

April, 1922

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Volume 9

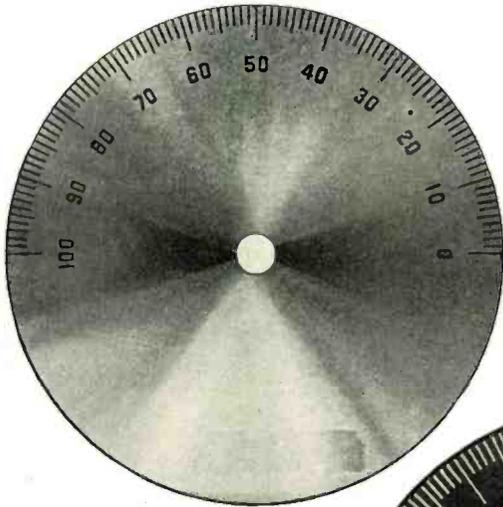
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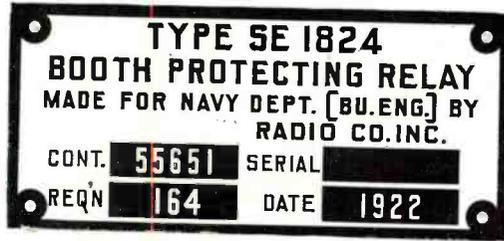
The present-day public interest in radio is here disclosed in a scene taken at the recent New York Radio Show which had six times the attendance of last year's show

New York's Amateur Show

And Many Exclusive Features In This Issue



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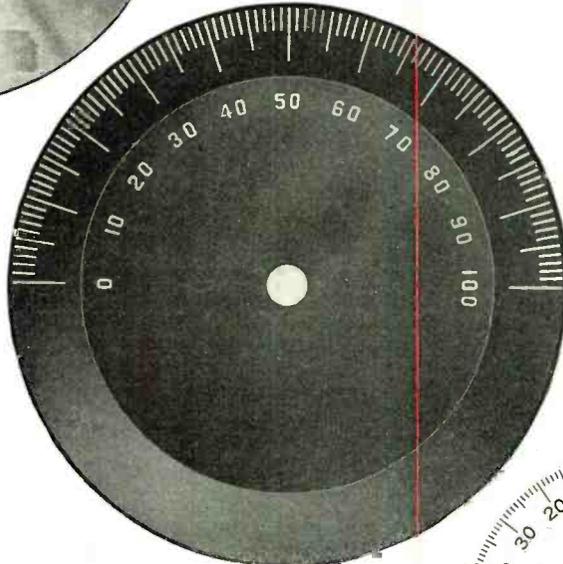
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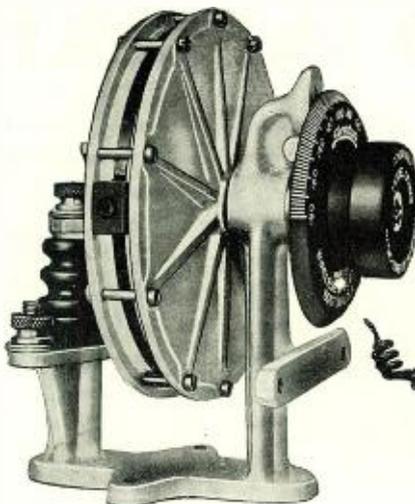
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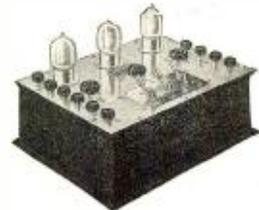
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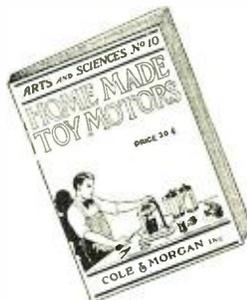
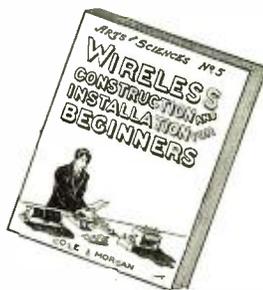
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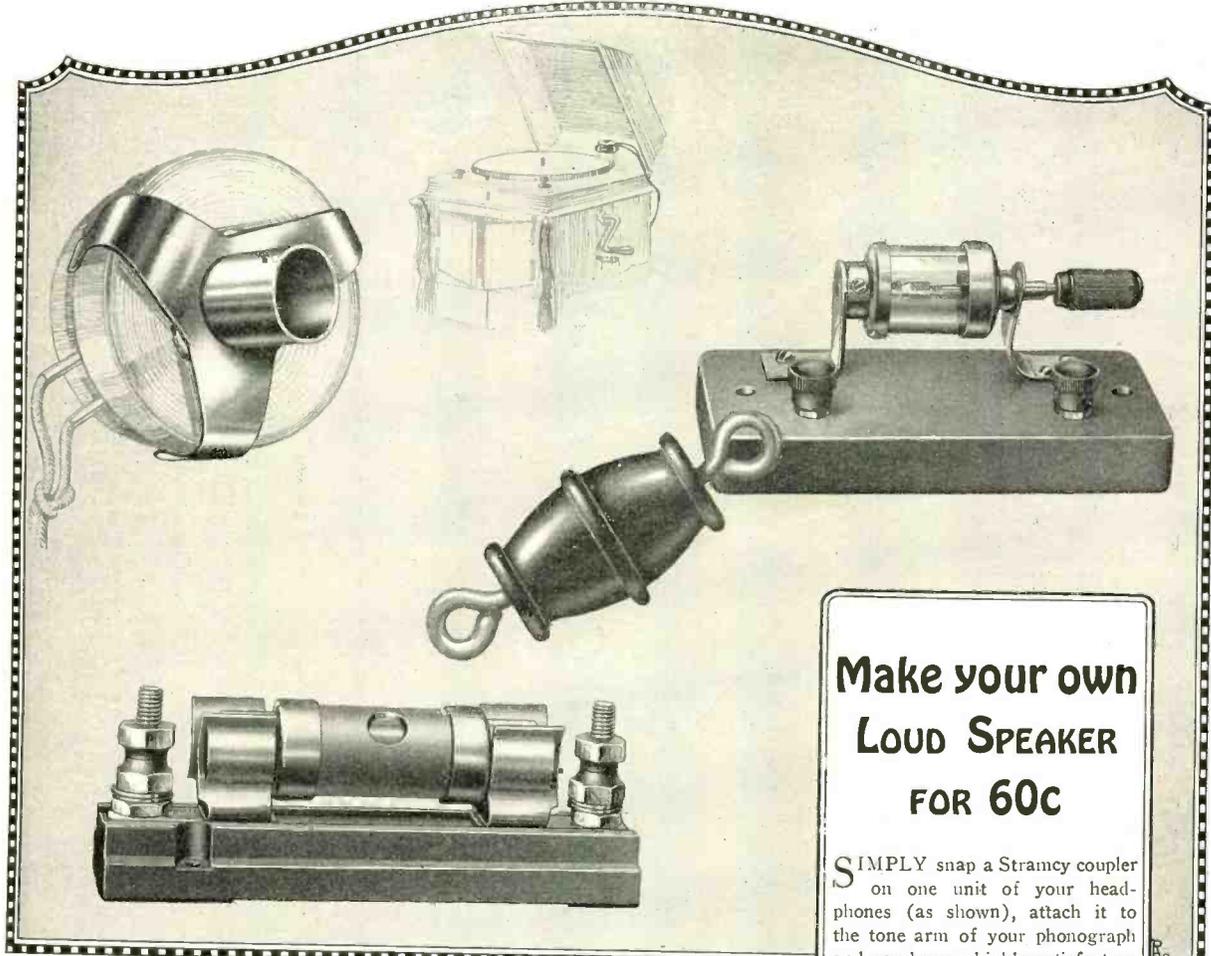
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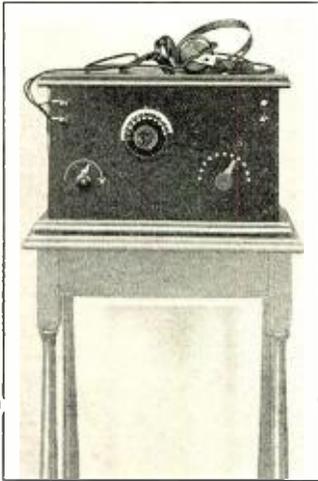
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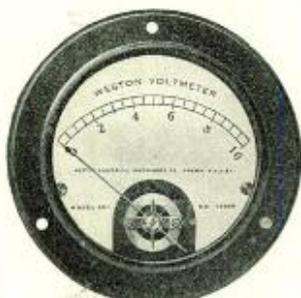
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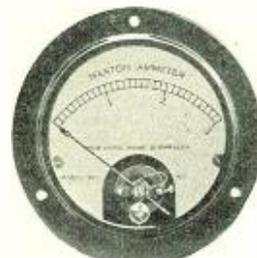
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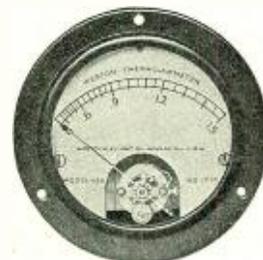
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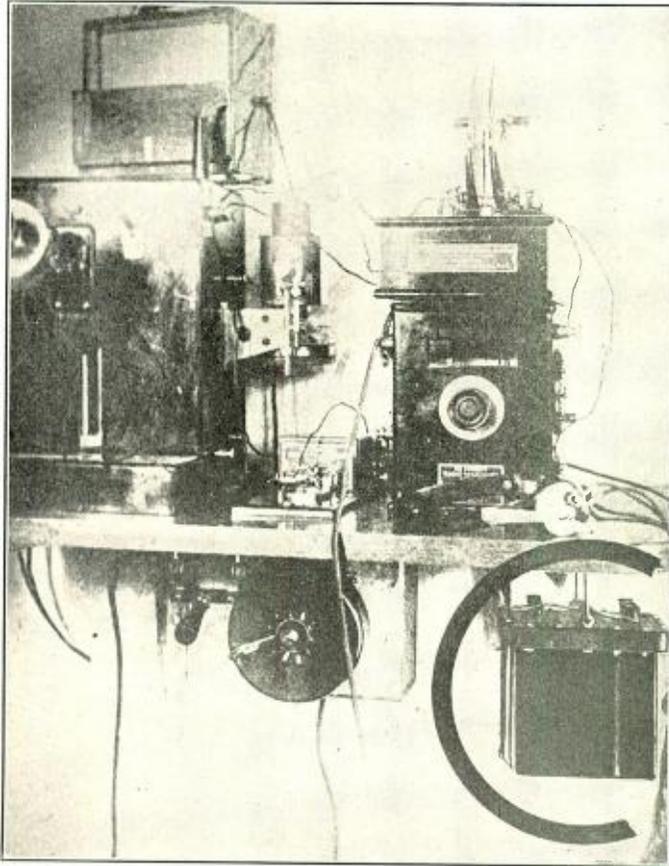
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Witherbee A Batteries are designed and built to meet the particular conditions prevailing in Radio CW Service.

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The entire construction is such that Witherbee Batteries may undergo continuous cycles of complete discharge and in addition may stand idle for long periods—without being harmed. The strong, clean Witherbee hard rubber case is the ideal enclosure for radio service. These cases have been a specialty of the *Witherbee* organization for nineteen years for use in the home or in the office where acid leaks would be fatally destructive. These cases have soft rubber bottom rests making them safe, clean and insuring perfect insulation.

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Builders of batteries since 1903 for automotive starting, lighting, ignition, etc.



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Bring Your Set Up-to-Date with this All-Rubber Radio Battery

It's just as important in receiving, to have a good battery as to have a reliable and efficient set.

The Willard All-Rubber Radio Battery was designed and is being used especially for radio work. It gives you the same reliability in wireless work as the starting and lighting battery has always given in motor cars. These batteries are available at a considerable less cost than the motor car battery.

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An important Radio feature is the All-Rubber Case. Cells and case are a solid piece of rubber that absolutely prevents leakage from cell to cell or to the ground, thus doing away with one of the most troublesome sources of noise.

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New York's Amateur Show

The Most Spectacular, Mystifying and Gripping Convention and Exhibition which New York Has Ever Witnessed

IN 1492 Admiral Columbus discovered America and in 1922 General Public discovered radio. There's no doubt about it. Radio has been discovered, and the whole world has come to see and feast upon its thousand and one interesting and delightful features. The awakening of the lethargic giant, public interest, while really long overdue, has been so sudden and so complete as to carry everything along with it in its eager search for more, and still more, information.

As recently as a year ago, radio was practically an unknown quantity to the average person. This was very vividly demonstrated by an inquiry from a well-known business man during the convention and exhibition of the Executive Radio Council last year. This man telephoned to the Pennsylvania Hotel and asked if the exhibition would be held on that particular day, as it was raining. He had heard something about "catching" radio signals and had assumed that it was necessary to go up on the roof with some sort of a device, such as a crab net, and catch the signals as they came along.

The attitude of that man was the attitude of the multitude. Radio? Oh, yes, all the little schoolboys played at radio, just as they played checkers or tiddle-de-winks, but there wasn't anything in it for the grownups. Consequently when the 1921 Convention and Exhibition was held, General Public wasn't even interested to the extent of even investigating the possibilities of radio, and the attendance at the affair was confined principally to the members of the Order of Hard Boiled Hams.

But, oh, what a difference a few months have made.

There was no such ignorance this year during the second annual affair, which was held March 7 to 11, at the Pennsylvania Hotel, New York. No, Sir. This year, *this year*, was different, vastly different. Every man, woman and child of the 33,801 who attended the show, knew—get that—KNEW something about radio. They may not have known the difference between



Miss Gladys Wryville singing "Kiss Me By Wireless," a song composed especially for the radio show

high and low frequency crystals, but they did know that it was necessary to have an aerial, a ground, a tuner and a pair of phones, and that when you turned a knob on the "box" to a certain place the result was—music, entertainment and education!

And so it has come to pass that radio has been discovered, has been acclaimed the greatest, most interesting, most fascinating of all forms of education and entertainment, and the news is rapidly spreading around the world. "Radio, on this particular day, thy name is legion."

Without question the Show was the most spectacular, mystifying, and gripping exhibition which New York has ever witnessed. The entire metropolitan area, from all appearances, was radio mad. The exhibition halls were packed with visitors from the first moment of opening, while during certain hours long lines in formation awaited with great patience entrance into the land of marvels. That their patience was well repaid was more than evidenced by the great interest displayed on every hand.

Owing to the heavy demand for space by exhibitors this year, it was necessary to use both the Roof Garden and the Butterfly Room for exhibits, and when the show was formally opened on the night of the 7th, sixty-five exhibits had been installed, every available square foot of space had been allotted, and there were still about a dozen applicants who could not be accommodated. Many of the exhibitors had based their printed matter supply on the attendance of last year, and the result was a flood of SOS telegrams to the home offices of the exhibitors for more salesmen and more printed matter. More than one exhibitor moved packages, boxes and bundles from out-of-town points in specially chartered Pullman berths on limited trains in an attempt to get adequate supplies to the firing line in time.

A half hour after the doors opened, J. O. Smith, the Chairman of the Council, wedged his way to the band stand and formally opened the affair with a few words of welcome to the visitors, the exhibitors and the representatives of the amateur fraternity who packed the floor of the Roof Garden. Comparing the enormous crowd of that evening with the small crowd which attended the opening a year previously, Mr. Smith said that if interest kept on increasing during the next year as it had during the past one, it would probably be necessary for the Council to hold next year's affair in Central Park.

It was necessary to adopt heroic measures in order to clear a space on the Roof Garden floor so that E. F. Glavin could operate his radio controlled vehicle. It took a lot of hard work on the part of a dozen huskies to get the crowd back, but when this had been accomplished Mr. Glavin entertained and mystified the large crowd with his radio controlled torpedo on wheels, familiarly known as the "Wireless Pup." As was the case last year, the torpedo proved to be one of the most interesting features of the exhibition and demonstrations during the following afternoons and evenings created great interest and enthusiasm among the thousands of spectators

who watched the demonstrations. Owing to the great crowds it was necessary to put blinders on the "Pup" to relieve it of stage fright.

The receiving equipment used by Paul F. Godley at Ardrossan, Scotland, caused more than one radio microbe to find an early lodging in the gaping mouths of the crowd. The tubes displayed with the set were the identical ones which actually recorded the signals of American amateurs during the tests. Mr. Godley operated the set during the afternoons and evenings and clearly demonstrated the great amplification possible with it. Using a small loop he succeeded in making audible the music, speech and signals from several radiophone stations. The broadcasting was heard all over the Roof Garden, by use of a loud-speaker horn. The degree of amplification obtained with this set was positively amazing even to the experienced operators, and as one visitor remarked: "In radio frequency lies the solution of the antenna problem for the New York City cave-dweller."

On Wednesday afternoon engineers of several of the exhibiting manufacturers radiated considerable verbal energy of various frequencies in giving talks on new equipment, which proved to be of great interest to the hundreds who filled the large ballroom of the hotel. In the evening over 1,200 persons listened to W. C. White, of the General Electric Company, who read a paper on "Vacuum Tubes and Their Operation." Mr. White is one of the foremost authorities of the country on vacuum tubes, and, in addition, possesses the happy faculty of being able to cover a technical subject in a non-technical way, a very desirable quality in view of the large number of non-technical enthusiasts who attended.

Paul F. Godley followed Mr. White, and got a rousing reception. He described in detail how the recording of American amateur station signals in Scotland was accomplished in spite of the wetness of the country, and in addition called attention to the large number of C. W. stations heard, as compared to the number of spark stations, and expressed the hope that all amateurs would use C. W. in the future and so avoid disturbance of other radio communication, which has in the past been attributed to the broad waves in amateur "stone crusher" operation.

On the afternoon of Thursday, March 9, the Roof Garden and Butterfly Room were crowded to capacity by the unprecedented, but not wholly unexpected crowds which had attended the affair from the beginning, among the crowd being a large number of correspondents, representing newspapers located all over the world. During each evening, in fact, the crowds had

become so great as to fill the Roof Garden to capacity and it was necessary to close the doors on hundreds who were attempting to get in. The Committee did this regretfully, as it was realized that many enthusiasts had probably traveled long distances to attend the exhibition, but the action was absolutely necessary as a matter of convenience and safety to the crowds already in the building, who wouldn't or couldn't get their fill of the exhibited wonders and take heed of the EXIT signs.

The preliminaries of the open-to-all code speed contest were held during the evening of the 9th, and when ten men qualified at 40 words per minute, with perfect copy, it was evident that the final on the following night was to be a real battle between the code speed experts of the eastern part of the country.

During the afternoon of the 10th, E. D. Glavin and P. F. Godley again entertained the crowd with demonstrations of their equipment and in the evening the finals of the Code Speed Contest were run. Radio Inspector E. A. Beane was judge of the contest. A vacuum tube, oscillating at audio frequency was used, instead of a buzzer and the transmission was done by means of a motor-driven Wheatstone transmitter. The tape was punched on the spot, the operator of the machine being in full view of the contestants. Straight copy from a newspaper was used. There were first, second and third prizes; the first being a silver cup, the second a gold watch fob and the third a silver fob.

Excitement ran high and it is even understood but not verified that several friendly arguments took place over the merits of the respective contestants.

The contest was very skillfully handled by Mr. Beane and resulted as follows:

First prize: José M. Seron, Radio Corporation of America, speed for two minutes, 49½ words per minute, with three errors.

Second prize: B. G. Seutter, New York Times (Last year's winner with 48.6 words per minute). Speed 49½ words per minute, four errors.

Third prize: George C. Otten, Radio Corporation of America. Speed 49½ words per minute, five errors.

The accomplishment of Mr. Seron breaks all known records for code speed reception, and 49½ words per minute, perfect copy, is therefore, the new world's record for all future aspirants to the honor to shoot at. The accomplishment of Mr. Seron is really a remarkable one, in view of the fact that he came to New York from Chili less than one year ago knowing very little of the English language!

On Saturday, the 11th, the last day

of the show, the crowd awaiting entrance had become so great at 12 o'clock that it was decided to open the show an hour ahead of time to relieve congestion in the lobby and halls of the hotel.

The Code Speed Contest for Women was held at 3 p. m., with Radio Inspector E. A. Beane acting as judge. There were ten entrants. A silver cup, suitably engraved, was awarded the winner for copying the greatest number of words per minute, with the least number of errors, hand copy. The contest was won by Miss Ruby Yelland of the Hudson street, New York, office of the Radio Corporation of America. Speed 30½ words per minute, perfect copy. Miss Marion C. Chicken, a student of the Radio Institute of America, was second with 30½ words. The judges reported, however, that Miss Chicken made four scratches in her copy. Miss Marianne C. Brown was third, with 30½ words, nine errors.

The jamming contest followed. This contest was open only to bona-fide amateurs not employed in the operating department of any radio, telegraph or cable company. It was not open to anyone who had entered the Code Speed Contest of the night before.

Signals were transmitted the same as in the Code Speed Contest and while there was no direct interference with the matter being transmitted, other signals from buzzers of different pitch were transmitted on the circuit, to simulate conditions in congested radio territory. The entrant turning in the most complete copy at the end of the contest was declared the winner. The prize was a silver cup, suitably engraved.

It was anticipated that some active amateur of the Second District would win the contest, for anyone who can successfully work night after night through the jamming in the Second District needn't worry over an ordinary jamming contest. Thomas A. Jobs, of Summit, N. J., a well-known amateur, call letters 2AAF, turned in the most complete copy and won the contest.

The convention and exhibition came to an end at midnight on Saturday at the close of the second annual dinner, the detailed story of which appears on another page.

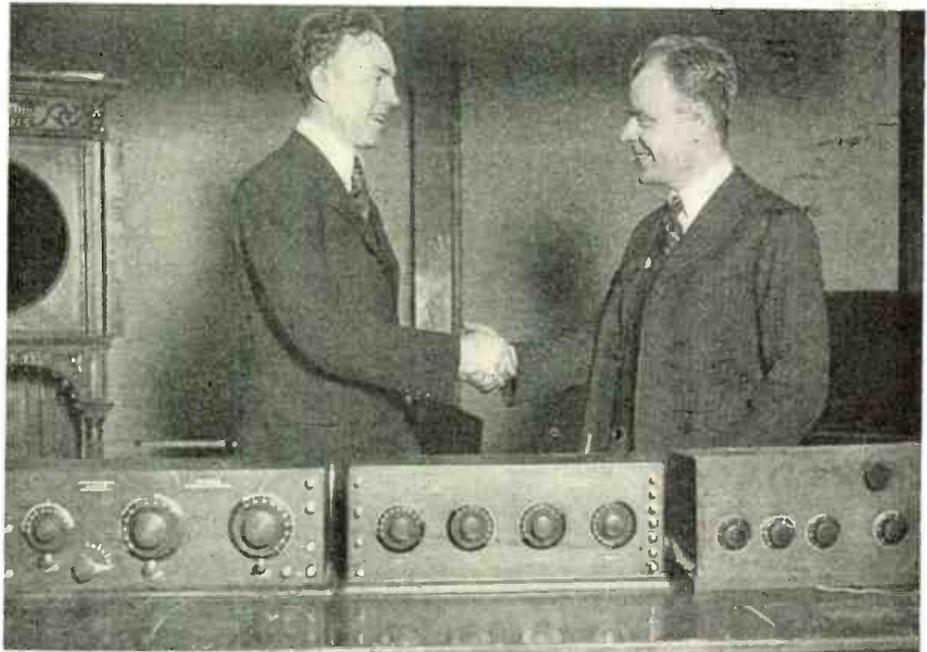
The outstanding feature of this year's affair, was the unusual crowd and the fact that a large part of it knew nothing about radio, but had been attracted, evidently by the great amount of space devoted to radio by the daily papers, and had come as a result, to find out what it was all about. Some of them found out, but many of them didn't, for the simple reason that visitors outnumbered exhibitors by about 100 to 1 at every ses-



The Convention Committee of the Executive Radio Council which made the affair a record-breaking success. In the front row, seated, are: F. L. MacLaughlin, W. J. Howell, C. E. Huffman, R. H. McMann, J. O. Smith, chairman; A. F. Clough, R. Hertzberg and C. E. Trube. In the rear row, standing are: W. A. Remy, B. B. Jackson, J. J. Kulik, F. B. Ostman, E. A. Kilroy, J. B. Ferguson, Leroy Watkins and Matthias Thury



Bronze tablet presented to Paul F. Godley by the Executive Radio Council



Paul F. Godley of Ardrossan fame and Jack Binns of S. S. Republic fame met for the first time at the show



Typical view of the crowd, a condition that prevailed during the entire week. Every walk and condition of life was represented and they came from all parts of the United States and Canada

sion of the exhibiton. Under the circumstances it was impossible to answer the questions on the tongues of thousands of visitors, and the result would have been the same had there been unlimited space available.

