of a special key, could make the desired connection. All the telephones were thrown across their respective lines and any station called from any other by code signal.

In this steel arch, stretching 1,017 feet from support to support, the United States has not only the largest arch in the world, but has accomplished the greatest engineering feat of its kind ever known, and that by the aid of the telephone.

LETTERS FROM OUR AGENTS.

NEW YORK POSTAL.

Ten operators of the force at 253 Broadway have resigned and gone to Montreal to help out during the rush due to the heavy grain traffic and the war.

NEW YORK WESTERN UNION.

W. H. Mayer, a well-known operator of this office, was re-elected to the council of Wallingford, N. J., at the recent election.

Chief dispatcher M. J. Duggan, of Chicago, and L. Smearer, of New York, have temporarily exchanged places in order to broaden their experience.

Thousands of "peace" messages were handled in this office on Thanksgiving Day, and just before, in connection with the Ford "peace" movement.

One hundred and fifty members of the Western Union Educational Society have joined the classes for study of telegraph engineering. The subjects embrace mathematics, mechanics, electricity and English. Prof. Thvedt has charge of the class in mathematics and Miss Glaser and Mr. L. C. Boocher the English class.

At a special meeting of the executive committee of the New York Telegraphers' Aid Society resolutions were passed expressive of the society's appreciation of the action of the Western Union Telegraph Company in granting vacations to its employees after January 1, 1916.

PHILADELPHIA POSTAL.

Mr. H. Scrivens, superintendent, Pittsburgh, Pa., was a recent visitor.

Mr. Geo. L. Kohlbrenner, a clerk in manager J. H. Wilson's office, was married to Lena Kranich, formerly of the Bell Telephone Company, on Wednesday, November 24, 1915. The couple spent their honeymoon in Washington, D. C.

RICHMOND WESTERN UNION.

James P. Merrihew, aged fifty-seven years, chief clerk to Mr. J. B. Faulkner, district plant superintendent, Richmond, Va., died October 19.

Mr. W. E. Blow has been appointed assistant manager at Norfolk, Va., vice former assistant manager Williams, transferred to the traffic department at Richmond, Va.

ATLANTA WESTERN UNION.

Miss Jimmie Vandigriff, of the automatic department in this office, has become engaged to Mr. Walter H. Poynter, a well-known operator of the New York office of this company. On April 29, 1913, Miss Vandigriff made the phenomenal record of perforating 1,003 messages in eight and one-quarter hours actual working time. A picture of Miss Vandigriff appeared in these columns at the time.

CHICAGO WESTERN UNION.

The "Friendship Pleasure Club" has been organized in this office, and its first annual reception and ball was held December 3. Charles W. Johnson is president; G. A. Gernigon, vice-president; P. E. Lieb, secretary and treasurer; J. T. Manning, recording secretary; C. A. Fuller, sergeant-at-arms.

Mr. J. E. Cox, of this office, is placing on the market a new word counter that registers fifty words. A number of the devices have been purchased by the operators with satisfactory results. Notwithstanding that the device only registers fifty words, it does its work so accurately and works so smoothly as to please those who have made purchases. As a matter of fact, a vast majority of the messages contain less than fifty words. The device, for that reason, fulfills most of the word counting requirements.

INDIANAPOLIS WESTERN UNION.

Mr. J. C. Willever, commercial general manager, New York, accompanied by Mr. W. W. Ryder, general manager of the Western Division, Chicago, made a recent tour of the Western Division in the interest of the development of business. Acquaintances were renewed at many of the telegraph offices in the various districts.

Mr. C. L. Yuille, formerly of Elkhart, Ind., has been appointed manager at Kendallville, Ind., where a new and more commodious office has been fitted up in a more central location.

Mr. M. R. Crisman, of North Manchester, Ind., has been appointed manager at North Vernon, vice E. H. Pogue, transferred to the traffic department at Indianapolis.

Manager P. L. Mounce, traffic chief H. Everode and operator J. J. Maher have just returned from a six weeks' trip to Los Angeles, Cal., where they

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.

had been subpoenaed as witnesses in the famous dynamiters' trial.

Fred Hahn, of the bookkeeping department at Indianapolis, has resigned to accept a position in the cost department of the Nordyke Marmon Automobile Company of this city.

Mr. M. J. Grady, formerly chief clerk to district plant superintendent W. Salisbury, at Omaha, has been transferred to a more lucrative position in the office of Mr. J. C. Nelson, district commercial superintendent at Indianapolis.

Mr. E. L. Johnson, formerly of the district commercial superintendent's office, Indianapolis, has been appointed manager at Logansport, Ind., vice M. J. Doherty.

ST. LOUIS WESTERN UNION.

Mr. Charles E. Dubbs has been appointed supervisor of the commercial news department.

"Service from a Commercial Standpoint" was the title of talks by assistant managers L. R. Spehr and E. Roe, delivered recently before the St. Louis Electrical Society. Chief operator G. R. Alger also made a few remarks.

Early in the morning of December 2, the house where Wm. Kairn, night loop chief in the plant department, lived, caught fire. Mr. Kairn was seriously injured by falling twenty feet when he attempted to escape by climbing down a water-spout from a second-story window. He was taken into a neighbor's house, where physicians found he was suffering from a fracture of the left arm and right wrist, and concussion of the lower spine. At last account he was resting easily, with prospects of early recovery.

30TH ANNIVERSARY

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No. 24.

NEW YORK, DECEMBER 16, 1915.

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CORRESPONDENCE SOLICITED

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 employees 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, 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.

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.

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We have established a Patent Department and arranged for the services of a first-class patent lawyer. If you have anything patentable or any patent litigation, write to us. Expert opinion on the patentability of ideas and any other patent information needed may also be obtained from us.

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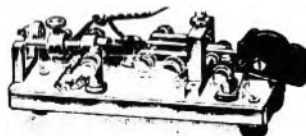
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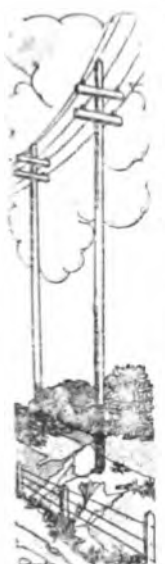
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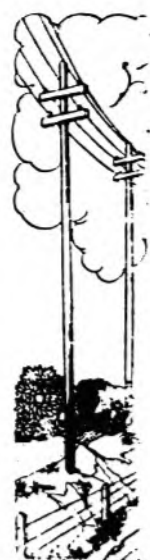
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