A comparison of attendance figures of this and last year's affair is an indication of the great growth of interest

Hill City Radio Club, Summit, N. J.
The Radio Club, Irvington, N. J.
Radio Club of Long Island, Long Island City, N. Y.
North Jersey Radio Association, Newark, N. J.
Radio Traffic Association, Brooklyn, N. Y.
Ridgewood Radio Club, Ridgewood, N. J.

Chicago Radio Laboratory
Diamond State Fibre Company
Electro Manufacturing Company
Experimenter Publishing Company
Formica Insulation Company
General Apparatus Company
Hudson Radio Club
International Radio Exchange
Jewett Manufacturing Corporation
Lexington Radio & Electric Corporation
Loyd Wireless Telephone Corporation
Novo Manufacturing Company
Westinghouse Union Battery Company



A new version of "His Master's Voice." The bushy appearance of the tail is due to the continual wagging of it by his Dogship while the picture was being made indicating that the music coming from the horn was pleasing

in radio. The detailed figures are as follows:

	This year	Last year
First Day	3,033	916
Second Day	8,661	1,015
Third Day	7,701	1,520
Fourth Day	7,364	1,714
Fifth Day	7,042	
	<hr/> 33,801	<hr/> 5,165

The Executive Radio Council, Second District, was formed for the purpose of mutual benefit and general improvement in amateur operating conditions. During its existence the Council has accomplished a great deal, has assisted a great many amateurs in the way of a "big brother," and has always promoted the advancement of the science of amateur radio communication whenever possible. The Clubs which compose the Council are the leading ones of the Second Radio Inspection District, which includes Southern New York, Long Island, Staten Island and Northern New Jersey. It is composed of two delegates from each of the following clubs:

Radio Club of America, New York City.
Armour Villa Radio Club, Bronxville, N. Y.
Bloomfield Radio Club, Bloomfield, N. J.
Radio Club of the Bronx, Bronx, New York City.
Radio Association of Greater New York, New York City.

Rutherford Radio Club, Rutherford, N. J.
Stuyvesant Radio Club, Bronx, New York City.
Taio Club, New York City.
Westfield Radio Association, Westfield, N. J.
Y. M. C. A. Radio Club, New York City.
Yonkers Radio Club, Yonkers, N. Y.
White Plains High School Radio Club, White Plains, N. Y.
Hackensack Radio Club, Hackensack, N. J.
Nutley Radio Club, Nutley, N. J.
Radio Club of Hudson County, Hoboken, N. J.
Nassau Radio League, Freeport, L. I., N. Y.
Passaic High School Radio, Passaic, N. J.
Hudson Radio Club, New York City.
Chelsea Radio Association, New York City.

The officers of the Council are: J. O. Smith, Chairman; R. H. McMann, Vice-Chairman; M. Blum, Recording Secretary; C. E. Trube, Treasurer; C. B. Hobson, Corresponding Secretary; C. J. Goette, Traffic Supervisor.

The following is a list of the exhibitors at this, the second annual convention and exhibition:

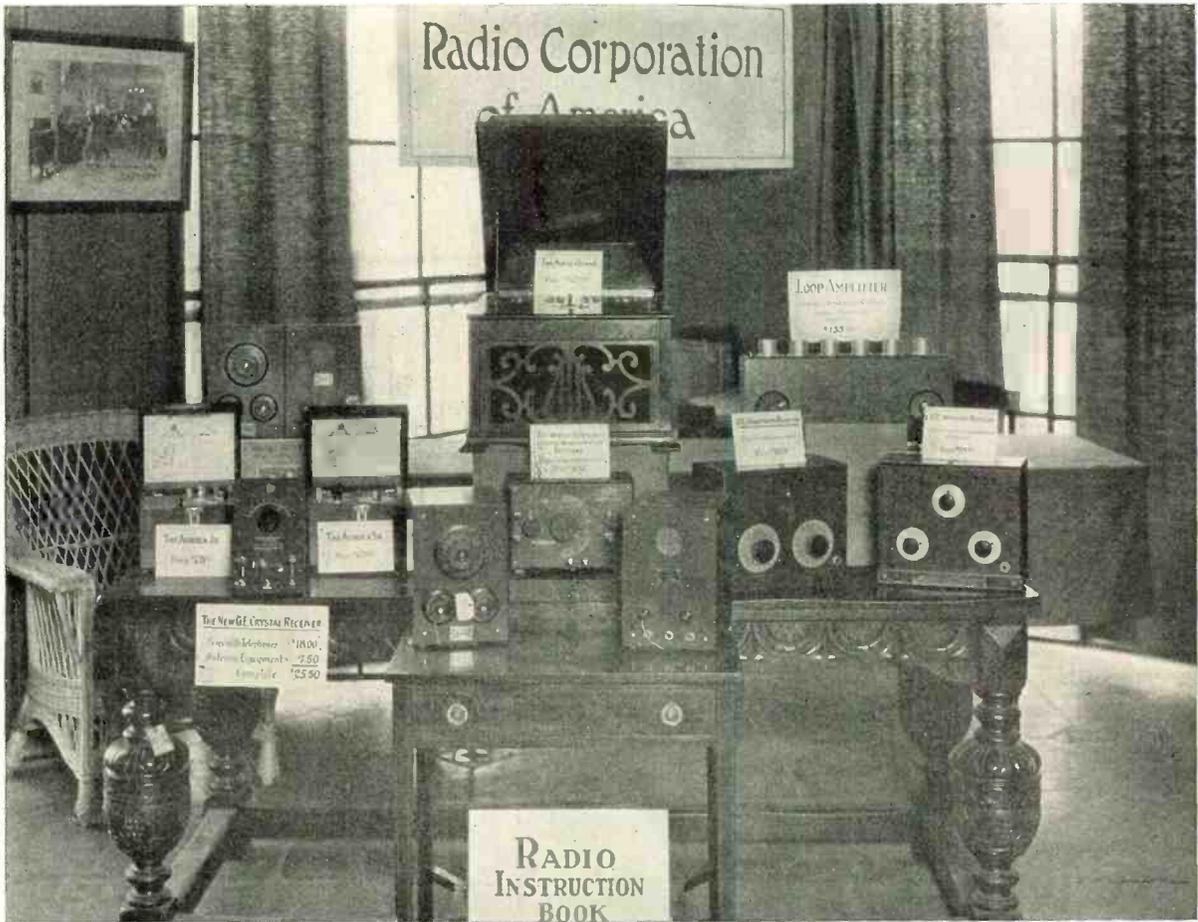
BUTTERFLY ROOM

American Eveready Works
F. Andrea & Company
L. S. Brach Manufacturing Company
Connecticut Telephone & Electric Company

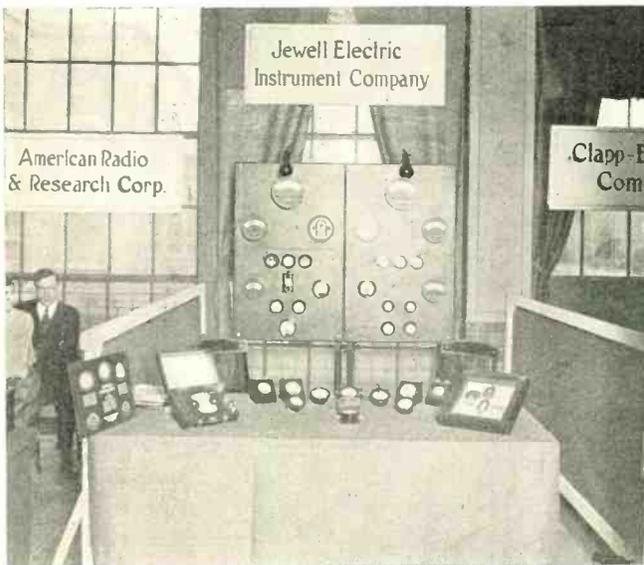
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Acme Apparatus Company
Adams-Morgan Company
American Electro-Technical Appliance Company
American Radio Relay League
American Radio & Research Corporation
Clapp-Eastham Company
Continental Radio & Electric Corporation
R. U. Clark, 3rd
Copper Clad Steel Company
DeForest Radio Telephone & Telegraph Company
Dreyfuss Sales Corporation
P. M. Dreyfuss Co., Inc.
George Fredericks
Freed-Eisemann Radio Corporation
Federal Telephone & Telegraph Company
The Globe
General Radio Company
A. H. Grebe & Company
Jewell Electrical Instrument Company
Keystone Wire Company
The Evening Mail
Manhattan Electrical Supply Company
Marko Storage Battery Company
The Modulator
William J. Murdock Company
Mills Radio & Electric Company
Pacent Electric Company, Inc.
Prest-O-Lite
Radio Audion Company
Radio Club of America
Radio Corporation of America
Radio Distributing Company
Radio Service & Manufacturing Company
Radio Topics
H. B. Shontz & Company, Inc.
Ship Owners Radio Service, Inc.
Shotton Radio & Manufacturing Company
C. D. Tuska Company
Wireless Press
Weston Electrical Instrument Company
Willard Storage Battery Company
East Side Y. M. C. A.
United States Army Signal Corps
United States Department of Commerce, Radio Service.

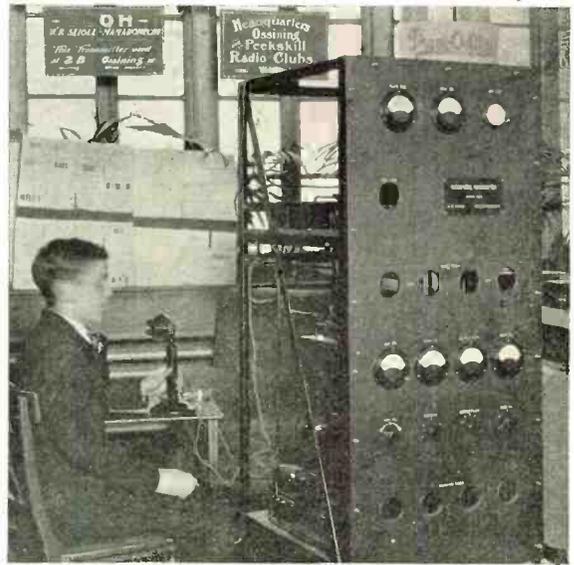
The Committee in charge of this year's affair was as follows: J. O. Smith, Chairman; R. H. McMann, Vice-Chairman; A. F. Clough, John DiBlasi, F. B. Ostman, Leroy Watkins, E. A. Kilroy, W. J. Howell, R. Hertzberg, J. B. Ferguson, C. E. Trube, C. B. Hobson, B. B. Jackson, F. L. MacLaughlin, Matthias Thury, J. J. Kulik, M. Blum, C. E. Huffman.



The exhibit of the Radio Corporation of America was filled to the limit at every session. The new outfits for the reception of broadcasting, including the Aeriola Grand, the Aeriola Senior, the new General Electric receiving units were subjects of great interest to the visitors



The Jewell Electrical Instrument Company exhibited an extensive line of AC and DC meters, for every conceivable purpose and the exhibit was a Mecca for the operators, or intending operators, of C. W. transmitting sets



The exhibit of the Ossining and Peekskill Radio Clubs, which contained a panel radiophone set belonging to W. R. Seigle, 2BQH, was an excellent indication of the skill of the amateurs in assembling sets of this type. The set was in operation during the entire week



The Second Annual Dinner was extremely novel in many respects and broke all precedents for attendance. It was the scene of wild enthusiasm on the part of the diners. Practically everybody in the country engaged or interested in radio was there, and for the first time many artists who had sung to thousands of listeners via the radiophone were present and entertained a gathering of radio enthusiasts in person. Speakers table, left to right: John V. L. Hogan, Consulting Engineer, Westinghouse Electric and Manufacturing Company; Dr. Alfred N. Goldsmith, Secretary Institute of Radio Engineers, Research Engineer, Radio Corporation of America; Major Roy H. Coles, U.S.A., Chief Signal Officer, Second Corps Area; Paul F. Godley, Radio Engineer, of Adrossan fame; Chairman J. O. Smith; Henry L. Bogardus, Assistant Radio Inspector, Second District; Lieut.-Commander D. C. Patterson, U. S. N., District Communication Superintendent; J. Andrew White, Editor, The Wireless Age; K. B. Warner, Editor, Q.S.T.; F. H. Schnell, Traffic Mgr., A.R.R.L.

The Banquet

ONE thousand and twenty-five persons crowded into the large ballroom of the Pennsylvania Hotel to attend the banquet which wound up the week's activities. The diners were in Saturday night festive mood and typically a radio gathering in spirit. Dot and dash messages and greetings were whistled and buzzed from table to table during the serving of the course dinner, including code applause for the entertainers who appeared in person to duplicate some of the features which had been broadcasted from WJZ and WDY. Among the prominent entertainers who sang familiar songs were Virginia Burt, the Stuart Sisters, Albert Wiederhold, Jack Sheehan, Louis James, Nat Saunders, Dave Wohlman, Raymond M. Shottler and Louis Breau. A novelty was also introduced in a dance — announced to be impossible for radio broadcasting — executed by Maxie and George, the sensational colored dancers who were then playing at the Winter Garden and the Club Maurice. Then everybody sang old-time favorite songs under the leadership of Nat Saunders, well-known composer, and responded with zestful "hello's!" as the music swung over to the first radio song, "Kiss Me by Wireless." For an hour or more, the thousand diners had a gloriously informal good time, but finally subsided into attentiveness as the scheduled after dinner speeches began.

The introductory remarks were made by J. O. Smith, presiding, as "Well, fellows, once more, we put it over!" he announced, adding that in view of the unprecedented crowds, it was unfortunate that the Pennsylvania Hotel was built of steel and stone, and not of rubber. The new situation in radio, he explained, was due to the great development of radio broadcasting "bringing with it multitudes of new converts to the Order of Boiled Hams. And to all of you who have become converts to the cause of radio broadcasting," he added, "we older Hams extend you a welcome, and we wish you the great joy that only faithful pursuit of this greatest of all hobbies, pastimes, educational pursuits (or whatever you choose to call it) can give you."

Mr. Smith noted that radio at present is in a state of evolution, observing: "What its future will be no man can say. It is practically certain, however, that there will always be a place in radio for the amateur and for amateur operation; and

when the emergency comes, no matter what that emergency may be, the amateur will be found ready and eager to do his bit as he always has in the past.

"The pages of history are filled with the deeds of radio amateurs which cannot be ignored or overlooked. From the ranks of amateurs must come the men of the future to carry on the science of radio to its greatest usefulness."

The individual members of the Committee of the Executive Radio Council were then introduced as the men who made this year's affair the greatest success in the history of amateur radio.

The diners were next called upon to disclose themselves by geographical designation, representatives arising from all districts except the sixth and seventh. Even Canada responded in the person of a single representative.

Mr. Smith then introduced the first speaker, John V. L. Hogan, Consulting Engineer of the Westinghouse Electric and Manufacturing Company, who selected as a topic the apparent difference of opinion which seemed to be growing up between amateurs generally and the manufacturing companies. "It appeared to me," said Mr. Hogan, "that within the last six months things had been getting worse and worse. I have heard three distinct criticisms from amateurs directed toward the manufacturing companies. The first one was, that the manufacturing companies don't want any amateur extension; that the amateurs interfere with broadcasting, and that they don't want to have any more amateur transmitters around the country. The second criticism was, that amateur transmitters must not be used for broadcasting. Manufacturing companies, according to this criticism, were behind the recent regulation of the Department of Commerce, which restricted broadcasting on two hundred meter wavelength. The third criticism was, that the manufacturing companies were attempting to restrict the sale of apparatus; that that was why you could not buy apparatus."

Mr. Hogan said he didn't like the sound of any one of these three criticisms, so he put the three questions to an executive of the Westinghouse Company, asking: "Does the Westinghouse Company oppose the extension of amateur activities?"

The answer was: "No. We hope that the new regulations which will grow out of the Washington Con-

ference will give the amateur, instead of the single wavelength of 200 meters, which he now has, a band of at least 100 meters for his purposes. The only thing we think the amateur should do is to stay within his band, as the other stations will be required to stay within their own wavelength bands."

On the criticism — that manufacturing companies were behind the ruling that no amateur station should be used for broadcasting, the answer was: "No, we did not attempt that; as we understand it, the regulation was carried forward at the request of amateurs who were endeavoring to do long distance work on the wavelengths available to them, and who were interfered with in that work by broadcasting on the amateur wavelengths. When the additional wavelengths are opened up to amateur communication, there is no reason why amateur broadcasting ought not only to be permitted, but encouraged."

On the third point, Mr. Hogan's inquiry was: "Are you restricting the sale of apparatus? Are you attempting to keep the stuff off the market, or are you doing all you can to make it ready?" He was told, he said, that everything possible was being done. "The demand for apparatus has grown so much faster than the possibilities of manufacture that all companies building radio stuff have, as you know, been up against it to get it out," he observed. "Now, they are spending large amounts of money in tooling up for the manufacture of materials in larger and larger quantities, and I have been able to find nothing which would indicate any desire to restrict the sale of the best material available to amateurs and to everyone else."

When the applause had subsided, the Chairman introduced Lieutenant-Commander D. C. Patterson, District Communication Superintendent, Navy Department, who outlined the extent of the Navy's radio communication system and the Department's attitude toward the amateur.

"Before this recent conference in Washington was called," he said, "the Director asked for my views and recommendations. I was very pleased to be able to tell him that we suffered absolutely no interference from any amateurs of this district, nor from the commercial radio telephone broadcasting!

"I told him that your increased importance and activities of ama-

teurs deserved special recognition in increased privileges and in increased wavelengths. I am glad to see that the Conference is granting those privileges and those extra wavelengths."

In closing, Commander Patterson called attention to the fact that our country while on the very threshold of world naval supremacy has foregone that naval supremacy in order to maintain the moral leadership of the world. "The actual disarmament was not the important thing," he stated. "It was the spirit back of this disarmament; but no one can promise you that war is over and you cannot be assured of that until there has been a spiritual rebirth throughout the world. Now, until that time comes, fellow radio men, I want to tell you that the Navy in another national emergency will need the amateur as it did before. I ask you not to let the fascination of radio telephone broadcasting and listening to music interfere with the vastly more, to us at least, business of code work. Keep at it!

"Let's all keep together and be ready if we should ever be called upon again."

At the conclusion of this speech the chairman called the attention of the diners to the high honor of having with them Major General George O. Squier, Chief Signal Officer of the United States Army, who was seated at one of the tables, in the midst of the amateurs. The diners applauded vigorously as General Squier arose and bowed.

Mr. Smith then found another celebrity, seated at a rear table, whom he introduced as "a man who has been in radio so long that when he started, there wasn't any amateur radio. Consequently, he has always been a commercial man — David Sarnoff, General Manager of the Radio Corporation of America."

Mr. Sarnoff made a brief complimentary address to the amateur fraternity, stating that to his mind there are a great many radio men of qualification and ability in the amateur world who might very properly be characterized as professional radio men, adding that in view of the accomplishments of these, he, as a professional man might say, "Pray make me an amateur." This observation brought forth laughter and applause.

"As General Manager of the Radio Corporation of America," said Mr. Sarnoff, "I can tell you officially that the policy of the Radio Corporation is to encourage in every possible way the activities of the amateur or experimenter or worker in the radio field, no matter what department he may be interested in.

"We believe there is enough op-

portunity in radio for everyone who is interested to have a chance to work, whether that be in the line of scientific experimentation, or whether that be in the field of merchandising — there is plenty for all of us. Radio to my mind is the biggest thing that has happened in the world in the last century, and any of you who are questioning your opportunities to be allowed by these large organizations to go forward with any program that has as its basis service and responsibility, can relieve your minds of such questions. You will have every opportunity that a responsible person deserves to do your part, whatever it may be in the radio world!"

Major Roy H. Coles was the next speaker, as representative of the many activities of the Signal Corps where they join the activities of amateur radio.

He stated that the adequacy and efficiency of communication systems are of the utmost importance to the Signal Corps, so that branch of the Service is sparing no efforts which resources and authority allow to keep in the forefront of the wonderful advance in radio.

"As to the supply of radio equipment and the development of new apparatus and its perfection, we feel that we can take care of the situation quite efficiently with a continuation of the hearty co-operation and assistance which has always been tendered us by the great commercial concerns of America," he explained, "but the personnel problem is one which we are not quite so well satisfied with. Equipment and apparatus can be supplied, but personnel is something that requires thought and spirit, and while we were with you from beginning to end in the pleasure and profit you amateurs derived from this great art, we ask you not to forget that in time of emergency, or war (which, please God, may never come!), that unless we put the communication business across, it is, good-night!

"So that all we ask you is to keep us in mind, co-operate with us, think of our troubles; we are trying to keep the old machine going, so that it will be ready if we ever do need it. We can't do it without the help of you amateurs.

"On our part, we are for you and with you. If there is anything that the Army has or that the Signal Corps has that you need and we can give you access to, we are not only willing to do it, but glad to do it."

The winners and successful contenders for the championship code speed contest, the contest for women only, and the jamming contest, were then introduced. Prominent amateurs of the Second District were

next called upon, each one rising in response to his call letters.

Henry L. Bogardus, of the office of the Chief Radio Inspector of the Second District, was then introduced as the next speaker. He said: "The average amateur looks upon the radio inspector as a fearsome individual who goes around with a pocket decremeter, and with one ear open for tales of wrongdoers. I wish to refute this theory. A large percentage of the radio inspectors and almost all of them, in fact, either are or were at one time amateurs themselves.

"I suppose that many of you are eagerly waiting news in detail of the conference in Washington. As some of you probably have noted, provision is made for amateur wavelengths of from 150 to 275 meters instead of setting the limit at 200 meters as at present required.

"This will provide a band of amateur wavelengths on which some very good results may be obtained. It must be borne in mind, however, that this band of wavelengths is not yet legally assigned and until such time as the necessary legislation is passed to amend the present law, the present 200-meter limit remains in force."

The address of Dr. Alfred N. Goldsmith, followed; he said in part:

"I had hoped very ardently that certain of my fellow-members of the Radio Telephone Commission, which recently met in Washington, would be present this evening to say to you in well-chosen and correct terms something about the work that was done down there.

"The interesting and, to me, most significant feature of the entire meeting was the absolute unanimity on one proposition. There may have been disagreements or careful thought and consideration required for the placing of the many complicated services which modern radio demands, but when it came to the status of the amateur, there was no dispute, there was no question!

"I may say that the amateur therefore took up less of the time of the Commission than anybody else," he continued, "simply because the amateur had laid down a well-considered and perfectly reasonable program which would give him an opportunity to expand his activities along legitimate lines which would relieve the present congestion on amateur wavelengths and which would give him wider opportunity to study the field of radio, to establish long distance records, to broadcast and to do all those other interesting things which are so dear to the hearts of amateurs.

"Accordingly he received the wave-



The exhibit of the Continental Radio and Electric Corporation contained the only known samples not in captivity of certain types of equipment. According to John Grinan the visitors at the exhibit totalled 41,144 which, however, is slightly at variance with the total attendance figures of the show



The Radio City, of the DeForest Radio Telephone and Telegraph Company, was a most unusual and attractive exhibit, and was packed full of interested radioires during the whole run of the show



The many models of receiving equipment manufactured by the American Radio and Research Corporation, attracted a great deal of interest. Two or three units of Amrad equipment were in operation during the week

length grant (or will receive under the proposed law) of from 150 to 275 meters; but this is not to be chaos, it is not to be used indiscriminately by any amateur at will on any wavelength within that zone. There is to be, as I understand it, order within that zone in that the shorter wavelengths in general will be recommended for use for the beginners and for the spark stations, and as the wavelengths increase, the interrupted continuous wave, the radio telephone, and finally that aristocrat of the ether, the pure continuous wave, will come into its own—at the top, naturally. So that each type of traffic of the amateur will flow smoothly in its allotted band with a minimum of interference and a maximum of pleasure to the amateur."

Dr. Goldsmith thought a most delightful vista unfolds itself before all. "I believe that radio records will be hung up during the next few years of a type previously unimagined," he predicted.

"Radio is the most romantic and remarkable of all methods of communication. It falls into two main divisions, apparently: the two-way communication, or ordinary communication; and broadcasting. Two-way communication, of course, is to be used above all in radio where no other means exist. It is obvious that but few ships will trail a cable after them to land and but few aircrafts will be anchored by a wire to the ground, and therefore these mobile services are exclusively radio, and must remain so. Impossible natural barriers are bridged with ease by the flying wave, and here again we have an unusually favorable condition for the use of radio.

"Broadcast communication which is now engaging so large a portion of our attention is the second great use of radio. Wire communication goes from point to point but radio covers an area. It spreads in all directions. Under its blanket all who wish to hear can hear, and this is one of the particularly useful applications of radio communication. We can do anything with broadcast nowadays!

"I see another aspect, though, of radio," Dr. Goldsmith continued, "of much more important and serious national aspect than even listening to messages and sending them. I mean the cultivation of an analytical turn of mind. When we take the life of the average man we see that he comes but rarely up to the present in the contact with scientific exactitudes, with things that compel logical thought and delicate manipulation.

"Now, for the first time, science comes into the household not only

as a means of amusement and communication and entertainment, but as an incentive for training the skilled hand and for developing the analytical turn of mind. A great nation such as ours, spread over so vast a territory, finds difficulty in holding together the millions spread over the stretches from the Atlantic to the Pacific, from the Gulf to the Great Lakes. Radio is the means whereby this great nation can be integrated and moulded into one coherent whole with everybody in touch with the rest. The analytic, scientific habit of thought is to analyze, to think, to examine, and radio is one of the best means of mental training that I know. So I believe in this country by bringing direct analysis into the home it will tend to make us more of a nation of thinkers and of accurate skilled manipulators and still further improve the industrial supremacy of the United States!"

The chairman then called upon members present from each amateur club affiliated with the Executive Radio Council to make themselves known, and the delegations in turn arose, to receive the applause of all the diners. F. H. Schnell, Traffic Manager, American Radio Relay League, was then called upon. He outlined the progress of radio in the year past, observing, "The amateur radio game has moved along so fast that if you drop behind for a week or ten days, it takes you two months to catch up. I have often wondered how many of you listen to the radio concerts every night or help one of the radio listeners who is interested in listening to the concerts. I have had some peculiar experiences with those people. They listen in of a night. They get a little scratchy noise and they want to know what it is. Someone comes along and says, 'Oh, that is the amateur dot and dash.' They want a law passed to stop the amateur from transmitting. Pretty soon they hear a little more scratchy noise — they are going to hear a lot more of it this summer — and they want a law passed to stop static! When they do that, let's all get behind and push."

Speaking of the trans-Atlantic test, Mr. Schnell said that the main issue in the whole thing was: "We fell down the first time in February because we did not allot the transmitters sufficient time during the test to give a man a chance to tune his receiving set. So we decided to give the transmitters a little more time and run the test over a longer period, ten days." Reports were then read by Mr. Schnell of the results of the Governors'-President's relay of 48 States. Forty messages were delivered into Washington. Typical radio-

grams from various Governors were read to illustrate the character of the communications.

The chairman next introduced the featured guest of the evening, "Paul F. Godley, who went across the ocean to a strange land, set up a receiving station on a barren, storm-swept field in Scotland and was successful in recording the signals of a large number of American amateur stations, some of them approximately 3,500 miles away across land and ocean."

He gave a graphic word-picture of the ordeal of the last few nights of that test, and introduced the successful American representative of the amateurs by saying:

"They say a prophet is without honor in his own country, but Paul Godley is not without honor in the Second District."

Mr. Godley said: "To those of you who are really dyed-in-the-wool amateurs, the carrying through of a test such as this was, is easily understood. I am not the only amateur who has gone through oftentimes seemingly foolish hardships in order to pursue a hobby to its lair.

"I am particularly glad of the opportunity which presents itself this evening to thank all of those amateurs who participated in the tests on this side for their very thorough co-operation," he added. "I put myself in your position over there, and the one thing I feared was that after about the second day a great many of you would say, 'Oh, well, what is the use? He didn't report any signals the first two days, and he isn't going to hear any.' But you didn't do that, to my great delight. You kept right at it.

"Notwithstanding that the first night only one signal was heard, you all came back just as strong the following night, and as a result of that co-operation, we got the great number of signals."

Mr. Godley expressed the belief that the greatest feature of the tests, or the most significant thing in connection with them, and as a result of them, is this: Since the tests were pulled off, the French apparently have gotten the craze; they have licensed amateurs to transmit using 100 watts. The Dutch are also going in for it. The British are strong after it, and the London Daily Mail has assured British amateurs that they will support them in their efforts to put over the desired legislation. Even the Mexicans have gone into it. It won't be long before all of the South American republics and all of the European nations will be letting their small boys play with radio," he thought, adding: "When that time comes, and this international amateur communication becomes an old story, the

next thing we will do is try the interplanetary stuff."

Chairman Smith then announced that the Executive Radio Council of the Second District had prepared in permanent form due recognition of the accomplishment of Paul F. Godley in the form of a bronze tablet, which was then formally presented. An illustration of the tablet appears with this article. The amateurs who did the transmitting were next called upon to make their presence known. Eight of the stations' owners responded.

The next speaker was J. Andrew White, editor of THE WIRELESS AGE, who remarked: "As I stood watching Paragon Paul with his bronze obituary in his hand, standing in the spotlight and responding with sad words, I thought, 'Well, it's all over now.' And as we look back at this convention week, we are, most of us, glad it is all over. For last year we had some predictions and some dreams, and they have all come true—so what is the use of predicting for the next year?"

Mr. White spoke of the night before Paul Godley sailed, when a very small dinner was given at which Mr. Maxim was the host. "The question came up in my mind then, of what he was to do, and it seemed to me then that the most significant thing (it has not been brought out here tonight) was that if he did receive these signals across the Atlantic on low-power and short wavelengths, we were coming pretty close to perfection in reception. And when we hear of 20 watts being received across the Atlantic, there has been some progress in reception!

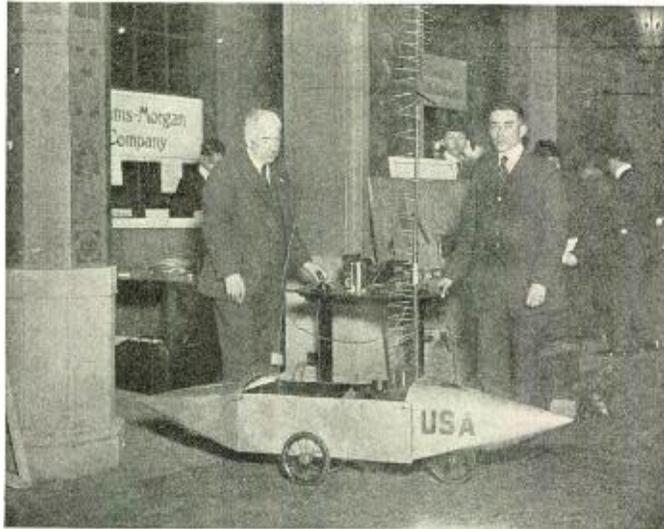
"This perfection in reception means lessening of transmitting power," Mr. White observed. "And it means also the coming to simplicity. Now, with the development of broadcasting and simplicity of receivers, there is no telling where radio will go. No matter where it is going now, there is no forecasting where it will stop. Probably when we come to this dinner again next year we will have a lot of new ideas, a lot of new conceptions, and we will be in a worse position than we are now, wondering what it is all about."

Looking upon broadcasting as radio's most fascinating field, from his personal viewpoint, Mr. White said: "I want to pay my tribute now to the amateurs for what they have done in broadcasting. Back when we asked them — on a few weeks' notice — if they would undertake the reception of the Dempsey-Carpentier fight, nobody knew whether the radio description would be received or not. We just expected it would. Yet the amateurs turned out without any warning, without any

preparation, and they did a wonderful job — that description of the fight was heard by 300,000 people, and nobody appreciates more than I do how much the amateur contributed to that. He contributed everything to it! But for the amateur the fight's radio audience would not have been of large proportions—it would have been heard only by a few people idling at home, or a few operators at sea. The amateur took his courage in hand, and with his usual thoroughness, put in his receiver and a loud-speaker and let the public hear it. That was a very big

men who have not seen each other for years, one of them way up in Canada, and he just felt as if the other was in the room. That is the important thing about radio. It somehow projects personality.

"As we have gone through this week with thousands and thousands of persons attending this show — they didn't see anything but the backs of the persons who were trying to look at the exhibits, and yet many more thousands were still trying to get in — we have been wondering whether this is a craze, or whether it is something permanent



E. F. Glavin and his wirelessly controlled car was the life of the party. Two or three demonstrations were given every afternoon and evening, in which Mr. Glavin clearly demonstrated the practicability and ease of controlling vehicles by radio

job. It was a job that has a great deal to do with broadcasting as it stands today. With the amateur backing us up as he did, it was proven that the public would like broadcasting."

To illustrate the grip radio has on the public imagination, Mr. White told about a conversation held with one of the fight listeners, who said: "When you talked about that airplane hovering around, I could hear the whir of the propeller," to which the comment was added: "That is the sort of thing that broadcasting does. A radio receiver is not a phonograph. It is a very human thing — super-human, when listeners can hear something that is not there!"

Another illustration was given in the experience of one man in Canada listening to his brother sing in New Jersey, through arrangements made by a Canadian amateur as a complete surprise to the hearer. "I think that is a very wonderful thing," Mr. White commented, "two

and real. I believe I heard the question not less than nine or ten thousand times this week, 'When is this craze going to die out?' Somebody compared it to the bicycle craze. That, to me, is no comparison at all. The bicycle was very popular, but you had to go out and pedal it, and all you got in return was in keeping the weight down and getting a little fresh air. But radio is something that comes into the sanctity of the home. It does not require any physical or particular mental effort and the character of the programs take many different forms. Consider a serious form: One of the latest thoughts, a designation that impressed me very forcibly, was that of a clergyman who said a blessing on a broadcasting station as a messenger of God!

"On the less serious side: I met a man day before yesterday who said he had often listened to the programs. He is a very fine musician and I wanted to have his expert musical opinion. This was the opi-

I got: 'I am glad I have found something where I can attend church services on Sunday and still smoke my cigar.'"

Mr. White stated that radio coming into the home with a varied type of program would have an enormous national influence. With an anecdote he illustrated the discovery that the projection has been found to be the reverse of what was expected; the listeners feel that the people who entertain by radio seem to get into the room. "With the listeners in a receptive attitude, as they are bound to be in carpet slippers and dressing gown, sitting at home, off guard, there is an opportunity to



As the New York Globe artist saw it

put in some very real, some very valuable, things," declared the Editor of THE WIRELESS AGE, adding: "This, too, will always have its element of danger. Programs must be very carefully controlled. In that, again, is something that the amateur can do; where his counsel will be of value. Amateurs are good listeners; they are quick to respond; will co-operate, and are faithful in reporting on anything that they are asked for. And that is one of the things that they can't do too often—take their pen in hand to write and say, what is the matter with the programs; how can they be improved. Among our radio listeners, the nucleus is the amateur — and he will never die — and now with the public rushing in as it has rushed in within the last few months, and will continue to rush, radio is something so very big that it can't be styled a craze. It is up to the amateur now, in these early stages, to steer it so that the best results will be gained."

K. B. Warner, editor of QST, was the last speaker. His subject was the Radio Conference at Washington, about which he observed:

"We are in a ticklish place right now, fellows, and it is not all over

by a jugful, but I think amateur radio can consider that it has received a very splendid recognition in the progress of the Conference up to date. The Radio Conference has gone on record as favoring that the wavelength band from 150 to 275 be allocated to amateur purposes, and all of the amateur testimony at the hearings was by way of a request that that wavelength band be subdivided among the respective amateur services according to the classes of transmitters. So that we have every hope that when the Secretary of Commerce is given additional authority to administer amateur radio as that department so sadly needs



him know that the amateur is something else than a nuisance, that he is a national asset in time of danger, that he is a contributor to the scientific progress of the art. And from your own standpoint have some respect for the rights of the listener, and where the listeners outnumber the amateur transmitter by many times, I think you should feel that the sentiment of the majority should be respected. And another thing that is most important, be very sure that you stay within the law in the operation of your transmitters.

"The Secretary of Commerce in future will probably have power to regulate operating hours and ranges to an extent that he deems best for the general public interest. Be very careful then that we do not make nuisances of ourselves, but show on the other hand, that we are a public asset.

"I feel that I must take this occasion to state that although the American Radio Relay League is primarily an organization of telegraphing amateurs, we feel that there is certainly plenty of field for all classes of amateurs, and we certainly had no part in the present restrictions on amateur broadcasting. Except that we feel that all amateur services should be segregated on separate wavelengths, we have no quarrel at all with amateur broadcasting; nor on the other hand, has it been the intent of the League to subject the radiophone to the relay telegraphy, as we feel that subdivision among those classes of stations should be by order of their interference proclivities, which we think would place them in the order that was universally recommended at the hearings in Washington."

The banquet concluded with an invitation to all present to come forward and meet in person Paul F. Godley. The response was so generous that it was nearly midnight before the informal reception broke up.

Everybody who attended the dinner this year commented on the excellent seating arrangements. The plan had been so well carried out that the 1025 diners had no trouble in easily finding their places at the tables. Credit for these arrangements belongs to John Di Blasi, of Continental. He was assisted by his side partner, Joseph Stantley.

Leroy Watkins of Gloversville, N. Y., the "money" man of the Council, was the busiest man in New York City during the show. Checking up approximately \$2,000 in small change each night is quite a job.

Strays and Sidelights

A REPORTER for one of the New York newspapers was interviewing J. O. Smith and, referring to the great advances radio has made, asked Smith if he would be surprised at some time in the future, to be able to take a small transmitter from his overcoat pocket while walking along the street and call up a friend in some remote part of the city, without the aid of wires. Smith replied that he certainly would.

One New York newspaper, in describing the show, said that the hall was full of "talkies," "singies" and "buzzies," whatever they are. Sounds like a cub reporter in love. But of course it's Spring.

R. H. G. Mathews, the well-known 9ZN of Chicago, arrived early, bringing the charming Mrs. Mathews with him. Mrs. Mathews braved the crowds about the hall for one night and then decided to watch the affair from the side lines for the rest of the time.

From far and near they came, the "far" distinction going to A. R. Oberson of Candiak, Saskatchewan, Canada.

Was there a crowd at the show? Ask Douglas Rigney of the Grebe Company, he knows.

Oh, that Radio Ball! Just as everybody was congratulating everybody else that it was time to go home on Friday night, along came Capt. Robert S. Wood, Radio Editor of the Evening World, with an invitation to everybody to join the merry throng at the Radiophone Ball at Terrace Garden. And so everybody went and a good time was had by all. The affair was remarkable, in the first place, for exceeding expectations in attendance, special stunts and general interest. Dance music from WJZ came out of the loud-speaking equipment in great volume, and the thousand or more dancers enjoyed themselves immensely. Uncle Ed. Glavin and his Wireless Pup waltzed and fox-trotted the gathering with as fine a demonstration as has ever been staged. Uncle Ed's lecture during the demonstration was particularly interesting and enjoyable. E. W. Danals and Boss Lowlass deserve much credit for their expert handling of the loud-speaking equipment.

The corner of the Roof Garden occupied by the exhibit of the Radio Corporation of America, was the scene of great activity during the entire show. Many new devices were exhibited and they attracted crowds of "dyed in the wool" amateurs, as well as those mainly interested in broadcasting. One item which attracted great attention was the Aeriola Grand. All of the apparatus of this outfit, including a loud-

length regulation is entirely controlled by a single knob.

The AA-1400 — the twin brother to AR-1300 — is a unit made up of General Electric accessories, especially designed for use in conjunction with the tuner just described. One outstanding feature in connection with this unit is that one stage of radio-frequency amplification has been provided. The remainder of the circuit comprises a detector and



The Code Speed Contest for Women brought together the best operating talent of the fair sex. A speed of 30½ words per minute, perfect pencil copy, was made by the winner, Miss Ruby Yelland, who is at the corner of the two tables

speaker horn, is contained in a beautifully finished mahogany cabinet, to which it is necessary to connect only a storage battery, antenna and ground wire. A single switch controls battery current for the filaments of the vacuum tubes and the intensity of the signals and their wavelength are controlled by a single variable arm.

The Aeriola Grand is provided with eight vacuum tubes. There is one detector, three stages of audio-frequency amplification and the other four tubes are ballast tubes used to control the filament current in the detector and amplifier tubes.

Among the new models which also received a great deal of attention were the General Electric twins — AR-1300 and AA-1400. The AR-1300 is the new single-circuit receiver developed by the General Electric Company and is fitted with a replaceable inductance for use in connection with various wavelength ranges. Where this set is used as a crystal receiver, it is merely necessary to connect the antenna and ground wires, insert a telephone plug in the jack provided, and adjust the crystal detector found on the face of the front panel. Wave-

one stage of audio-frequency amplification. The vacuum tube sockets have been mounted on individual shock-absorbing bases. Another receiving set made by the General Electric Company is known as the ER-753, and is a complete crystal receiver having a single wavelength control which has been especially designed for use for radio broadcasting reception over comparatively short distances.

A receiving outfit which attracted great interest was the six-tube amplifier built by the Wireless Specialty Apparatus Company and exhibited at the Radio Corporation's booth. This amplifier has been designed for use in connection with loop aerials, although but six vacuum tubes are employed, 5 stages of radio-frequency amplification, a detector, and two stages of audio-frequency amplification are made possible because there is a feed-back arrangement wherein two of the vacuum tubes perform two distinct kinds of duty. This very distinctive amplifier is fitted with but two controls and should be very popular in connection with loop reception from broadcasting stations, for which it was specially designed.

For the first time in the history of radio, a song was specially written for the occasion. Before the week was over every man in the place was singing, humming or whistling "Kiss Me by Wireless." The young ladies seemed less thrilled over the osculation by proxy idea.

On the second day of the show a nearly-solid gold violin was presented to Chairman J. O. Smith by Michel Hoffman, noted Russian violinist, who has played to big houses via WDY. All important parts of the violin were appropriately labelled. The bow was the "tickler," the neck of the violin was the "tuner," and the keys "frequency changers." The violin, about half regulation size, was mounted upright on a porcelain base. It attracted a great deal of attention during the show.

It's a lucky thing Vice-Chairman R. H. McMann is a slender chap. He was the only one of the committee who could work his way through the crowds to attend to the wants of 65 exhibitors.

Late one evening, after John Grinan (pre-war 2PM) had answered 99,999 questions, touchin' on and appertainin' to the subject of radio, somebody came along and asked him how to properly insulate an earth ground. Right there is where John quit and the radio world will probably never know the answer to this important question.

An elaborate crystal receiver, made up in an artistically decorated metal case, was found at the Radio Corporation's booth. This receiver had a wavelength range of 180 to 2650 meters in three steps. These steps were controlled by a three-point rotary switch and variation within the different ranges was effected by a single control knob fitted with a pointer made to move over a calibrated dial engraved on the bakelite panel.

The Aeriola Sr., which was exhibited by the Radio Corporation, is the first receiving outfit to be put on the amateur market wherein a vacuum tube may be used in conjunction with a single dry cell to heat the filament. Advantage is taken of the regenerative circuit and this formerly delicate arrangement has been reduced to a point of simplicity, permitting those entirely unfamiliar with radio, to employ it satisfactorily.



The Lyradion, a combined phonograph and radio receiver, attracted much interest during the show

William H. Edwards, former Collector of Internal Revenue, visited the show and was taken in charge by a group of young enthusiasts, who explained in detail all the wonders of radio-land.

Two groups of enthusiasts, the broadcast receivers and the amateur transmitters, indulged in many discussions during the week, generally resulting in a better understanding by both sides of the problems involved.

On the Sunday following the show five elevator boys of the hotel reported off with lame arms.

The United States Radio Inspectors, headed by E. A. Beane, were kept busy during the entire show examining applicants for amateur licenses.

During the show one of the New York newspapers referred to Paul Godley as "a radio engineer, of Ardrossan, Scotland." Such is fame.

One young woman, who was too pretty to be able to understand, after watching Uncle Ed Glavin control his little car by a wave of his hand, exclaimed, "Oh, isn't he a wonderful hypnotist!"

The speed of 30½ words per minute, pencil copy, made by Miss Yeland in the women's code speed contest, made many of the Boiled Hams wonder.

When Chairman Smith introduced

Jack Binns and Paul Godley to each other there was a round of applause from the nearby spectators. The operator of the Republic and the engineer of Ardrossan represented the ultimate in their respective accomplishments and the crowd evidently wanted them to know that they knew it.

The booth of the American Electro-Technical Appliance Company, where the new Western Electric loud-speaker was demonstrated, was surrounded by crowds 20 deep whenever the outfit was in use. The music of the Radio Corporation-Westinghouse broadcasting station at Newark came out in such volume as to be plainly heard over most of the Roof Garden. This new loud-speaker reproduces music practically without distortion. In addition to the horn itself, the outfit consists of a power amplifier, which employs three Western Electric tubes specially designed for the purpose. This new loud-speaking equipment will be available for the retail trade in about six weeks.

The exhibit of A. H. Grebe & Co. contained two cabinet type receivers which attracted visitors to an extent that kept the booth packed full during the whole show. One of these, the "Radiotone," was an upright type phonograph cabinet, containing the latest type of Grebe receiving equipment and considerable amplification. A still larger Console type cabinet called the "Radionelle," contained both a phonograph and radio receiving equipment, making it possible to use the phonograph sound box and sound magnifying qualities of the outfit for either records or radio reception.

Guy R. Entwistle, of Boston, was on hand again this year during the entire week, reporting everything of interest to the Boston Traveller.

English Radio Exhibition

An exhibition of radio material and equipment was held recently at the Gloucester Baths by the Glevum Radio and Scientific Society, Gloucester, England. The secretary of the society, in his report of the affair, states that "our members had three days' strenuous work, answering questions and obtaining signals for the crowd which besieged the hall." The affair was declared to be a decided success and the enthusiasm of the schoolboys and their intelligent inquiries were declared to promise well for the future development of wireless.

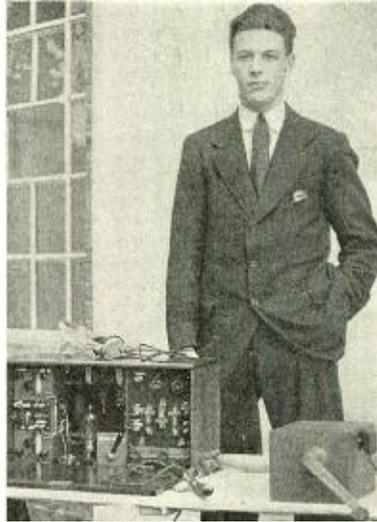
Great Britain's Radio Sky Line

Some of the Startling Things that Have Been Accomplished by the Radio Men in Great Britain

By Paul F. Godley

If you are an American, and also, if you chance to be an engineer, student, experimenter or amateur who has been foully pursued, bitten and infected by the insect Radio you have, whether you know it or not, long since rabidly consecrated yourself to an endless search for relief from an incurable itch. In fact, this hunger for new cure-alls has become a devouring passion well-nigh controlling your whole subconsciousness and you awaken in remote and strange places to catch yourself diligently engaged therein. Without fear of successful contradiction it could even be said that were you to be placed forcefully, or otherwise, on the frozen flats of the barren polar regions your first perceptible performance would consist in giving the polar sky-line the once-over, while your first coherent expression would be one of regret arising out of your failure, prior to embarkation, to interview the available authorities on "Types of Ice House Best Suited for Antenna Support."

Speaking as one who, it may be said, has contracted the infection, I recent-

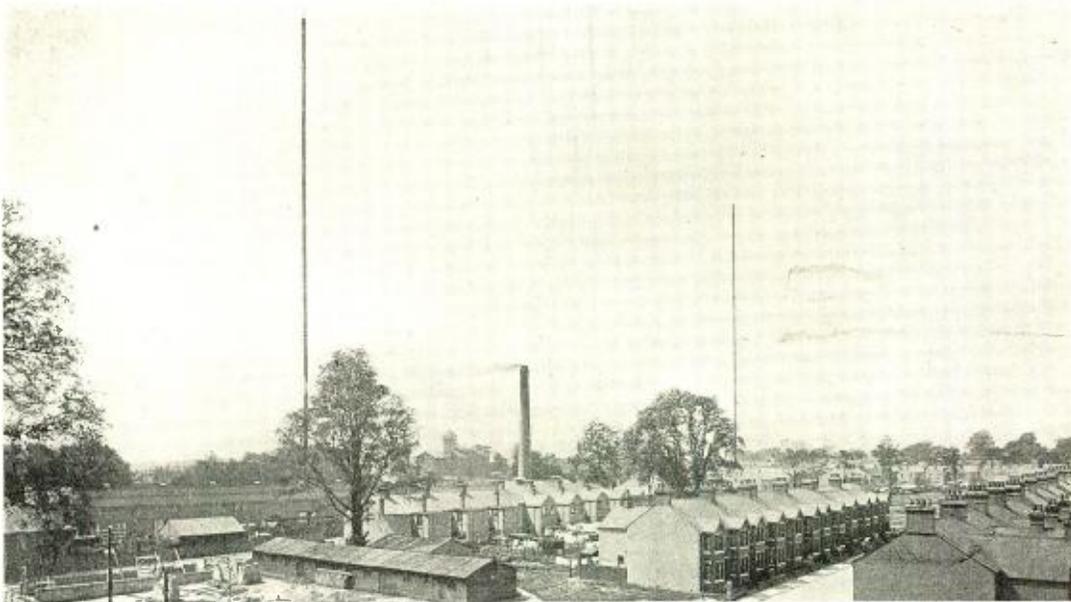


Type YA1 Marconi 20-watt transmitter and receiver. Note the hand-operated generator.

compartment were wonderful to behold. Everywhere thereon were to be

the landscape, the transportation system, and, to a certain extent the language—all were different. My Chinese acquaintance proved quite talkative and had a keen eye for those things which were unusual to an American resident, but I awakened presently to the knowledge that he had quieted and had for some minutes been following my eyes in an effort to see those things which I had been seeing. I had given but scant attention to the quaint old English houses, their winding dirt lanes and carefully tilled fields or to the many new natural beauties on every hand. Realizing, and with no idea of answering the question in the Chinese gentleman's eyes, I reviewed the picture presented for the past hour. It was a wonderful picture—40 miles of sky-line and nothing more; unpunctuated, even, by a single antenna. That antenna is what I had been looking for!

A great deal more of looking had to be done before the first was discovered. Like the first, those which put in their appearance later were much abbrevi-



The English Marconi Works at Chelmsford, Essex

ly found myself ensconced together with a member of the Chinese diplomatic corps in the very comfortable compartment of a first-class railway carriage which was slowly moving from the train sheds in Southampton bound for London. The walls of this

found beautiful pictures of Southern England's enticing sea-side places, hat-racks and luggage carriers and gadgets which I can never name. To both of us England was a strange land. The people, and their methods, the conveniences on the streets, the architecture,

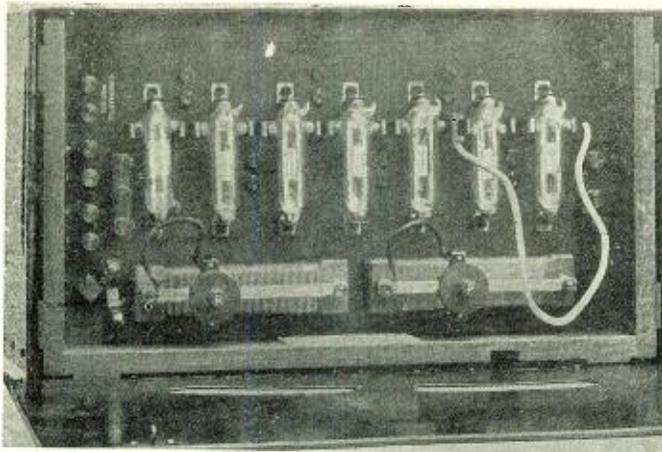
ated in form as compared to their American counterparts. For this there is a reason, and a good one. The British Post Office, which controls all amateur radio in Great Britain, forbids the use of more than about 140 feet of wire total in any antenna unless exception

is granted by very special permission. These antennae usually had about two wires, which means that their total length was approximately 70 feet. What manner of communication, then, did these amateurs maintain? What types of equipment did they use? And, were these Britishers, who really have contributed a great deal to the advancement of the art, mainly scientists, and book-writers, or were they "dyed-in-the-wool" amateurs and manipulators too, and what was the percentage of each, and what were they like?

I found many of them grouped together at meetings of their societies,—

of their facial adornments, or their profession, calling, or job, I was by no means unacquainted with their habits and mental processes. Amateurs and physicists alike— all had been bitten and had as their chief aim the swapping of information on itch lotions. However, I feel free to admit that we Americans could give them all the aces in the deck and beat them at it. It has been my observation and it is my firm belief that for "dope," "hunches," and sure-things, inside information the American would-be radio convalescent has all others tied to the post.

quite gray, and somewhat bent, his very keen eyes peer beneath a shaggy brow and coupling with quick gesture unflinchingly drives home point after point as he reads his remarkable lucid lectures. Nor, does he ask one to depend alone upon his text, though this would seem quite enough, but he freely illustrates by the use of carefully set up demonstrations through the medium of well trained assistants. Usually the "setting off" of the demonstration entails not the slightest pause in the flow of words. This was true to such a great extent that when he had finished I marvelled at the vastness of the ground he had covered, the thoroughness of the treatment and the perfectly timed smoothness of the demonstrations.

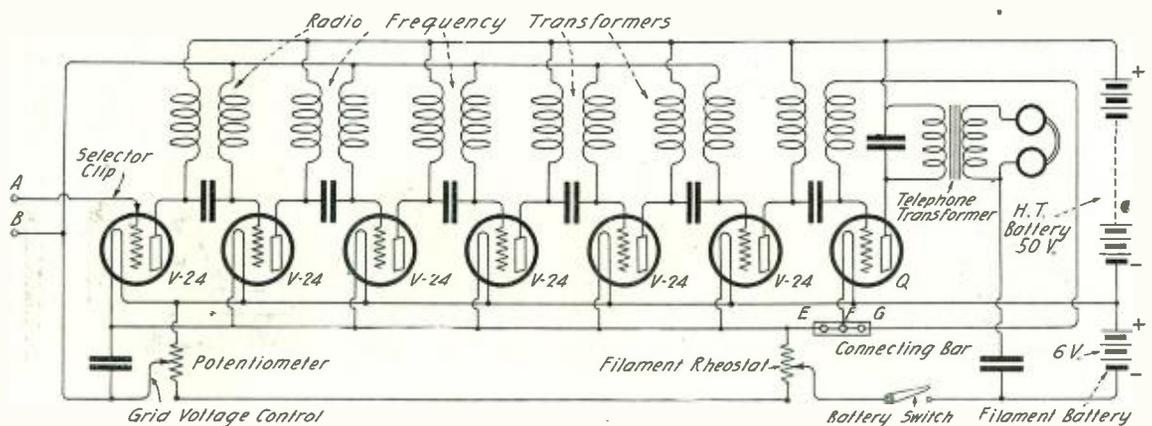


Marconi multi-stage amplifier using six radio frequency and one detector tubes

With one exception, all of the dozen or more "set-ups" were manned at the proper time by an assistant. This one exception was the demonstration of the "feed-back" method for the production of continuous oscillations. For this, Dr. Fleming used his own "ear-phone" and its sensitive microphone attachment, for he is quite deaf. This experiment may be performed with any standard telephone instrument and is accomplished by placing the receiver against the transmitter. If in striking the mouthpiece of the transmitter the receiver jars the carbon granules of the microphone a sudden change of current flow will take place in the circuit and be communicated via the transformer coil to the receiver which, due to the resulting motion of its diaphragm, will again disturb the quiescence of the microphone, etc., etc. So long as the receiver is placed in such position as to feed some energy back into the mi-

the first a meeting of an amateur organization, the Wireless Society of London, and the second a meeting of a physical society, the Royal Society of Arts. To my great surprise, the age of

England has no mean quota of radio medicine men. Neither can the potency of their concoctions be gain said. But it might be intimated here that the more potent the application the



The cascade hook-up using six tubes for radio frequency amplification and the seventh tube as detector

members of the amateur society averaged close to forty years. The greater part of these men had families, and many of the faces were adorned with mustache or beard while but few were in their mid-twenties. But, be their age what it may, and regardless of the cut

more violent the breaking-out in new places. Chief, and senior of those I encountered is: J. A. Fleming, M. A., D.Sc., F. R. S., etc., etc., scientist, educator, author, who, although well along in his seventies is still very active. Rather small in stature, slight,

crophone, this reaction will continue indefinitely at a frequency of approximately 400 times per second.

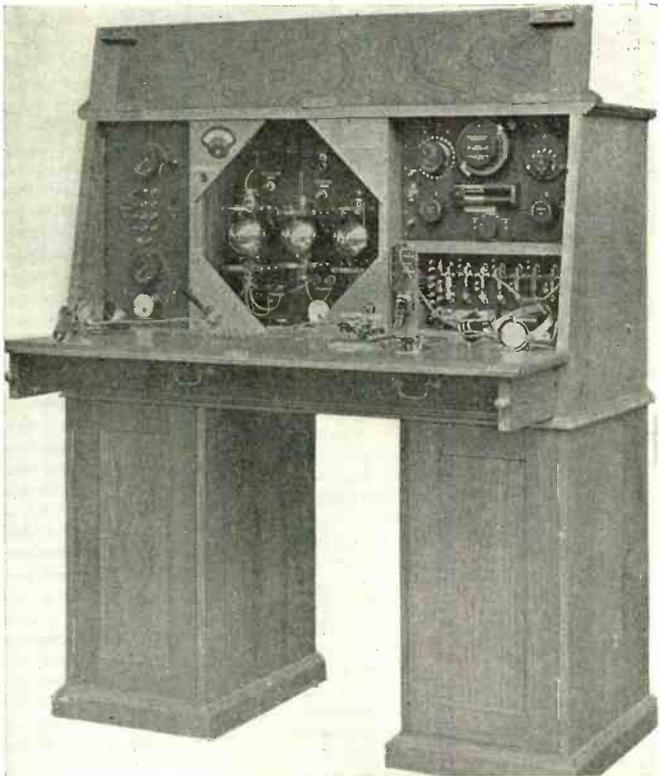
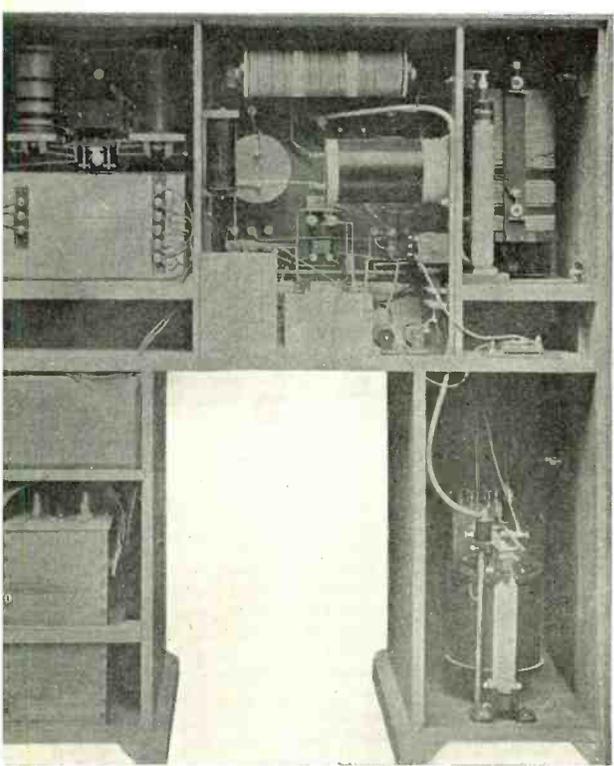
In his attempt to demonstrate this action, the doctor's affliction handicapped him. After several efforts, he came to the conclusion that his appar-

atus had gone out of order. That it had *not* was apparent to every one else in the room,—so much so, that one of the assistants was sent to shut the thing off so the audience might hear, for, although a bit nettled, the doctor had gone rapidly ahead with his lecture.

Some of the most startling things that have been accomplished by radio men in Great Britain since the war are: (1) the installation at Carnarvon, Wales of a tube transmitter which successfully communicates with

standing, developed themselves some very good equipment, though as such, amateurs have not contributed to the advancement of the art to the same extent as have their confreres in America. Relay work is prohibited by the British Post Office. In the judgment of the GPO authorities, to permit it would mean a certain decrease in the revenues which accrue to the government overland telegraph systems. Further, amateurs are restricted to the use of an input of 10 watts for the transmitter. Under these circum-

great surprise the audio-frequency transformers in most common use in Britain were American built. Transformers built in Britain for amateur use were comparatively crude of construction and not so efficient, and this also might be said to be true of the greater portion of the manufactured amateur apparatus. The reason is apparent. It is estimated that there are but 5,000 amateurs in Great Britain. Lacking the market, manufacturers have been unable to make the outlay necessary for the development of real-



view of the 1/4 kw. C. W. transmitter with receiver. Note receiver in-
 ce at top left and shielded amplifier case immediately below. Plate and
 rent batteries lower left and high voltage transformer lower right.

Front view of the 1/4 kw. C. W. transmitter. Note transmitter control at left.
 one oscillator and two rectifier tubes in centre and seven-tube amplifying re-
 ceiver at right. An ideal arrangement for a real amateur station

Australia; (2) the operation for the past eighteen months of a high-speed, automatically recording duplex telegraph circuit between London and Paris; (3) the successful operation on wavelengths between 90 and 100 meters of a duplex telephone circuit between London and Amsterdam; (4) the development of low cost vacuum tubes capable of dissipating several kilowatts of energy; (5) the production of an excellent receiving tube which draws but 1-10 ampere on 3 1/2 volts; and (6) the transmission of signals over considerable distances on wavelengths of six or eight meters.

As for amateur work, there is no relaying of traffic and no broadcasting. Lacking the zest which relay work and broadcasting gives to the game, British amateurs have notwith-

stances, the transmitter takes the form of one or two small vacuum tubes connected with capacities and inductances very similar in physical dimensions to those to be found in their receivers, and the energy is passed out into the ether on a wavelength of about 1000 meters, although they have available a shorter wavelength of 180 meters.

In attempting to make up for the limits placed on the power of their transmitter, they have gone in strongly for amplification with the result that a few British amateurs have built for themselves radio-audio frequency amplifiers having 5 to 10 stages, though the average British receiver more than likely consists of a single stage of radio frequency amplification, a detector and a single stage of audio frequency. To my

ly good lines, and are forced to use designs which are somewhat crude, in appearance at least, and to build the greater portion of the equipment by hand.

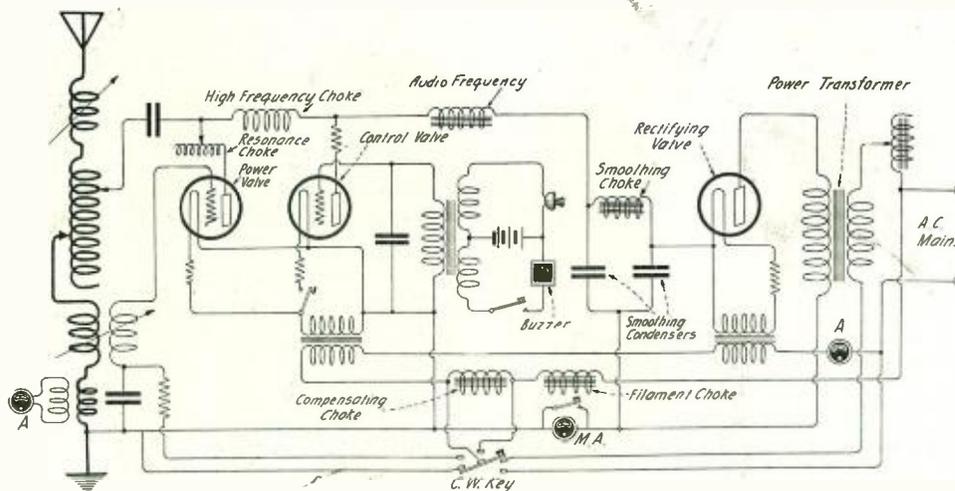
The radio frequency portion of their circuit has, however, been developed to a further degree than has our own. This is due partly to their failure to fully appreciate the advantages of the tuned plate circuit regenerative receiver, to their lack of "gassy" tubes, and to their tendency to work on 1000 meter wave, at which wavelength the accomplishment of good amplification at high frequency is a somewhat simpler matter than on those waves which are allotted to amateur use in this country. However, in some quarters there seems to be the opinion that too little is known of effective and handy methods for accomplishing this sort of

amplification, though some amateurs have rigged for themselves some fairly effective, but not very flexible outfits. Accompanying this article is a photograph and circuit diagram of a seven tube amplifier as manufactured by the Marconi Company for commercial use. Many of the amateur amplifiers pattern after this circuit, though some omit the small fixed condenser shown as connecting the grids with plates of succeeding tubes. As to the transformer itself, some have been made by turning a groove $\frac{1}{8} \times \frac{1}{8}$ inch in a hard rubber or hard wood rod $1\frac{3}{4}$ inches in diameter. Wound in this groove is a primary consisting of 30 turns of No. 40 D. S. C. C. This

the "A" battery, to the slider of which all the grids of the outfit are connected as shown in the diagram. This provision is made to prevent oscillations, and where more than two radio frequency tubes are used it begins to be the practice to have the whole amplifier in a case which has been lined with copper and connected to the negative terminal of the lighting battery to further prevent the stray electric fields from setting up oscillations in the outfit.

A visit to the Chelmsford works of the Marconi Company will disclose many types of amplifiers being built for use on board ship, for direction-finding work and for use in

but, as the potential of this electrode is practically equal to that of the filament, very little current will flow in the plate circuit. The characteristic curve of this current with respect to the voltage is very similar to that of the ordinary vacuum tube rectifier (Fleming valve). Thus, if symmetrical oscillations occur in the primary of the transformer they will induce in the secondary a symmetrical E.M.F. variation which will produce an unsymmetrical or rectified series of oscillations in the plate circuit, provided that the potentiometer is adjusted so that the point of working is on or near one of the bends of the curve. the rec-



Circuit diagram of the $\frac{1}{2}$ kw. transmitter

winding is covered with a layer of thin Empire cloth, and a secondary wound on consisting of about 35 turns of the same winding. The primary of this transformer goes into the plate circuit and is shunted by and tuned by a small variable condenser, being good for a range between 180 and 325 meters. Where such transformers as these are wound for use without the variable condenser — as they may be by a little experiment — the range of wavelengths covered will be considerably narrower.

A variation of this method, and one which is interesting, is that adopted by the Marconi Company. The transformers are wound on hollow cores somewhat after the fashion described above, and so arranged that a paraffin core which has been impregnated with iron filings slides in and out of each transformer. The iron in this core is so finely divided that very little eddy-current loss occurs in the iron, yet sufficient iron is present to greatly vary both the self and mutual inductance of the transformers, giving them a comparatively wide operating range.

In all of these amplifiers, it is necessary to use a potentiometer across

aircraft. All follow the same general principles of design, however, being altered here and there to more particularly fit certain exact requirements.

A four-element tube of rather an interesting nature is also being manufactured and is coming into quite general use for ordinary ship service. A photograph of the tube is shown herewith, and it will be seen that in appearance it is not unlike the three-element tube also pictured. The circuit diagram on the other hand shows some differences. The three inner electrodes of this tube carry out exactly the same functions as the three electrodes of the ordinary V.T.

The plate is connected, through the secondary winding of the high-frequency transformer, to a potentiometer shunted across the filament battery — the primary winding of this transformer is in the second grid circuit. By this means the plate potential can be varied between limits of a few volts above and below that of the filament. Some of the electrons which are emitted by the filament pass through the second grid and fall on the plate;

oscillations so produced are fed back into the first grid circuit by means of the audio-frequency transformer. At this stage the second grid acts as an audio-frequency amplifier, and the signals are passed on to the telephones. It will be seen then that the tube has performed three functions; that of radio-frequency amplifier, rectifier and audio-frequency amplifier.

Most interesting of all at Chelmsford were the vacuum tubes of various sizes. There is shown here one of the medium-sized transmitting tubes. Contrary to American practiced transmitting tubes are unbased. Cost of base is thus saved, and one other great advantage offered, namely, that even the larger tubes may be made of ordinary lead glass, for the weak spot in the larger tubes is in the stem where the terminals and leads from the electrodes are brought out. Here, when the high potentials are applied, the heat does its work, slightly softening the glass and allowing disintegration of the glass due to electrolysis. This electrolysis will eventually so affect the glass that it becomes porous, and a

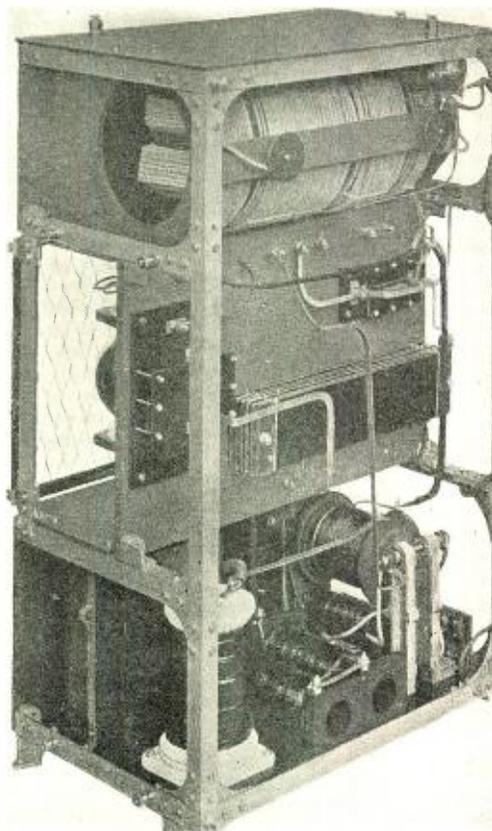
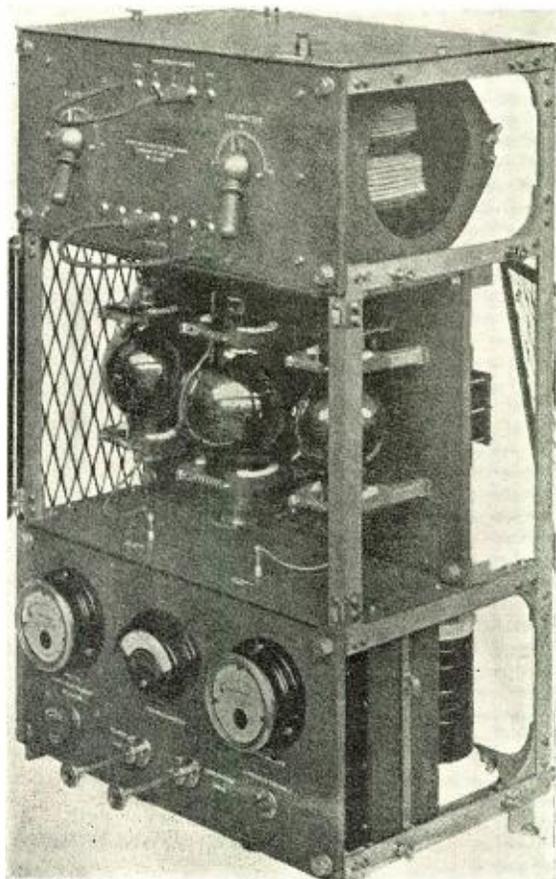
certain amount of air will be allowed to leak in.

In using their transmitting tubes, the Marconi company arrange a small air line so that a stream of air is at all times blown down into the stem, thus keeping this vulnerable point cool and preventing disintegration. A careful examination of the photograph of the tube set at Carnarvon will disclose these air

neers and workman to carry all the necessary component parts for the new set to Clifden in suitcases. The Clifden station communicates regularly with a similar station in Newfoundland.

Of interest also are the $\frac{1}{4}$ Kw. and $\frac{3}{4}$ Kw. cabinet sets illustrated. Designs such as these should prove ideal for the use of the American relay amateur. They are extremely

ture filament, and consumes an exceedingly small amount of energy since it draws but 1-10 of one ampere on 3-5 volts, or 0.35 watts. Such a tube as this should prove ideal for any use, particularly in the home. Six of them which were brought back from England have proved very good for all purposes, and all six, when running together consume but slightly more than $\frac{1}{2}$



Front and rear views of $\frac{3}{4}$ kw. transmitter. Note power control and meters below and oscillation circuit control above. An ideal arrangement for the amateur station deluxe

lines in the form of white rubber tubings running to each tube. In the end of the rubber tubing is placed a little glass nipple, which protrudes within the stem.

By virtue of this cooling method, the forty-eight tubes shown in this photograph easily give the same antenna current as the high-frequency alternator (200 Kw.) which is in use at Carnarvon for American communication, and, upon occasion the tube set has been able to supply close to 300 Kw. to the antenna. A tube set of this type — twelve tubes — has been in use at the Clifden station of the Marconi company for some time. When it was decided to make the change-over from spark to C. W. it was possible for the engi-

compact, simple in design and operation, and of such nature as to properly grace the library or operating room of any amateur. Circuit diagrams and photographs make the construction and design fairly clear to those who have had experience with C.W. transmitters, the main feature of the design being the inductance unit, which is built so as to include grid inductance (variometer) plate inductance (tapped for wavelength and adjustment) and antenna inductance (also variometer).

A small receiving tube, very similar in size and appearance to the Standard Marconi tube illustrated, also proved extremely interesting. This tube contains a low tempera-

ampere of filament current. The size of the electrodes in these tubes and the method of bringing off terminals gives them a very low internal capacity and thus renders them highly desirable for high frequency amplification purposes.

At Chelmsford, also, was the transmitting unit of the high speed circuit running from London to Paris (wavelength 3000 m), the most novel feature of which was the signaling key, which broke the high-voltage plate supply line, the breaks occurring immediately above the opening of a $1\frac{1}{2}$ -inch or 2-inch pipe through which shot a continual blast of air. This blast of air blew out any arc which might form, though when the keys were in operation to

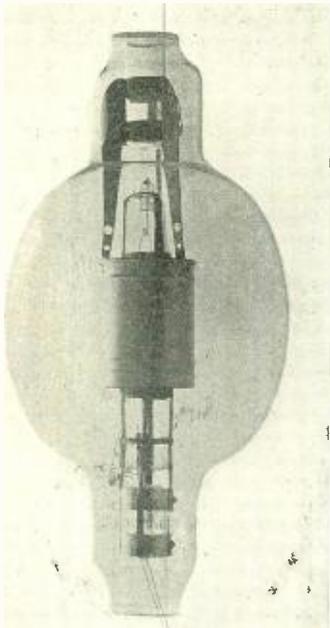
all appearances the arc was continuous. That the break was a clean one was proven by listening in on a side circuit arranged for the purpose. Speeds up to 170 words per minute have been satisfactorily run on this circuit, though normally the speeds used lie in the neighborhood of 120 words per minute. Each message is sent through twice. This is done to obviate necessity for repetition of parts of messages, for if some stray should happen to wipe out a word or a portion of a word, not one time in a thousand would the same word be damaged during second transmission. This method

side with a galvanized iron casing, the stages being set several inches apart. Tuning of the audio-frequency circuits further frees the signal from strays. The audio-frequency amplifier finally feeds a vacuum-tube bridge relay, and current variation in one arm of the bridge averages 15 to 18 milliamperes, which current is used to actuate a polar relay, which in turn controls the recorder. Signals taken on a rapidly running tape recorder are perfect in formation and may be read without the slightest difficulty.

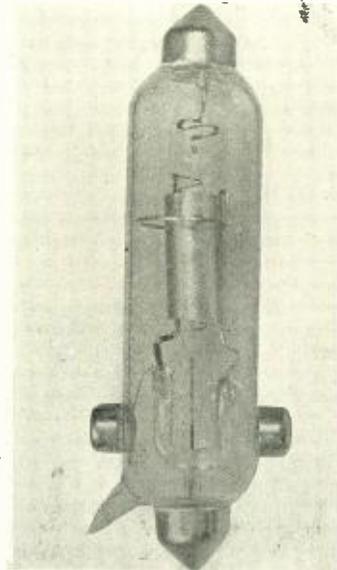
What it is possible to do on the shorter wavelengths is well illus-

account of the fading effects with which American amateurs are so familiar. Signals vary greatly in strength during these fading periods, and in addition to this, speech becomes more or less garbled due to distortion enroute or due to the out-of-phase arrival of impulses which have traveled over a different route. Considerable attention is being, or has been, given to these effects by the various engineers who are working on the problem, and I was given to understand that very shortly some very interesting disclosures would be made as a result of their work.

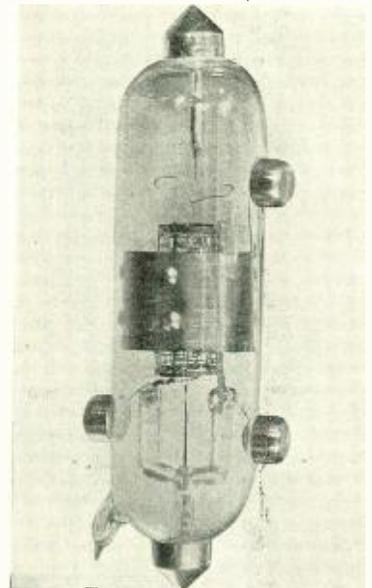
The antenna system used at South-



Marconi transmitting tube, type MT6. This tube is similar to the tubes used at Carnarvon, except that it is smaller.



Standard Marconi receiving tube, type V24



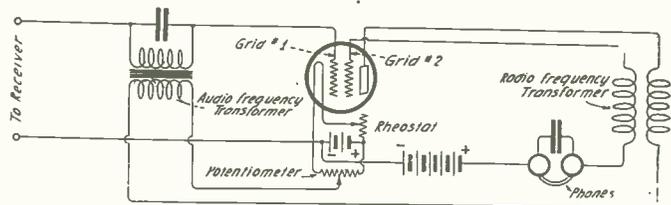
Four-element tube used as a combined radio-frequency amplifier, regenerative detector and audio frequency amplifier

would appear to reduce the speed of the circuit by half. The service furnished between London and Paris offices over this circuit is said to average about six minutes from filing of message to its delivery, the greater portion of the service having to do with stock exchange quotations and buy-and-sell orders.

The receiving unit is located a few miles out from Chelmsford. A visit discloses a low building about 20 x 50 feet. Quite near the building is erected a Belini-Tossi type of directive antenna, this type being used to minimize interference and atmospheric disturbance. The receiving circuits comprise a tuner, four or five stages of radio-frequency amplification, a rectifier, and three to five stages of tuned audio-frequency amplification. Each stage of audio is placed in its own wooden case. This case is shielded inside with an aluminum shield, and out-

trated by the installation at Southwald on the channel, which station works duplex telephony with Zandvoort, Holland, a distance of 115

miles. The wavelengths used are approximately 97 meters and 100 meters, respectively, a separation of 3 per cent. Service over this circuit is highly satisfactory during daylight hours, but frequently becomes very uncertain at night, not on account of total loss of signals, but on



Circuit diagram of four-element vacuum tube

ported on an insulator at a point approximately three feet above the ground. The mast is held in position by four sets of tarred rope guys and itself acts as the antenna. Radiating from its base at a height of about two feet is the counterpoise system, or, as the British call it, the "earth

... account of the fading effects with which American amateurs are so familiar. Signals vary greatly in strength during these fading periods, and in addition to this, speech becomes more or less garbled due to distortion enroute or due to the out-of-phase arrival of impulses which have traveled over a different route. Considerable attention is being, or has been, given to these effects by the various engineers who are working on the problem, and I was given to understand that very shortly some very interesting disclosures would be made as a result of their work.

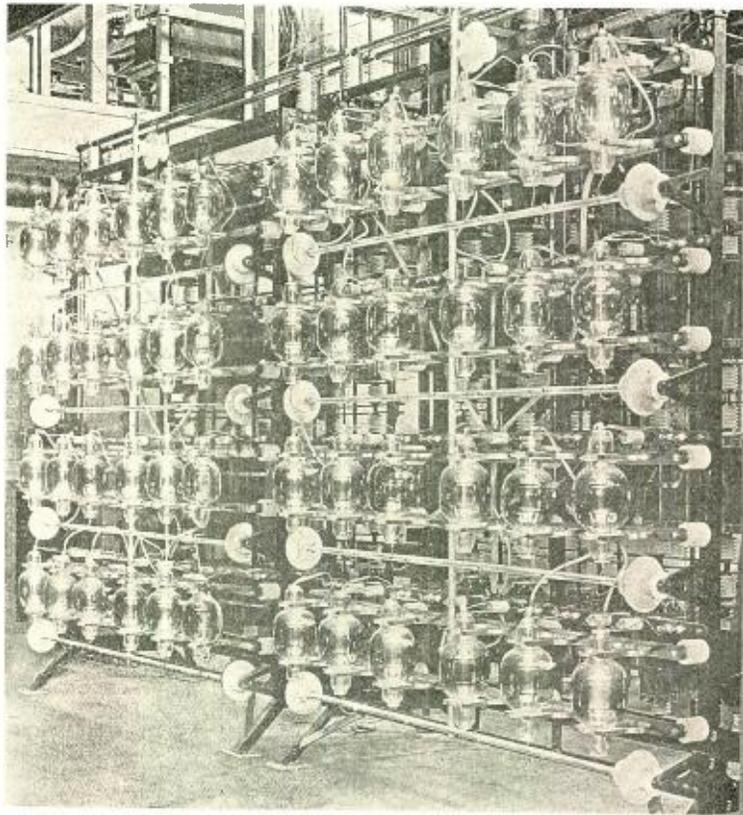
shield." Thus an antenna having a fundamental wavelength slightly under 100 meters is provided. For reception, various types of antenna have been tried including modifications of the Beverage-Rice antenna used at Ardrossan in connection with the trans-Atlantic tests.

H. J. Round is mainly responsible for the "heavy" work in connection with the tube development, and the very interesting practical applications of these tubes. His grasp of the problems presented to the radio engineer and the sometimes startling practicality of his methods are a delight to the radio enthusiast. Many American engineers agree that his long years of experience with radio in all parts of the globe and under all possible conditions have rendered him, without doubt, the most versatile radio engineer in the game. About five feet eight inches in height and in his early forties, clean shaven and of youthful bearing, he has the habit when thinking, of pacing the floor, hands in pocket and head bowed. Round is very sure that large high-frequency alternators have had their day. He is certain that no more will be built for use in Europe, and points with considerable and quite pardonable pride to the functioning of the tube transmitters. These power tubes show a life of well over 2,000 hours. Round also has a hobby — it is photography. Who ever before heard of a radio man with a hobby?

Details concerning the work which has been done by C. S. Franklin of the Marconi company on wavelengths under ten meters was un-

available. It is to be expected that the radiation efficiencies at these wavelengths would be extremely

high, and it is to be hoped that we may look forward to some accounts of this work within the near future.



18-Tube panel transmitter at Carnarvon, Wales. A unique cooling system consisting of rubber hose attached to the bases of the tubes through which air circulates permits operation at high powers. This set gave satisfactory service between England and Australia.

Proposals for Regulating Radio

THE Technical Committee of the Washington Radio Conference in its report, made public on March 10, recommends a zoning system of wave lengths for various kinds of service, power limitation and fixed rules for geographical distribution, and defines the various types of stations and their services and also standardizes the nomenclature of radio.

It is proposed that allocation of wave lengths would give amateurs exclusive use of wave lengths from 150 to 275 meters. Sharing from 200 to 275 with technical and training school stations, Government, public and broadcasting stations would be given from 1,050 to 1,500 meters, and Government and public station 700 miles inland from 700 to 750 meters. Private and toll broadcasting (including newspapers) would have exclusive use of 310 to 435 meters.

In its resolution the technical committee recommends:

"That the radio laws be amended so as to give to the Secretary of Commerce adequate legal authority for the effective control of the establishment of all radio transmitting stations, except amateur, experimental and Government stations and of the operation of non-Governmental radio transmitting stations."

It also provides: "That it is the sense of the conference that radio communications is a public utility and as such should be regulated and controlled by the Federal Government in the public interest."

And that "the types of radio apparatus most effective in reducing interference should be made freely available to the public without restriction."

A summary of the preliminary report of the technical committee of the

Radio Telephone Conference, prepared by Secretary Hoover, is as follows:

"The Radio Telephone Conference was divided some days ago into committees, of which one of the most important is the technical Committee, under the chairmanship of Dr. Stratton, S. W., director of the Bureau of Standards. This committee has now issued tentative recommendations as to methods and policies for radio telephone control.

"The committee puts its recommendations forward for consideration, and constructive criticism by interested organizations with a view to re-assembling again in two or three weeks to reconsider such criticism. The recommendations are of great length and detail. They first point out the necessity for Government control of radio telephones as the only solution

(Continued on page 42)

WORLD WIDE WIRELESS

Big Four-Nation Radio Station

OWEN D. YOUNG, Vice President of the General Electric Company, on his way to Cannes, with Thomas N. Perkins of Boston, on a mission in connection with the activities of the Radio Corporation of America for the development of trans-Atlantic wireless communications between Europe and North and South America, gave interesting details concerning the various great European organizations which have now reached an agreement with regard to wireless transmission between Europe and South America. These are three, namely, the English Marconi Company, the French Compagnie de Telegraphie Sans Fil and the German Telefunken.

Each had planned to erect a station in South America sufficiently powerful to transmit to Europe. The American Radio Corporation had similarly planned a South American station for communication with the United States. Owing to the great distance and also to the fact that the Equator must necessarily be crossed it was essential that these stations should be of very great power. And the erection of the four stations in Argentina thus planned would have entailed what Mr. Young described as a "waste of waves which the world could not possibly afford." The volume of the messages transmitted, too, could not warrant this expenditure of money and energy.

Consequently Mr. Young, representing the Radio Corporation of America, came to Paris last October and called a meeting of representatives of the three European organizations in order to discuss what could be done. It was decided at this conference to build only one station in Argentina from which news will be transmitted by the various companies to their own several countries.

The accord was signed, patents were exchanged and decided to place control in the hands of nine trustees, each of the four companies involved naming two, while the ninth, acting as Chairman, will also be appointed by the Radio Corporation of America. Thomas N. Perkins was chosen to fill the post of Chair-

man. Meetings are now being called at Cannes in order to discuss further developments.

"It is not our intention," said Mr. Young "to compete with the cable companies for what I may describe as news of the more expensive kind, such as for instance, financial news and stock exchange messages. What we wish to do is to provide the cheapest possible form of general private communication. For example we are now building a great station at Warsaw. Well,



12-Year old Kenneth R. Hinman using his match box receiving set out in the woods

I want to educate the public to make the same use of wireless as they now make of the telephone.

"The day will come when a Polish business man in the United States will flash a wireless to Warsaw asking how his wife and latest baby are getting on and whether that tooth is now through. And when communication between the various countries has reached that stage of development I think the world will be able to talk of general disarmament."

Next Presidential Campaign by Radiophone

THE next Presidential campaign will be conducted largely by wireless telephone, Professor G. O. Aubrey, of Swarthmore Preparatory

School, predicted in an address before the Radio Club at the school.

"Better acquaintance with the various candidates for the Presidency in 1924 is almost assured with the increasing use of the wireless telephone," said Professor Aubrey. "Voters, millions of them, most likely will hear the messages sent out by the candidates by wireless, for receiving sets will be found in homes and meeting places throughout the nation."

★ ★ ★

Airplane Radio Sets Send and Receive

ONE of the airplanes of the Ninth Squadron, stationed at Kelly Field, Texas, has been specially fitted with radio equipment for transmitting and receiving, together with an SCR-72 amplifier.

Two generators are used, with a special changeover switch, which eliminates several articles as regularly installed with the service SCR-73 set. Two antennas are used, one for the transmitting set and one for the receiving. The operator can talk and receive messages at the same instant. The ship has been tested with the new high-power radiophone of the first wing with good results, although it has not been possible to make distance tests as yet. Radio music has been transmitted successfully from the ground to the plane at 4,000 feet.

★ ★ ★

Russian Chain of Radio Stations

SOVIET Russia will soon have a wireless station capable of trans-Atlantic service, says H. Nikolaiev, Assistant Commissar for Posts and Telegraphs.

The station is in progress of erection at Bogorodsk, near Moscow, and is expected to be one of the most powerful in the world. Its towers will be more than 900 feet high, which is 300 feet higher than the famous German wireless station at Nauen. The new Russian station will have a strength of 500 kilowatts.

Nikolaiev adds that Soviet Russia has made great progress in wireless communication in the last four years and cites as evidence of it the fact that the station at Moscow is able to hold telephone conversations with another at Chita, Siberia, 3,000

miles distant. Russia now has thirty-eight sending stations and 290 receiving stations.

New wireless stations will be erected within the next few months at Tashkent, Kharkov, and Novo-Nikolaevsk, as well as at the radial points of the Siberian water basin and along the Arctic sea coast, where nine stations were installed in 1921.

2,000 Saved by Radio Compass

THE Army Transport Cantigny, with 2,000 of the Fifth Infantry aboard, was in a storm off the coast March 21, with her compass out of commission and unable to get bearings until the radio compass came to her aid.

With the assistance of shore stations, which sent her bearings by wireless, the Cantigny was piloted to safety at Portland, Me.

Capt. Hitchcock of the Cantigny congratulated operators at Bar Harbor and Cape Elizabeth stations on their almost perfect compass bearings during the storm, which was "our only means of direction, for it was too dark for sights."

New Italian Station

THE new experimental wireless station eleven miles out of Rome was inaugurated on the twenty-fifth anniversary of the invention of wireless telegraphy by Guglielmo Marconi. Several Government officials attended the ceremony.

Signor Marconi sent a message regretting his inability to attend, as he is convalescing from pneumonia in London. He was represented by Marquis Luigi di Solari.

The new station received messages from Long Island, New Brunswick and San Francisco.

Leviathan Staterooms Equipped with Radiophones

THE steamship Leviathan, when she starts again in the trans-Atlantic service next year, will have a wireless telephone in every stateroom, Chairman A. D. Lasker says. The plans for the reconditioning of the huge liner, he said, call for the finest wireless equipment ever put on a passenger vessel.

Dramatic Rescues Due to Direction Finder

THE wireless direction finder has been instrumental in effecting two dramatic rescues at sea. In each case by a strange coincidence the foundering ship was of Norwegian nationality, the captain's idea as to

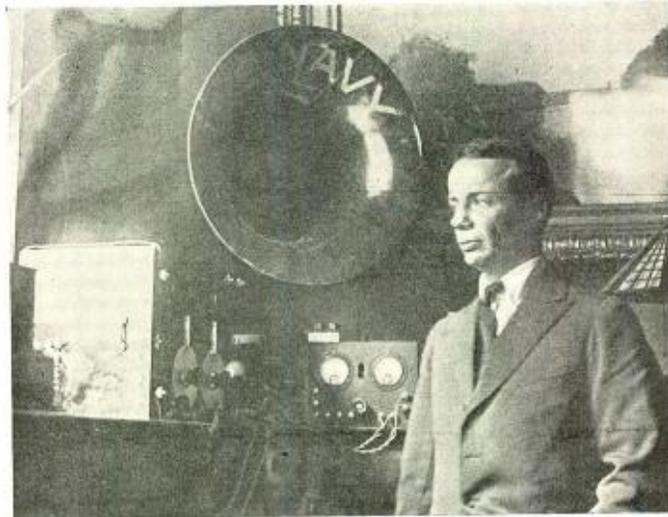
his position — arrived at by observation — was many miles out, with the result that several vessels were searching for him in the wrong direction, and the rescue took place at the "eleventh hour."

During the recent storms in the North Atlantic the Norwegian steamer "Mod" was so badly damaged that she became practically a wreck and for 36 hours the crew were huddled on deck without food. The captain sent out an SOS message giving what he believed to be his position but which proved to be erroneous. At least six vessels diverted their course in an attempt to render help but no trace of

another steamer of the Head Line under precisely similar circumstances. In this case the Fanad Head saved 31 members of the crew of the Norwegian steamer Ontaneda. The Captain of the "Ontaneda" estimated his position by dead reckoning which showed an error of 90 miles.

Armstrong Upheld on Appeal

THE United States District Court of Appeals in an opinion by Judge Martin T. Manton and concurred in by Judges Rogers and Knox, affirmed the judgment of the United States District Court in the



Assistant Secretary of the Navy Theodore Roosevelt has installed a receiving set in his home, and with his family enjoys the broadcasted concerts

the Mod could be found. The George Washington searched for 15 hours and proceeded to three different positions without result.

For some time the British vessel Melmore Head was too far away to be of any assistance but the Captain kept in touch with what was happening, and when he found the Mod's signals getting stronger he directed the wireless operator to ascertain her position by means of his radio direction finding apparatus. According to the reading thus obtained the Mod was 78 miles away from the position she herself had sent out and sailing in an entirely different direction. The Captain of the Melmore Head placed his reliance in the direction finder and found it to be correct. He came up to the foundering vessel only just in time to save 23 members of the crew. The vessel sank almost immediately and ten men, including all officers, were drowned.

The earlier rescue took place in January, 1921, and was effected by

wireless patent litigation instituted by Edwin H. Armstrong of Yonkers, and the Westinghouse Electric and Mfg. Company, against the De Forest Radio Telephone and Telegraph Company.

The patent in question related to an amplifying system for the radiophone to increase the loudness of signals and sounds so that greater distances can be covered.

Amundsen to Use Radio on Arctic Trip

CAPTAIN Raold Amundsen sailed for New York recently on board the Stavangerfjord, having been in Norway three weeks in connection with his next expedition into the Arctic region, to begin about June 1. He is going to Seattle, where his steamship, the Maude, is being repaired.

The expedition is being supplied with a wireless outfit capable of covering a radius of 2000 miles. He expects to reach Wrangel Island in July.

Read what

Radio Corporation of America
233 Broadway
New York City

As the representative of the American Radio Relay League in England during the recent Trans-Atlantic Amateur Transmission Tests, I wish to call your attention to the assistance given by all members of your organization from whom assistance was asked, and the cheerful, wholehearted manner in which it was given.

I have endeavoured, both in the written accounts of my experiences as well as in verbal reports of it, to point out the great value of this assistance, and to call attention to the fact that Radio Corporation Detector Tubes Type UV 200 were used during the reception at Arrossan in conjunction with the regenerative receiver and 2-stage tone, frequency amplifier. These tubes functioned admirably, and the results obtainable was a surprise to the several British amateurs who saw them in operation.

All Radio Relay men with whom I have spoken concerning the matter since my return are deeply grateful for the co-operation given by your company, and fully appreciate that the completeness of the success of the venture would have been lacking in great degree but for your co-operation.

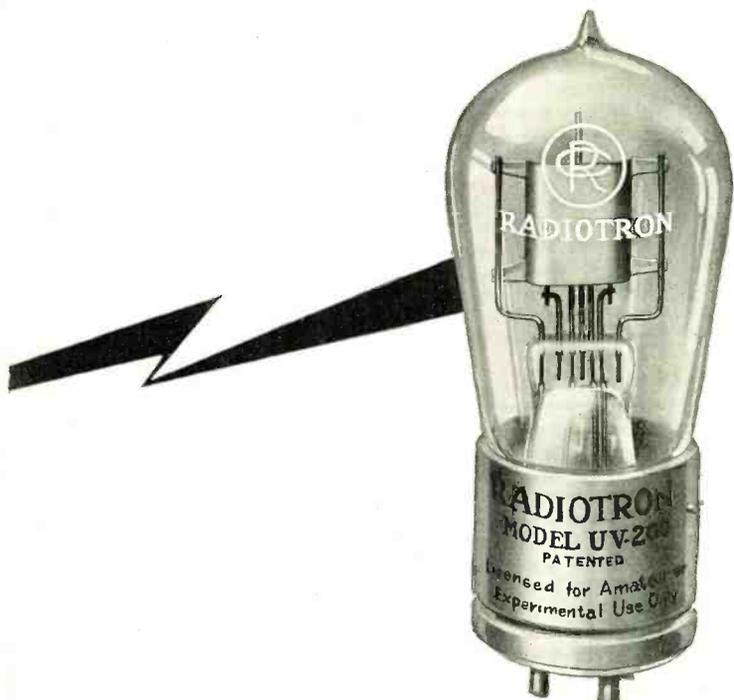
Respectfully,

Paul Goddard

Radio  **Corporation**
of America

Sales Department, Suite 1801
233 Broadway, New York City

Godley says



It was a great triumph for the amateurs when they sent messages across the Atlantic to Scotland. But it was also a Radiotron triumph. Read what Paul F. Godley says in the letter here reproduced in facsimile. There are two Radiotrons available for reception. For Detection—Radiotron UV—200, the popular tube used by thousands

of amateurs and novices because of its long life and super-sensitive-ness. Price \$5.

For Amplification—Radiotron UV—201, the amplifier tube which gives maximum amplification without distortion and which, like UV—200, is used throughout the nation for radiophone broadcasting reception. Price \$6.50.

Ask your nearest Dealer for Radiotrons

Radio  **Corporation**
of America

Sales Department, Suite 1801
233 Broadway, New York City

New York Hotel to Have Radiophones

ON March 23 Chief Magistrate W. G. McAdoo laid the cornerstone of the first hotel in New York City to be completely equipped with radiophones. Every room in this structure, The Sherman Square Hotel, which will be sixteen stories in height and covering the block front of Seventy-fourth street, from Amsterdam avenue to Broadway, will have the new invention at the disposal of guests.

* * *

Radio Saves Lives and Money

RADIO systems, strung along the coasts, saved untold lives last year besides rendering assistance to vessels valued at more than \$66,000,000,000. The vessels assisted had on board at the times of mishap 14,013 persons besides 1,621 rescued by coast guard officers and enlisted men from water disaster.

Commander W. E. Reynolds, chief of the coast guard service, says perfection of the radio in life saving and in preventing ship disasters is one of the wonders of the age. The system consists of 2,240 miles of telephone lines made up of 1,800 miles of overhead line and 440 miles of cable. That much the layman comprehends. The rest he takes on trust. He knows that over these wires comes the call for help from vessels in distress and through them revenue cutters and other ships are sent to the rescue of precious lives. He knows that warnings are sent to vessels of storms and other impending dangers because such things are noted as matters of routine news in the papers and he knows that comparatively few lives are lost at sea these days because of this modern wonder—this system

of communication, accepted as an every-day matter. The service, so valuable, is maintained by the United States Government.

* * *

Radio Beats Bookmakers

WILBER DUBA, a United States navy radio operator assigned to shore duty with the American Relief Administration, succeeded in "putting it over" on Vienna bookmakers, but he got himself in trouble doing it.

Owing to the difference in time between Vienna and Paris and the slowness of transmission, bookmakers at Vienna have been accepting bets upon horses after the races actually were run in Paris. From this situation, Duba developed a system of obtaining quick returns from the Paris races. He played bets in several ways to allay suspicion, taking care to plunge on "long shots." One win was on a 130 to 10 shot.

One of the bookmakers became suspicious. Duba was arrested, but was released upon parole when restitution was made. Another American was fined 10,000 crowns and a doctor's expenses for resisting being called a "schieber" (profiteer), which is an odious epithet in Vienna.

* * *

Yukon Wants Radio

CANADIAN legislators are making efforts to have the Government establish two powerful radio stations in the Yukon country, one at Dawson and the other at White Horse.

Influence is also being brought to bear in favor of opening other stations at Stewart, Atlin and Alice Arm, B. C., in opposition to a proposal to rebuild an abandoned telegraph line in that country.

Presidential Proclamation by Radio

PRESIDENT HARDING may broadcast a Presidential proclamation by radio telephone launching the Government's savings certificates campaign if plans being worked out by the Treasury and Post Office Departments are carried out.

* * *

Oil Prospectors Use Radio in the Orient

WHEN the Canadian Pacific "Empress of Asia" sailed from Vancouver recently for the Orient she carried in her hold a shipment of wireless equipment made up of a number of sets of instruments which are to be used by oil prospectors for one of the large companies now endeavoring to locate oil fields in the Orient. Lack of transportation facilities and means to get information from one point to another in the Orient has forced the larger concerns to use wireless telephones as a means of communication.

* * *

The "Baltic's" Remarkable Record

A REMARKABLE achievement in a ship-to-shore wireless working is reported by the White Star liner Baltic. Every night throughout her recent voyage from New York to Liverpool she was in direct communication with the Radio Corporation's station at Chatham, Massachusetts. Messages were actually exchanged while the vessel was anchored at the Liverpool Bar when over 3,000 miles separated the two stations.

The Baltic was using her standard tuner and four-electrode detector, the regulation circuits being unaltered.

Proposals for Regulating Radio

(Continued from page 37)

to the present chaos of interference; that unless there is definite regulation of all telephone transmitting stations the whole system will be destroyed by interference.

"In order to accomplish this the committee recommends that the existing powers of the Department of Commerce should be extended to complete control of transmitting stations. Below 6,000 meters should in a general way be reserved for radio telephone service, but those wave lengths which have become fixed in service for telegraph service within this range, such as SOS signals shall be retained. But

it is the hope and expectation that the radio telephone may ultimately keep the whole range from zero to 6,000 meters.

BROADCASTING CLASSIFICATION

"The committee considers that the present development of the art warrants the separation of twenty different wave bands within this range, of which seventeen lie between zero and 2,000 meters. In the assignment of these wave bands the committee recommends that priority first be given to broadcasting service and that secondarily broadcasting service itself

should be divided into priorities the following rotation: First, government broadcasting; second, educational and public broadcasting; third, private broadcasting, including entertainment, news, etc., and fourth, toll broadcasting.

Reservation of wave lengths between 150 and 275 is made for amateurs and some opportunity in experimental wave length would be assigned to them in addition. The committee recommends that amateurs shall police themselves as to division of their wave bands between different varieties of amateur work. The committee recommends in addition to the establishment

of wave bands for different services in various priorities that it is also necessary to limit the amount of power used in transmitting stations, thus limiting each of them to some special zone in order to further limit interference and enable a wider variety of wave lengths to be assigned to different localities.

"The committee also recommends that the time of day occupied by different transmitting stations for different services should be placed in control.

"The conference strongly recommends the extension of authority of the government into thorough control of transmitting stations for different services, and that the radio telephone may not be considered a public utility.

"BROADCASTING" IS DEFINED

"'Broadcasting' signifies transmission to an unlimited number of receiving stations without charge at the receiving end. 'Government broadcasting,' signifying broadcasting from public institutions, including State Governments, political subdivisions thereof and universities and such others as may be licensed for the purpose of disseminating news, entertainment and other service, and 'toll broadcasting' signifying broadcasting by a public service radio telephone company as a paid service.

"The restricted special amateur wave of 310 meters is for use by a limited number of inland stations and only where it is necessary to bridge large, sparsely populated areas or to overcome natural barriers.

"It is recommended that the Secretary of Commerce assign a specific wave length to each radio telephone broadcasting station (except Government and amateur stations), this, of course, being within the band pertaining to the particular service of that station.

"It is recommended that the wave band assigned to amateurs, 150 to 275 meters, be divided into bands according to the method of transmission, damped wave station being assigned the band of lowest wave lengths; interrupted or modulated continuous wave radio telegraph stations the next band; radio telephone stations the next band, and, finally, unmodulated continuous wave radio telegraph stations to carry on within the wave lengths assigned by the Secretary of Commerce to amateur radio telephony.

"It is recommended that in cases where congestion of radio telephone broadcasting traffic exists, or threatens to exist, the Secretary of Commerce assign suitable hours of operation to existing or proposed private and toll broadcasting stations."

The general system of allocation of wave lengths recommended by the Committee is as follows:

- Trans-oceanic radiophone experiments, non-exclusive—5,000 to 6,000 meters.
- Fixed service radio phone, non-exclusive—2,850 to 3,300 meters.
- Mobile service radio phone, non-exclusive—2,500 to 2,650 meters.
- Government broadcasting, non-exclusive—1,850 to 2,050 meters.
- Fixed station radio phone, non-exclusive—1,550 to 1,650 meters.
- Aircraft radio phone and telegraphy, exclusive—1,500 to 1,550 meters.
- Government and public broadcasting—1,050 to 1,500 meters.
- Radio beacons, exclusive—950 to 1,050 meters.
- Aircraft radio phone and telegraphy, exclusive—850 to 950 meters.

(b) It is recommended that the same wave (or overlapping wave bands) not be assigned to stations within the following distances from one another, except that these distances may be lowered if the normal ranges of the stations are correspondingly lowered:

- For Government broadcasting stations, 1,500 miles.
- For public broadcasting stations, 750 miles.
- For private and toll broadcasting stations, 150 miles.

(Note—The Bureau of Standards should make a study of the width of wave band—expressed in cycles per second—required for satisfactory radio telephony. It is recognized that this width depends on the meth-



Attending the Radio Regulation Conference at Washington. Left to right, front row—Sec. of Commerce Herbert Hoover, Mr. Will Hays, Maj.-Gen. Geo. O. Squier, Congressman W. H. White, former Congressman S. Sherley. Back row—Dr. Louis Cohen, Prof. C. M. Jansky, Jr., Edwin H. Armstrong, Harry F. Breckel, Dr. Alfred N. Goldsmith

- Radio compass, exclusive—750 to 850 meters.
- Government and public broadcasting, 700 miles inland—700 to 750 meters.
- Mobile radio phone, non-exclusive—650 to 750 meters.
- Mobile radio telegraphy, exclusive—525 to 650 meters.
- Aircraft radio phone and telegraphy, exclusive—500 to 525 meters.
- Private and toll broadcasting, exclusive—310 to 435 meters.
- Restricted special amateur radio phone, non-exclusive—310 meters.
- City and State public safety broadcasting, exclusive—275 to 285 meters.
- Technical and training school, (shared with amateur)—200 to 275 meters.
- Amateur (exclusive) 150 to 200 meters; amateur (shared with technical and training schools), 200 to 275 meters.
- Reserved—below 150 meters.

The detailed recommendations of the Committee are as follows:

POWER LIMITATION, GEOGRAPHICAL DISTRIBUTION

- (a) It is recommended that the Secretary of Commerce assign to each radio telephone broadcasting station a permissible power based on the normal range of the station, such normal ranges for the different classes of service to have the following average values, larger or smaller values being discretionary where conditions warrant:
 - Government broadcasting station, 600 (land) miles.
 - Public broadcasting stations, 250 miles.
 - Private and toll broadcasting stations, fifty miles.

ods of transmission and reception employed).

(c) It is recommended that the Secretary of Commerce cause an immediate study to be made of the best geographical distribution of broadcasting stations with the view of attaining the best service with a minimum of interference.

(d) It is recommended that in cases where congestion of radio telephone broadcasting traffic exists, or threatens to exist, the Secretary of Commerce assign suitable hours of operation to existing or proposed private and toll broadcasting stations.

GRANTING OF STATION LICENSES

(a) It is recommended that in the case of conflict between radio communication services first consideration be given to the public not reached, or not so readily reached, by other communication services.

(b) Subject to public interest and to the reasonable requirements of each type of service the order of priority of the services shall be government, public, private, toll.

(c) It is recommended that the degree of public interest attaching to a private or toll broadcasting service be considered in determining its priority in the granting of licenses, in the assignment of waves, and in the assignment of permissible power, within the general regulations for these classes of service.

(d) It is recommended that toll broadcasting service be permitted to develop naturally under close observation, with the understanding that its character, quality and value to the public will be considered in determining its privileges under future regulations.

(e) It is recommended that direct adver-

tising in radio broadcasting service be not permitted and that indirect advertising be limited to a statement of the call letters of the station and of the name of the concern responsible for the matter broadcasted, subject to such regulations as the Secretary of Commerce may impose.

(f) It is recommended that when all available wave bands in any geographical region are already assigned, no further licenses for broadcasting be granted in that region until cause arises for the revocation of existing licenses.

(g) It is recommended that private or toll broadcasting stations transmitting time signals shall transmit only official time signals and with authorization from and under conditions approved by the Secretary of Commerce.

(h) It is recommended that the transmission of signals of such character or wave length as to deliberately interfere with the reception of official time signals constitutes grounds for the revocation of the transmitting license.

(i) It is recommended that license requirements for the operator of a radio telephone transmitting station include a knowledge of the International Morse Code, sufficient to receive at a rate of not less than ten words per minute.

REDUCTION OF INTERFERENCE

(a) It is recommended that the Secretary of Commerce at his discretion prohibit at any time the use of existing radio transmitting apparatus and methods which result in unnecessary interference, provided that such action should not be taken unless more satisfactory apparatus and methods are commercially available at reasonable prices and until an adequate time interval is allowed for the substitution of the more satisfactory apparatus.

(b) It is recommended that the Secretary of Commerce at his discretion prohibit at any time the use of existing radio receiving apparatus which cause the radiation of energy, provided that such action should not be taken unless more satisfactory apparatus and methods are commercially available at reasonable prices and until an adequate time interval is allowed for the substitution of the more satisfactory apparatus.

(c) It is recommended that the Bureau of Standards make a study of the technical methods for the reduction of interference, with a view to publishing their findings, giving special attention to the following:

1. The reduction of the rate of building up (increment) of oscillations in radiating

systems. (This rapid building up of oscillations occurs in damped wave and interrupted continuous wave transmitters, and may, of course, be eliminated by the substitution of other types of transmitter. It may, however, be reduced in these types by proper circuit arrangements).

2. The reduction of harmonics in continuous wave transmitters and of irregularities of oscillation ("mush" in arc transmitters and "swinging" of the frequency in all types of continuous wave transmitters not employing a master oscillator).

3. The comparison of the variable amplitude method with the variable frequency method of continuous wave telegraphy.

4. The preferable methods of telephone modulation to avoid changes in the frequency of oscillation.

5. The proper circuit arrangements of regenerative (including oscillating) receivers to avoid radiation of energy (as by the use of radio-frequency amplifier with an untuned antenna or with a coil aerial).

6. The use of highly selective receiving apparatus, including a list of improved forms.

7. The use of receiving coil aerials instead of antennas, with special reference to high selectivity.

8. The reduction of interference with radio communication of other electrical processes, such as the operation of X-ray apparatus and electrical precipitation.

9. The study and standardization of wave meters.

RECOMMENDATIONS ON NOMENCLATURE

1. In place of the word "wireless" and names derived from it, use the prefix "radio"—radio telegraphy, radio telephony.

2. Instead of "statics" or "X's," use "atmospheric disturbances" or "atmospherics."

3. Disturbances produced by other stations to be designated as "interference."

4. For the generic title of the vacuum tube, of any number of electrodes, and in any of its recognized modes of operation, use "electron tube."

For the specific title of the ordinary three-electrode tube use "triode."

For the title of a triode employed in one of its regular modes use "rectifier triode," "amplifier triode," "generator triode."

5. In describing coupling of high-frequency circuits use "resistance coupling," "inductive coupling" (by self-inductance or mutual inductance), "capacity coupling."

6. For the generic title for a system of conductors for radiating or absorbing radio waves use "aerial." For an open circuit

aerial use "antenna." For a closed circuit aerial use "coil."

7. For a receiving arrangement in which beats are produced by a separate local oscillator, use "heterodyne." For a receiving arrangement in which the same electron tube is used for generating oscillations and detecting, use "self netro."

8. Classification of waves emitted by radio transmitters.

Type A—Continuous waves: Waves that in the permanent state are periodic and such that their successive amplitudes of oscillations are identical.

Type A-1—Manipulated continuous waves: Continuous waves of which the amplitude or frequency vary under the action of hand telegraphic manipulation.

Type A-2—Continuous waves with audible frequency modulation: Continuous waves of which the amplitude or the frequency vary according to a periodic law of audible frequency. This is commonly referred to as ICW method of transmission.

Type A-3—Continuous waves with speech modulation: Continuous waves of which the amplitude or the frequency vary in accordance with speech vibrations (radio telephony).

Type B—Damped waves.

Waves composed of successive trains in which the amplitude of the oscillations after having reached a maximum decreases gradually. This refers to waves from spark transmitter or other types of transmitters having a characteristic decrement similar to spark transmitters.

Note 1—If in continuous wave transmitters the rectified plate voltage is not substantially constant direct voltage, the station should be classed under Type A-2.

Note 2—In ICW transmitting stations if the variation in the wave length or frequency of the transmitted wave is effected in a gradual wave (sinusoidally) the station should be classed under Type A-2. If the variation in frequency or amplitude is abrupt (chopper method) it should be classed in Type B.

In order to differentiate between the amateur and the experimenter the following definitions are suggested for consideration.

The amateur is one who operates a radio station transmitting, receiving, or both, in a professional way, merely for personal interest or in connection with an organization of like interest.

An experimenter is one who operates a transmitting or receiving station, or both, for exclusively technical or scientific investigations.

Talks From Office to Ship

FOR the first time in the history of maritime radio, docking instructions were given verbally to the captain of a big trans-Atlantic liner by the manager of the line, seated in his office in New York while the ship was 360 miles at sea. This pioneer work in radio communication was accomplished by utilizing one of the latest developments of radio engineering, duplex radio-telephony, in conjunction with the usual land-line telephone.

While the America of the United States lines was 360 miles east of New York on the evening of March 5, Thomas H. Rossbottom, general manager of the S. S. lines, picked up the ordinary telephone on his desk and asked central to connect



Thomas H. Rossbottom, General Manager of the U. S. Lines, talking by wire and radio to Capt. Rind of the S. S. America 360 miles out at sea

him with the S. S. America, at sea. His line was connected through to the Deal Beach, N. J., station, and thence by radio to the ship.

Within ten minutes after the call was made Captain William Rind, of the America, was on the telephone. After an exchange of greetings, Captain Rind told Mr. Rossbottom the speed he was making, and the time he expected to reach Quarantine. Mr. Rossbottom in reply gave his instructions to Captain Rind concerning the special arrangements which had been made with the Public Health officials at the Quarantine station for the passing of the vessel after the sunset hour.

Mr. Rossbottom and Captain Rind conversed for several minutes. Mr.

Rosbottom, using the telephone at his desk, the one that is normally used in his daily business, and without any special appliances.

The interesting feature of a ship-board duplex installation is the fact that the antenna is being used to radiate several hundred watts of power while at the same time the radio receiver detects and makes audible the extreme amount of energy that is being picked up from the distant transmitting station. Much research has been done to allow this simultaneous transmission and reception to be carried on and a ship equipped with apparatus of this nature may communicate to any subscriber on land who has an ordinary telephone in his home.

Radio telephony, heretofore limited to a single operation — reception or transmission — has been revolutionized as a result of these tests. Up to this time the radio telephone has been handicapped by conditions similar to those of the ordinary apartment house speaking tube. It has been necessary for the operator to throw a switch when he



Duplex radio telephone equipment on the S. S. America

desired to talk after listening, or vice versa. This prevents a land-line telephone from being linked up with the radio telephone system, as it is not practical to provide a control or "send-receive" switch at each land phone.

With the advent of the duplex wireless equipment, however, a conversation may be carried on through the ether as simply and as naturally as between land telephones.

The equipment installed on the America consists of three main units — the Kenotron or power panel, the vacuum tube transmitter and the radio receiver. Power is supplied to the Kenotron panel in the form of low-voltage alternating current and after passing through the various pieces of apparatus comes out in the form of direct current at a very high voltage.

This high voltage is fed into the radiotron power tubes, where it is transformed into radio-frequency energy. Other radiotron tubes are used to control, or modulate, the high-frequency current.

General Electric Broadcasting Station WGY

A RADIO broadcasting station, more powerful than any now sending out programs, has been installed by the General Electric Company at its plant in Schenectady, N. Y.

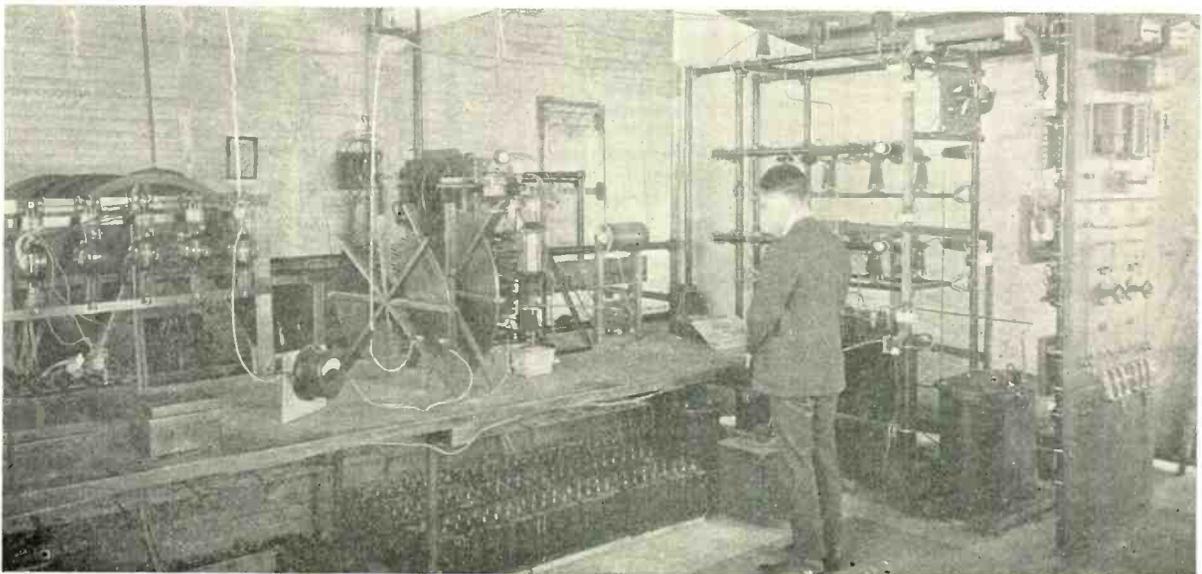
From the roof of a five story factory building, two towers 183 feet high and spaced 350 feet apart, support an antenna at such height as to give the wireless waves unobstructed freedom

to travel equally well in all directions.

This station has not been regularly operated nor has advance announcement been made of the impromptu or test programs sent out, which would cause amateurs to be listening, yet, letters have been received from such distant points as Cedar Rapids, Iowa, Minneapolis and Santa Clara, Cuba, the latter place 1450 miles distant, an-

nouncing that the programs have been heard. These reports come from operators who, in an evening's experimenting with their receiving sets, have accidentally come upon the waves from Schenectady and is in no way an indication of the full distance that this station may be heard.

Broadcasting stations, with but a fraction of the power of the G-E sta-



Interior of transmitting room in WGY, the General Electric Co. radio broadcasting station located at Schenectady, N. Y. View shows control panel at right and oscillator and modulator tubes at left

tion, have been heard at distances of 2,000 miles or more under favorable atmospheric conditions.

The General Electric station has been licensed to operate on a 360 meter wave length under the call letters of WGY. It is equipped with the most modern of radio apparatus, including the multiple-tuned antenna which, because of its many advantages, has been installed in Radio Central, the world's most powerful commercial station at Rocky Point, L. I., and other transoceanic stations of the Radio Corporation of America.

A three-room studio, where the programs are produced, is located in a Company office building, 3000 feet from the transmitting station. One room is used as a reception room for the artists, where they may sit and chat until their time on the program arrives without danger of interfering with what is going on in the studio. The second room is the studio, where a concert grand piano, victrola, an organ and other equipment for the artists are to be found. Here a number of portable microphones, which are commonly known as pick-up devices can be shifted about to locations best suited for the reception of announcements, musical numbers, or whatever may be sent out. In the room on the opposite side of the studio is apparatus for amplifying the sound waves before they are transmitted by wire to the broadcasting station.



One of the 183-foot towers at WGY

A red light when the station is in operation warns persons in the room that whatever they might say will be sent out to thousands of ears of an invisible audience. A switchboard in the studio is within reach of the studio director at all times. Not until he

throws a switch can anything reach the antenna. A telephone attached keeps him constantly informed just how the program is going out and enables him to change the position of the artist or microphone to improve the tone quality of the entertainment. With the exception of the small pick-up devices or microphones and the switchboard, there is nothing in this room to indicate it as being different from any musical studio.

In the apparatus room, the sound waves are put through a number of steps of amplification by means of vacuum tubes which increases their volume thousands of times. The amplified sounds are then put into a wire and sent to the broadcasting station, where they enter another bank of vacuum tubes, known as modulators or moulders of the electric waves.

A 220-volt alternating current line, which is but little higher than the voltage used for lighting purposes in the home, is boosted to 30,000 volts by means of a transformer. This voltage is then applied to a number of vacuum tubes, acting as rectifiers, which change the voltage to direct current. Placed between the rectifier and the modulator or moulding tubes, is a high power oscillator tube. The electric power entering this tube sets the ether into vibration and upon these vibrations the electric waves, moulded into shape in the modulator tubes, are sent to the antenna to go out into space.

Alternating Current for Filament and Plate

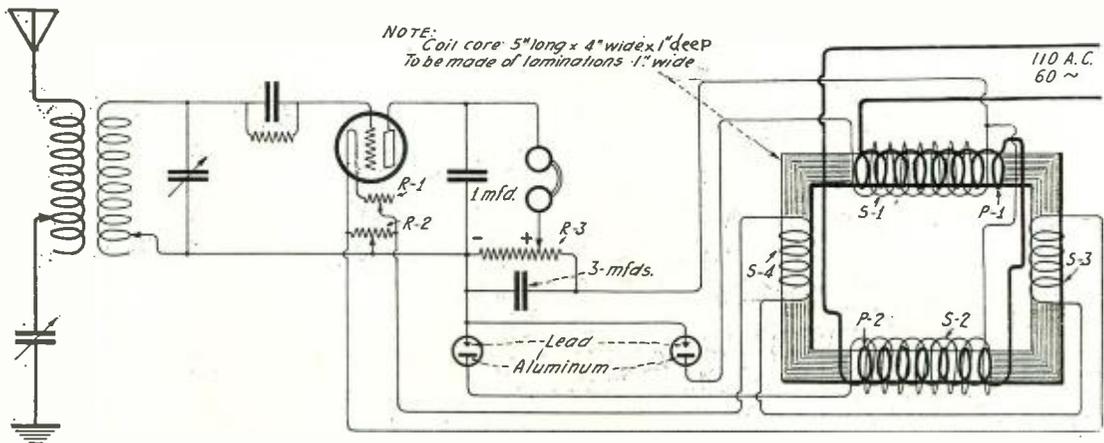
THESE has come to the editors of this magazine during the last month, many inquiries requesting a fuller and more complete explanation of the "first prize" article entitled "Filament and Plate Current Direct

practicability and utility to both the experimenter and the layman.

Though this method is very satisfactory to the amateur who has the necessary knowledge as to the theoretical operation of the circuits, it is prob-

complete satisfaction in the results obtained.

It seems, however, that this method is the logical solution for quite a few of the items of expense in connection with the average receiving outfit, and



Circuit diagram for filament and plate current supply from A. C. source

from A.C. Supply," in THE WIRELESS AGE prize contest for the month of March 1922, with opinions as to its

able that the average layman will experience some difficulty in securing such adjustments as will give him

if anyone is blessed with a small amount of patience and a knowledge

(Continued on page 55)

RADIOPHONE BROADCASTING

Texas Radio Market News

PLANS to install daily agricultural market news for Texas by radiophone, have been completed by officials of the State Department of Agriculture, State Department of Markets and Warehouse, the University of Texas and the Federal Bureau of Markets and Crop Estimates, Washington, D. C.

The necessity for a general diffusion of reliable information is evidenced by a growing public desire from all trades and professions, manifested in the great number of



"Listening in" at the corner storekeeper's

constant inquiries and requests received daily by State officials for information.

Since radio news broadcasting has been demonstrated as efficient, economic and instantaneous, it has been decided to put on the market service in a moderate way. The service will be known as the "Texas Radio Market News Service."

Daily market reports will be obtained from the central markets of the country through the Kansas City office of the United States Bureau of Markets and Crop Estimates and from other sections of the country through other agencies. The data will be collected by the State Department of Agriculture, compiled by the State Markets and Warehouse Department, and disseminated by the University of Texas. The news will be broadcasted through the university high-power radio station daily.

Broadcasting Stations

- KYW—360 meters. Daily, 8 P. M. Central time, 9 P. M. eastern time. Westinghouse Station located at Chicago, Ill.
- KDKA—360 meters. Daily, 8 to 10 P. M. Westinghouse Station located at East Pittsburgh.
- WBZ—360 meters. Sundays, Mondays, Wednesdays and Fridays, 8 P. M. Westinghouse Station located at Springfield, Mass.
- WNO—360 meters. Evenings 10.30 o'clock. Jersey Journal station located at Jersey City, N. J.
- WGI—360 meters. Evenings. American Radio and Research Corporation station located at Medford Hillside, Mass.
- WGY—360 meters. No schedule. General Electric Co. station located at Schenectady, N. Y.
- WJZ—360 meters. Daily, 11 A. M. to 10 P. M. Radio Corporation-Westinghouse Station located at Newark.
- WVP—1450 meters. Evenings 9 to 9.55 o'clock, except Sundays and Holidays. Signal Corps, Bedloe's Island, New York Harbor.

Stations Broadcasting Music and Speech on 360 Meters

- KDN Leo J. Meyberg Co. San Francisco, Calif.
- KGB Edwin L. Lorden San Francisco, Calif.
- KGC Electric Lighting & Supply Co. Hollywood, Calif.
- KGF Pomona Fixture & Wiring Co. Pomona, Calif.
- KFC Northern Radio & Electric Co. Seattle, Wash.
- KFU The Precision Shop Gridley, Calif.
- KHJ Louis Wassner Seattle, Wash.
- KIZ Reynolds Radio Co. Denver, Colo.*
- KJJ The Radio Shop Sunnyvale, Calif.
- KJQ C. O. Gould Stockton, Calif.
- KJR Vincent I. Kraft Seattle, Wash.
- KLB J. J. Dunn & Co. Pasadena, Calif.
- KLP Collin B. Kennedy Co. Los Altos, Calif.
- KLS Warner Bros. Oakland, Calif.
- KOG Western Radio Electric Co. Los Angeles, Calif.
- KQL Arno A. Kings Los Angeles, Calif.
- KUD The Examiner Printing Co. San Francisco, Calif.
- KVQ J. C. Hobrecht Sacramento, Calif.
- KWG Portable Wireless Telephone Co. Stockton, Calif.
- KYY The Radio Telephone Shop San Francisco, Calif.
- KYJ Leo J. Meyberg Co. Los Angeles, Calif.
- KZM Preston D. Allen Oakland, Calif.
- KZY Atlantic-Pacific Radio Supplies Co. Oakland, Calif.
- WBU City of Chicago Chicago, Ill.
- WCJ A. C. Gilbert Co. New Haven, Conn.
- WCR L. Bamberger & Co. Newark, N. J.
- WDM Church of the Covenant Washington, D. C.
- WDT Ship Owners Radio Service New York, N. Y.
- WDF Radio Construction & Electric Co. Washington, D. C.
- WFO The Rike Kuller Co. Dayton, O.*
- WGH Montgomery Light & Water Power Co. Montgomery, Ala.*
- WGL Thomas F. J. Howlett Philadelphia, Pa.
- WHA University of Wisconsin Madison, Wis.*
- WHK Warren R. Cox Cleveland, O.*
- WHQ Rochester Times Union Rochester, N. Y.*
- WHU William B. Duck Co. Toledo, O.*
- WHW Stuart W. Seeley East Lansing, Mich.*
- WJH White & Boyer Washington, D. C.
- WJK Service Radio Equipment Co. Toledo, O.*
- WJX DeForest Radio Telep. & Teleg. Co. New York, N. Y.
- WLB University of Minnesota Minneapolis, Minn.*
- WLK Hamilton Mfg. Co. Indianapolis, Ind.
- WLW Crosley Mfg. Co. Cincinnati, O.*
- WMH Precision Equipment Co. Cincinnati, O.*
- WOC Karlova Radio Co. Rock Island, Ill.*
- WOG Hatfield Electric Co. Indianapolis, Ind.
- WOQ Western Radio Co. Kansas City, Mo.*
- WOK The Pine Bluff Co. Pine Bluff, Ark.
- WOU Metropolitan Utilities District Omaha, Neb.*
- WOR L. Bamberger & Co. Newark, N. J.
- WOS Missouri State Marketing Bureau Jefferson City, Mo.*
- WOZ Palladium Printing Co. Richmond, Ind.*
- KQV Doubleday-Hill Electric Co. Pittsburgh, Pa.
- KQW Charles D. Herrold San Jose, Calif.
- WRK Doron Brothers Electric Co. Hamilton, O.
- WRL Union College Schenectady, N. Y.
- WFB Newspaper Printing Co. Pittsburgh, Pa.
- WSZ Marshall-Genken Co. Toledo, O.*
- WWJ The Detroit News Detroit, Mich.*

* Stations broadcasting market and weather reports on 485 meters in addition to music on 360 meters.

Radio Broadcasting Surveyed

By William H. Easton, Ph. D.
(Westinghouse Elec. & Mfg. Co.)

APPARENTLY the first person to conceive of the transmitting of music from distant concert halls to the home was Edward Bellamy. In his famous book, "Looking Backward," which was written in 1887, to describe conditions that would exist in the year 2000, is the following interesting passage:

Edith Leete, the heroine, has invited Julian West (the victim of the strange mesmeric accident that sent him to sleep for 113 years) to hear



"Listen In"

This **MINTER** **New Radio Bungalow** \$1950

Erected Complete Within Reasonable Distance of New York City

There's a delightful treat awaiting the owners of Minter-Radio Bungalows. Get away from the city this summer, yet "listen in" radio outfit includes amplifier, and will cover a radius of 40" to 500' with "listen in" radio outfit.

Radio bungalows are now in style

music produced by ultra-modern methods.

"I was prepared for new devices in musical instruments," says West, "but I saw nothing in the room which by any stretch of the imagination could be conceived as such. It was evident that my puzzled appearance was affording intense amusement to Edith. "Please look at today's music," she said, handing me a card, "and tell me what you would prefer. It is now 5 o'clock, you will remember."

"The card bore the date Sept. 12, 2000, and contained the longest programme of music I had ever seen. I remained bewildered by the prodigious list until Edith's pink finger-tip indicated a particular section of it, where several selections were bracketed with the words '5 P. M.' against them; then I observed that this prodigious programme was an all-day one, divided into twenty-four sections answering to the hours. There were but a few pieces of music in the '5 P. M.' section, and I indicated an organ piece as my preference.

"She made me sit down comfortably, and, crossing the room, merely touched one or two screws, and at once the room was filled with the music of a grand organ anthem. I listened, scarcely breathing, to the close.

"Grand! I cried, as the last great wave

of sound broke and ebbed away in silence. 'Bach must be at the keys of that organ; but where is the organ?'

"Wait a moment, please," said Edith, "I want to have you listen to this waltz before you ask any questions. I think it is perfectly charming;" and as she spoke the sound of violins filled the room with the witchery of a summer night. When this had also ceased, she said, "There is nothing in the least mysterious about the music, as you seem to imagine. It is not made by fairies or genii, but by good, honest, and exceedingly clever human hands. There are a number of music rooms in the city perfectly adapted acoustically to the different sorts of music. These halls are connected by telephone with all the houses of the city whose people care to pay the small fee."

A masterly prophesy, but truth is far stranger than fiction. What would Bellamy have said if told that the concerts he foretold would be realities in 1922, but that the music would be conveyed without wires or any other tangible medium; that the especially-equipped concert halls would be located in cities hundreds of miles apart; and that no fee whatever would be required of the listeners?

Today ethereal concerts can be heard by sensitive receivers in almost every part of the United States. The trapper in Canada and the rancher of Texas alike ask to be provided with the daily programmes of the various stations. More than 500,000 listening stations are in active operation; and since most of these accommodate the entire family and many have loud speakers that serve audiences of hundreds at a time, it seems certain that several million people are enjoying this novel form of entertainment and instruction every night.

What the future of the radio telephone will be it is impossible to say. The only invention it can be compared with is the printing press. Gutenberg certainly could not foresee what was going to happen to the world because it occurred to him to make books by means of separate types; nor have those engaged in developing radio telephone sufficient vision to know what will happen when the voice of a single person can instantly reach everyone in North America.

* * *

Christy Mathewson Interested in Radio

CHRISTY MATHEWSON, famous Giant pitcher, has become interested indirectly in wireless telephones since his son, Christy, Jr., has installed both a receiver and sending outfit in their apartment at Saranac Lake, N. Y., where they listen to the "music in the air" sent out from Newark, Pittsburgh, Chicago and other points. He awaits with interest the sending of the news reports of the day, and he is looking forward with much interest to the opening of

the baseball season, when he will be able to obtain the results almost immediately after they have happened.

* * *

WGY "Listens Good"

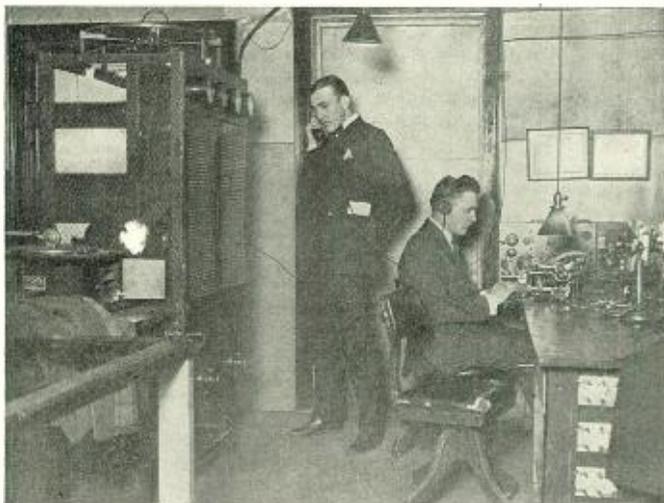
WGY, the General Electric Radio-Phone Broadcasting Station at Schenectady, N. Y., has been heard in Minneapolis, 1,100 miles distant, and also in Santa Clara, Cuba, 1,450 miles away. The following cablegram was received from Cuba: "We danced new radio fox-trot last night. Send program. Wonderful reception."

Reports from other cities follow: Minneapolis, Minn.—While feeling around for KDKA this evening, picked up your concert. I did not know it at the time as I thought I

Springfield, Mass.—Your music and voice came in the best and clearest that we have ever received on second stage. Even the harmonics in The Son of the Puztta of Keler Bela came in as clear and distinct as if you were playing in the room.—C. C. Waldron.

Hamilton, Canada—This is just to advise you that we heard part of the program last night very distinctly on the small receiving set my boy has. I presume that Hamilton is about 350 miles from your city. The violin solo by Mrs. Peter Smith was particularly clear and we heard the entire number from start to finish just as plainly as though it was being played in a room adjoining.—G. Allan.

Blissfield, Mich.—We appreciate



Interior of KYW, the Westinghouse broadcasting station located at Chicago

had KDKA, and you cannot imagine my surprise when I heard you make the announcement that you were WGY. I certainly enjoyed the concert very much. Came in very QSA. Modulation fine. I am using a short-wave variometer set, detector and one stage, but just had detector bulb lit as I did not need any more. I wish you would send me schedule of your concerts so I can get you again.—W. G. Peaslee.

Portland, Me.—In response to your request last evening from parties who heard your concert, the writer begs to state that same was received at Cape Elizabeth, Maine. The writer enjoyed the program very much and wishes to state that it was the clearest that I have received since I had the station in operation for the past month.—E. S. Lincoln.

Warren, Ohio—I was among your unseen audience last night and wish to say that we received your concert very plain and distinct.—Wm. C. Hein.

concert which you gave us tonight. It came in splendidly and was one of the best ever received.—Ina Staup and Haden Porter.

Pawtucket, R. I.—I had the pleasure of listening to the last two numbers of your concert last evening, and they were very enjoyable. The piano and violin I heard as plainly as if they were in the same room and were perfect as to modulation.—Fred W. Eaton.

Boothbay Harbor, Me.—The concert that your station gave out last evening was the most perfect toned and clearest that I have ever received, and I receive from five to seven stations a night. I use a set that I have made. Radiotron tube. I entertained a small party of friends and also, by holding one of the receivers in front of the telephone, gave a concert to several people three or four miles away. They said that the piano sounded as clear as though it was in the next room.—Charles B. Dolloff.

Supply of Radio Apparatus

THERE has been considerable agitation recently over the supply of radio apparatus and requests have come from all quarters asking that the position of the Radio Corporation with reference to this condition, be defined.

The Radio Corporation of America is endeavoring in every way possible to meet the unprecedented demand for radio devices, including vacuum tubes, broadcasting receivers and other equipment, which has recently developed, not only on the part of the amateur and experimenter, but also on the part of a great

of radio devices can only be properly taken advantage of if all those who are interested in distributing and selling this apparatus, properly equip themselves to handle this class of merchandise in a satisfactory way. This means that the dealer or whoever is effecting the sale to the consumer, must familiarize himself with the product, explain its capabilities as well as its limitations and lend assistance in every way toward the proper installation and maintenance of radio sets.

Those who desire radio equipment and cannot for the moment obtain it, should be informed that the pres-



Radio reduces the cares of Ma and Pa in this family

many people who desire to equip their homes with suitable radio telephone devices for receiving music, concerts, lectures and other interesting features transmitted from radio telephone broadcasting stations.

The factories of the General Electric Company and of the Westinghouse Electric and Manufacturing Company, which are manufacturing such devices for the Radio Corporation of America, are now operating on a greatly expanded production program, and it is expected that within the next few weeks considerable quantities of material will be shipped on orders already placed with the factories by the Radio Corporation. These will be delivered to customers as rapidly as received in the warehouse.

Distributors are requested to communicate the above information to dealers and to inform them that orders will be filled just as promptly as possible. This applies to all classes of radio apparatus, including Radiotrons, Vacuum Tubes, etc., which are employed for reception.

Radio broadcasting is here to stay. The great opportunities for the sale

ent shortage is but temporary and due entirely to the great demand which suddenly came as a result of broadcasting, and that the Radio Corporation and its associates, the General Electric Company and the Westinghouse Electric and Manufacturing Company, are doing everything in their power to produce the necessary apparatus with maximum speed; that normal production is expected to begin within the next few weeks and that deliveries will then be promptly made.

A new catalog covering all of the radio devices being manufactured for the Radio Corporation of America by the General Electric Company and the Westinghouse Electric and Manufacturing Company, is now in course of preparation and it is expected that it will soon be available for distribution.

* * *

Secretary Denby "Listens In"

AMONG prominent officials in Washington who have private radio sets in their offices is Edwin Denby, Secretary of the Navy.

President Harding Greet Masons by Radiophone

THE resonant voice of Warren G. Harding, President of the United States, passed through the air between Washington and Utica, conveying his greetings and good wishes to the Utica Masonic Craftsmen's Club on the occasion of the opening of its 1922 Follies at the Masonic Temple.

The President sent this message: "Greetings and good wishes to the Craftsmen's Club. Sincere congratulations on its progress toward full realization of the humanitarian ideals of a noble and inspiring order." The message was conveyed from the President's private telephone in the White House to the Anacostia Naval Wireless station five miles out of Washington, where a giant amplifier sent the words on their way north.

Immediately upon the receipt of the message the following reply was transmitted:

Hon. Warren G. Harding, President of the United States:

Your greetings and good wishes gratefully received.

Your message inspires our members to prayer that God may bless you and that our high ideals may be fully realized.

E. William Reusswig.

* * *

Movies and Radiophones

IS the radiophone destined to become a feature of motion picture theatre entertainment?

This interesting question is well to the point in view of recent installations of wireless telephonic receiving apparatus in various playhouses throughout the country. While the matter cannot be said to be an entirely new innovation in the theatrical field, radiophones having been used in some of the larger theatres in connection with special events such as Presidential election returns and the like, indications at present point to a more widespread and actual interest in the subject.

The most recent radiophone receiving instruments to be installed in a motion picture theatre is the one at the Palace Theatre, Peoria, Illinois. Upon its success and the possibilities of entertainment which it affords, as well as the reception of the feature by the audience as a part of the Palace program, will depend the inauguration of similar arrangements in other houses.

Immediately following the installation of the instrument at the Palace Theatre two other Peoria playhouses announced plans for similar arrangements.

The first radio entertainment at

the Palace Theatre was given February 15 to 1,500 patrons at the regular show. When the curtain was raised at 9 o'clock the audience saw a radiophone on the stage and heard music from the transmitting station at Bradley institute. News bulletins received by a local paper were also transmitted to the audience. In the future patrons will hear radio matter transmitted from all parts of the country, including speeches, music, fight returns, baseball news and in fact anything else that may be picked up from the air and made audible to those in the theatre.

Further use of the radiophone will be made by the Palace Theatre by throwing the house open to the public on Sunday mornings to hear sermons and lectures broadcasted.

According to the Palace Theatre managers, the demonstration met with the hearty approval of the audience and furnished a new thrill.

* * *

Tonsorial Parlor Installs Radio

THE radio family grows. Now it has a barber.

Patrons of E. E. Gist's barber shop at Detroit, Mich., hear above the singing of razor blades and the hum of vibrators, soothing music, striking speeches and interesting news bulletins coming into the shop by wireless.

"It's just an experiment," said Mr. Gist. "If it works out I plan eventually to put them in all my shops. There is no reason why a man should sit idly by while being shaved or having his hair cut, is there? With this wireless perfected he can sit back and listen to good music and speeches, get the news of the day and enjoy himself.

"You know the worst thing about a barber shop for the average man is the chatter he has to listen to from the barber who is working on him and who doesn't know that men don't like to be talked to while being shaved. Now with this wireless, men coming in here will enjoy a quiet and instructive entertainment."

* * *

"Tuning In" on Congress

A DEBATE in Congress occurred recently concerning the installation of a radiophone broadcasting station in the Capitol. It was suggested that the people of this country might like to "listen in" on this august body. What would happen if our congressmen and representatives knew that the entire country was listening to their debates and speeches?

This is a question for politicians to answer.

Telephone Company's Accomplishments and Plans

WITH the opening on July 16, 1920, of the Avalon-Los Angeles Radio Toll Circuit, operated as a part of the telephone system by the Pacific Telephone and Telegraph Company, radio was introduced to regular telephone users. Connection to the wire circuits of the telephone system is provided on Santa Catalina Island and on the mainland at Long Beach, Cal. The circuit is equipped for through-line ringing, which is almost interference proof, and a system of simultaneous duplex telegraphy. The telegraph circuit, with terminals at Los Angeles and Avalon, replaced the Naval Telegraph Service when it was opened to commercial service on July 1, 1921.

On the Atlantic coast the problem of ship-to-shore communication has been studied in great detail and the experimental shore stations at Green Harbor, Mass., Cliffwood, N. J., and Deal Beach, N. J., together with the experimental ship stations installed on the SS. Gloucester and the SS. Ontario, were used in these extensive tests. The radio circuits on both the Atlantic and Pacific gave such satisfactory transmission as to permit their being connected to the longer telephone circuits of the Telephone system. This was dramatically demonstrated before the Communication Conference when the Gloucester, riding in the Atlantic, spoke with Avalon, Santa Catalina Island, in the Pacific.

More recently, however, broadcasting has come to be the vogue. With facilities for development increased, sending stations from which broadcasting was done were set up, and thousands of radio amateurs, whose receiving stations sprang up like mushrooms, were treated nightly to wireless concerts, market reports and the like.

A permit has been granted for the erection of a radio telephone broadcasting station by the American Telephone and Telegraph Company on the roof of the twenty-four-story operating building between Walker and Lispenard streets, New York.

The new line of business to be handled by this radio telephone broadcasting station will be in charge of the Long Lines Department of the American Telephone and Telegraph Company.

For some time the radio section of the company's engineering department has been carrying on broadcasting experimentally. The record distance from which signals were heard was approximately 3,300 miles, when the station was

heard by R. H. Horn of the Radio Corporation of America aboard the SS. Col. E. L. Drake, at sea 1,000 miles west of San Francisco. Other distant points heard from were Avalon, The Anaheim, Santa Maria, Oakland, Berkeley and San Anselmo, all of California; Pima and Clifton, Arizona; Silver City and Roswell, New Mexico; Vera Cruz, Mexico, and Halifax, Nova Scotia.

* * *

1,000 Dance to Radio Music

MORE than 1,000 care-free lads and lassies wriggled their silken ankles to jazz melodies wafted on air waves over the Jersey meadows from Newark to Terrace Garden, New York, when the Empire State Novelty Six threw their saxophones into high and moaned ten miles away. The loud speakers and power amplifiers installed in the Garden and used for transmitting dance music batted 1,000. Scores of artists—vocal and instrumental—applauded the innovation. The overflow from the Radio Convention regarded the novelty as significant of what may be accomplished with music and waves. Hotels in Florida received the same music and undoubtedly many informal dances took place which have not been noted.

The melodies were perfectly timed, and the dance music continued from 10 to 11 o'clock.

* * *

Radio Fans Mail Church Collection

WHEN the Rev. Edgar S. Wiers, pastor of Unity Church at Montclair, N. J., delivered a sermon recently which was broadcasted by radio telephone from the WJZ station in Newark, he did not expect that there would be any collection taken up as the result of his wireless services.

Such has been the case, however, for he has received several letters containing money contributions for his church from people who listened in at distant points in New York and New Jersey.

* * *

Employees Band at WJZ

JUST to show the world that all the good talent hasn't left Newark, employees of the Westinghouse Electric and Manufacturing Company put on their own broadcasting feature recently.

The Westinghouse Employees' Association Band presented a programme of popular pieces in a manner that the workers at the big broadcasting station are confident will compare with the best outside talent. The band consists of twenty-eight pieces.

EXPERIMENTERS' WORLD

Views of readers on subjects and specific problems they would like to have discussed in this department will be appreciated by the Editor

Heating Vacuum Tube Filaments from 110 Volts D.C.

By H. P. Thomas

FIRST PRIZE \$10.00

THESE is no question about the advantages of using the D.C. lighting circuit for lighting the filaments of vacuum tubes for receiving. The only question in the mind of an amateur who has a direct current lighting circuit is how to use it to the best advantage. I have used direct current with great success with very simple apparatus, and besides lighting the bulbs, I have added other desirable features.

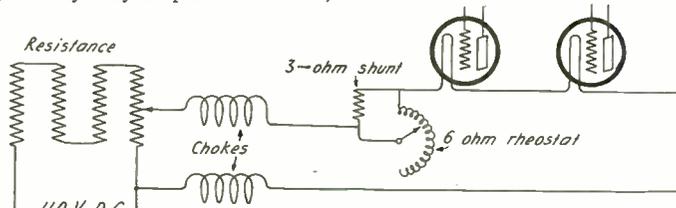
The resistance I use to cut down the voltage of the 110-volt line is a resistance similar to that used to run toy electric trains. It is composed of four porcelain tubes wound with German silver wire. On one coil is a slider to vary the current. Any amateur should be able to pick up such a piece of apparatus second hand easily, or he may build a similar one very easily. The resistance of the whole thing is about 45 ohms, and enough wire should be used to get this resistance. It should be noticed on the diagram, that the apparatus to be run is not merely placed in series with the resistance, but is shunted across a part of one coil.

Before using this apparatus, two small choke coils should be inserted in the leads from the resistance to the bulb. If this is not done, considerable inconvenience will be experienced from the hum from the generator, which becomes very annoying when listening for faint signals. I have successfully

used the magnets from a four-ohm telegraph sounder for this purpose. Magnets for telegraph sounders can be obtained separately very cheaply, if the amateur has none on hand. By using these chokes, the hum is cut down so that it is practically impossible to hear it.

If more than one bulb is used, they may be connected either in parallel, as usual, or they may be placed in series,

the current to about the desired amount, and then by using a low resistance rheostat instead of the usual form, very close adjustment of the current can be obtained. To avoid making a rheostat to get lower resistance, a very good way to do is to use an ordinary rheostat of about six ohms resistance shunted with a resistance of three ohms. The rheostat will then have a total resistance of two ohms. A resistance to be used as a shunt in this way can be made from



Circuit diagram using D. C. house-lighting current for vacuum tube filaments

and one rheostat used to control the current through all the bulbs. Higher voltage is needed for this method. By merely pushing up the slider on the main resistance, voltages anywhere from about three or four up to twenty-four or five can be secured.

One advantage to be gained by using this resistance is close adjustment of the current supply, equal in fact, to that obtained by the use of a vernier rheostat. The slider on the main resistance can be varied so as to bring

about five feet of No. 30 iron wire. This can be wound into a coil of any convenient shape. I have used this method with very good results, and find it especially useful in tuning in C.W. stations, where a critical adjustment of the filament current is necessary.

If this entire apparatus is bought new, it should not cost more than a storage battery, and, unlike a storage battery, if obtained second hand, it is as good as when new.

Alternating Current for Vacuum Tube Filament

By S. Weitzer

SECOND PRIZE \$5.00

THE following experiments for replacing the storage battery for filament lighting were carried out by the writer, not as a means of temporary replacement, but for the permanent replacement of the expensive storage battery. For some time the writer was unable to obtain the use of a storage battery and later secured one of small capacity, which was not very satisfactory. Considerable time has been spent in attempting to

devise a scheme whereby satisfactory results could be obtained from the 110 volts, 60 cycle lighting circuit. I shall state here frankly and accurately the results obtained.

The writer possessed two tubes: a Radiotron detecting (UV-200), and an amplifying tube. In the circuit of figure 1, the soft tube was first employed in an ordinary rectifying circuit. As

the slider on the potentiometer was varied the A.C. hum was reduced considerably, but even at the best adjustment the induction was very uncomfortable and drowned out signals below a medium intensity.

The amplifying tube gave far better results in this circuit and the hum was practically inaudible — in fact, less than the induction often encountered in many stations. Obviously the hard tube gives more satisfactory results

than the soft tube. Each tube was introduced into a regenerative-oscillating circuit. The hum of the soft tube was partly reduced upon maximum regeneration, but again became loud when the circuit was oscillating. The amplifying tube acted conversely. Slightly louder induction was obtained upon regeneration, but even then it was much weaker than that obtained with the detecting tube. When the tubes were brought into oscillation the amplifier was noiseless, and on long waves

most effectively prevent any current at that frequency to flow through it, but will easily allow current at any other frequency to pass. Such a circuit is known as a tuned impedance and reflects back any alternating current at the frequency to which it is tuned. The condenser B provides an easy pass for any high frequency current.

The transformer is a small toy transformer giving about six volts. The potentiometer may be of any resistance from 100 to 300 ohms. The rheo-

stat should be adjusted before the potentiometer, as any change in the resistance of the rheostat will necessitate a readjustment of the potentiometer. The transformer and all A.C. wiring should be placed as far away from the receiving equipment as possible.

Most satisfactory results are obtained with the hard tubes. In the short-wave variometer type of receiver the circuit breaks into a ham at certain points, and is not as satisfactory as the three-coil receiver, the latter being ideal on long waves.

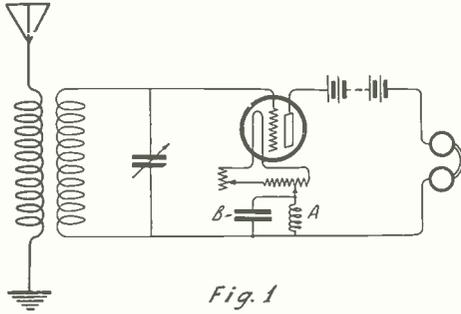


Fig. 1

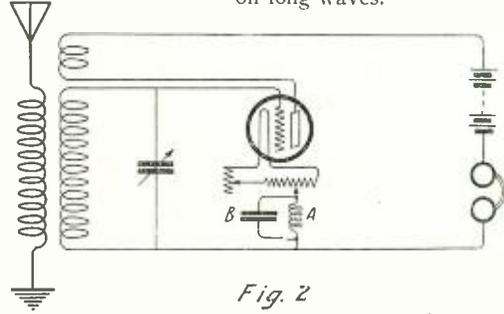


Fig. 2

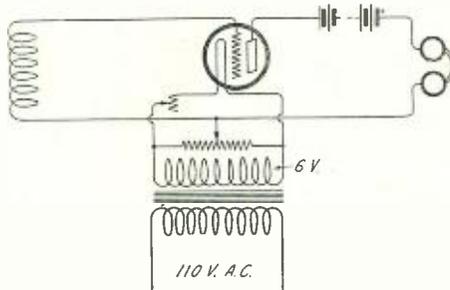


Fig. 3

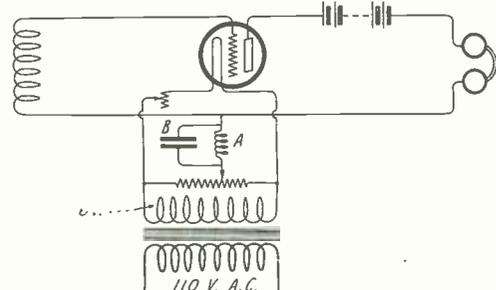


Fig. 4

Hook-ups using A. C. supply for vacuum tube filaments

the action was the same as when the filament was lighted from a storage battery. The writer now uses regularly the amplifying tube in a regenerative circuit employing spider-webs or honeycomb coils, and enviable results are obtained.

It will be noted that essentially the usual method of balancing the voltage is employed. A potentiometer of 300 ohms resistance is shunted across the filament and transformer terminals. It is obvious from figure 3 that aside from induction from the filament to the other elements, the only means any A.C. has of getting into the circuit is from the common point on the potentiometer. Into this circuit is introduced a choke coil shunted by a large condenser (figure 4). The inductance used was a one pound spool of No. 36 D.C.C., and the condenser of about 4 mfd. A section of a spark coil — minus core — may be used as an inductance. Various values of inductance and capacity should be tried.

The circuit, AB (figure 2), has a frequency of approximately 60 cycles or a wavelength of 5,000,000 metres. This circuit which possesses the same frequency as the lighting circuit will

Prize Contest Announcement

The subject for the new prize contest of our year-round series is:

RADIO-DETECTOR - AUDIO CABINET

CLOSING DATE :: :: MAY 1, 1922

Contestants are requested to submit articles at the earliest practical date.

Prize winning articles will appear in the July, 1922, issue.

All manuscripts should be addressed to the CONTEST EDITOR OF THE WIRELESS AGE.

Considerable interest is being displayed just now in detector-amplifier cabinets employing one or more steps of radio frequency amplification, a vacuum tube detector and one or more steps of audio frequency amplification.

Prizes will be awarded to best articles on this combination cabinet and should contain constructional data wiring diagrams and wherever possible, photographs.

PRIZE CONTEST CONDITIONS—Manuscripts on the subject announced above are judged by the Editors of THE WIRELESS AGE from the viewpoint of the ingenuity of the idea presented, its practicability and general utility, originality and clearness in description. Literary ability is not needed, but neatness in manuscript and drawing is taken into account. Finished drawings are not required, sketches will do. Contest is open to everybody. The closing date is given in the above announcement. THE WIRELESS AGE will award the following prizes: First Prize, \$10.00; Second Prize, \$5.00; Third Prize, \$3.00, in addition to the regular space rate paid for technical articles.

The Monthly Service Bulletin of the NATIONAL AMATEUR WIRELESS ASSOCIATION

Guglielmo Marconi
President

J. Andrew White
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Founded to promote the best interest of radio communication among wireless amateurs in America

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HEADQUARTERS: 326 BROADWAY, NEW YORK

THE equipment used by G. J. Eschauzier, 19 Parkweg, The Hague, Holland, at the demonstration of radiophone reception from Pittsburgh and New York, but owing to disturbances from a leaky high-voltage power line nearby could not successfully carry out the program. Arrangements were made with a radio station at Taylorville, Ill., however, and the latter station received the Pittsburgh music and speech and retransmitted it by radiophone to Springfield, where it was clearly heard by means of loud speaking equipment.

△ △

THE call of the amateur station of A. C. Mertz, Mt. Carroll, Ill., has been changed from 9AKR to 9ZG.

△ △

A RADIO club has been organized at Bellaire, O., which is known as the Allied Radio Club, of Bellaire and Shadyside. W. J. Irvine is president. All amateurs interested are invited to join.

△ △

IN response to an inquiry, the Postmaster General of Great Britain replied that the number of radio licenses issued to amateur experimenters for reception only was 6,986, and for transmission 286.

△ △

THE equipment used by G. J. Eschauzier, 19 Parkway, The Hague, Holland, at the time signals from Station IBCG, Greenwich, Conn., were heard during the Trans-Atlantic tests, consisted of the following:

Aerial: Three wires 60 feet long, 35 feet above house which is 45 feet high.

Apparatus: A four-electrode Schottky tube, as a detector, with two steps of audio-frequency amplification.

Receiver: Two-circuit, with variometer coupling.

△ △

RADIO students at St. Xavier college Cincinnati, O., enjoyed the concert given by the Detroit Symphony Orchestra at Detroit, Mich., on February 10, when they listened to the wireless at that institution.

△ △

THE Radio Club of Long Island has elected P. B. Ferguson honorary president; J. D. Fowler, acting president; Samuel M. Christie, vice-president; William Eckert, secretary, and Edward Fenn, treasurer.

A board of directors has also been elected with Ed. Fuerhusen, operator of a radio station in Richmond Hill, as chairman; other members of the board are: L. S. Browne, F. W. Miller, William Reuman.

△ △

AGAIN the radio department of the University of Vermont has come into the limelight as one of the leading amateur radio stations in the United States. According to information recently received by G. H. Brodie, U. V. M., '21, in charge of

the radio station at the University, the calls of this station have been heard by the station at Avalon, Catalina Island, 30 miles off the coast of California, also by the station at Tucson, Arizona, and by a ship in port at Chorrera, Mexico. This means that the station at the University of Vermont, with the low power and low wave length which amateurs are obliged to use in operation, has been able to bridge the continent, a feat accomplished by only one other station using a single 50-watt Radiotron.

In connection with this accomplishment, and the record which the University of Vermont made during the recent trans-Atlantic tests of the American Radio Relay League, Mr. Brodie says:

"We believe that these transmissions, in connection with our transmission to Scotland, during the trans-Atlantics, constitutes a new record for total miles covered by a fifty-watt CW set.

"The wave length on which these transmissions were made was approximately 225 meters."

Official recognition of the receipt of calls from the U. V. M. station by the station at Avalon, Catalina Island, California, was received by Mr. Brodie from Lawrence Mott, associate editor and president of The CW Association of America, who wrote Mr. Brodie under date of January 26:

"Just a few lines to apprise you of the fact that last night, at 1.52 a. m., Pacific Coast Time, I got your calls and the reception of your signals was very good."

△ △

FROM every corner of the city and neighboring counties radio men attended a regular monthly meeting of the Tri-County Radio Club on February 5 in the John Marshall High School. The program for the evening consisted of talks and practical demonstrations in radio work.

△ △

HAROLD M. LEFFINGWELL, 23 years old, 1010 North Pine street, Lansing, Mich., is said to be the only blind person in the United States who has successfully passed the Federal "first grade amateur" radio examinations. In tests held here in Lansing recently by A. F. Parkhurst, Federal examiner this youth, who has never seen the light of day, passed the highest examination in the class, with a grade of 93 per cent.

Harold studied at home, first learning the mysterious touch system of reading by the Braille method from books with pages of raised letters.

"It was just a step, you see," he explained, "from the dots of the Braille books to the dots and dashes of the telegraphic code. And then I became interested in wireless about two years ago."

In addition to reaching a high stage of proficiency in wireless telegraphy, that permits him to send 25 to 30 words a minute, and to receive 20 or more, to adjust, install

and care for his own instruments, Harold is an efficient stenographer and piano tuner.

Though his sending apparatus is limited to sending but a few miles, Harold and his friends, many of them blind and students at the Lansing School, have listened in on radiophone messages and concerts broadcast from far and near. The Government radio station at Arlington, ships in mid-Atlantic, and The Detroit News carry on by day and night with countless others in penetrating space, and each is at the finger tips of the blind youth.

His equipment for sending and receiving is simple, but practical and effective. The antenna strung between the house and barn at an average height of 30 feet, is 80 feet long and consists of two strands of No. 14 copper wire. He uses an old-form tuner, and simple audion detector. He has no amplifier, but uses double phones. The addition of a "squeek-box" or spark coil, gives his equipment a sending radius of a few miles, sufficient to converse with other amateurs about Lansing and East Lansing.

△ △

THE first successful wireless track and field meet in the history of radio telegraphy was held between the Universities of Iowa and Wisconsin recently. Through the co-operation of the Electrical Engineering and Athletic departments of the two universities this novel scheme worked perfectly in every detail. The events of the meet were staged with the Iowa team running against time at Iowa and the Wisconsin team running against time at Wisconsin. Immediately after each event the time and score were exchanged by radio between the Wisconsin station and the Iowa station, and in this manner the meet progressed exactly as if the two teams were at one place and not several hundreds of miles away as was the actual case. Experienced operators handled the wireless instruments at both stations and the exchange of scores took place without a break in the entire program.

△ △

PROF. F. F. HOUSEHOLDER is now installing a complete radiophone equipment in the physics laboratory of Municipal University, Akron, O. When finished, students will be able to hear concerts and addresses from New York, Pittsburgh, Chicago and other large cities.

△ △

THE Monthly meeting of the Gargoyle club of St. Paul, Minn., was held at the St. Paul Athletic club on February 13. The program was in keeping with the St. Valentine day spirit and the commemoration of Lincoln's birthday.

Dinner was followed by entertainment, after which the members joined the Engineers' Society in another room to hear an address on "Modern Radio Communication," by Prof. C. M. Jansky, Jr., of the University of Minnesota.

WITH the adoption of a constitution and by-laws, election of officers and the completion of other details, formal organization of the Milford, Conn., Radio Club took place recently at an interesting meeting held at the radio station of W. H. Gilbert at the rear of 14 Center street. Plans were also discussed for the future of the organization, and judging from present indications, it will not be long before Milford will be a center of radio activities.

△ △

THE Harvard Wireless Club is working on plans for an intercollegiate wireless news service, it was announced recently. The club has arranged to have men on duty at certain hours each day and will try to draw up schedules with other colleges. The club is equipped with a transmitting set which will send 500 miles and a receiving set which will pick up messages from any point in the United States east of Mississippi.

Arrangements are to be made with Dartmouth, Princeton, Yale, Brown and Tufts for the proposed news service.

tary Hoover vehement denial that the conference had such a purpose.

Mr. Hoover declared whoever started such a report was "maliciously fabricating." The Secretary asserted that the primary purpose of the conference was for the protection and encouragement of amateurs in the use of the new means of communication.

△ △

THE Hudson County Radio Club, with which many amateurs are affiliated, held its regular semi-monthly meeting on February 13 at the Standfast Club, Bacot Place, Jersey City, and the affair was well attended. The regular routine business was transacted.

Gaylord Smith of Jersey City, the president of the club, who had charge of 2AWE station, spoke on the development of radiophones. He spoke at length on the subject and described the various pieces of apparatus composing the instrument.

△ △

BOYS and girls of the John Ericson Junior High School, at Guernsey street and Meserole avenue, Brooklyn, have be-

which has been formed at Stevens Institute of Technology, Hoboken. Men interested in the valuable help and advice given by the "Tech" radio operators should attend the next meeting of the club and arrange to join it. The club plans to hold a number of sessions during the spring term and talks on subjects of a popular and practical nature are being scheduled.

Recent developments in the radio world, the broadcasting of music and news, and the unprecedented interest aroused everywhere by the practical use of wireless are the factors behind the statement issued by the Radio Club, offering its co-operation.

At a recent meeting of the organization, B. Guild, '23, was elected president for the remainder of the term and H. Schlecta, '23, was chosen secretary-treasurer.

△ △

WIRELESS was seen, heard and almost eaten on February 8 at a banquet given by the Houston, Tex., Radio Club at the Young Men's Christian Association.

Talks were delivered by F. M. Corlett of Dallas, division manager of the American Radio Relay League, and L. B. Henderson, also of Dallas, assistant in charge of police broadcasting in Texas.

On the program also was H. E. Worthington, district superintendent, Houston; W. A. Tolson of A. and M. College, assistant district superintendent, and A. P. Daniel, assistant divisional manager for the national body and president of the local club.

△ △

THE newly organized Radio club of Quincy, Ill., met for the first time, in the lobby of the Y. M. C. A., January 31. E. C. Hurdle, of the Gem City Electric Company, recently elected leader of the club, instructed the boys in the wireless code.

Plans for a city-wide employed boys' conference, to be held at the Y. M. C. A., March 16, were discussed at a meeting of the boys' work committee, February 1, at which time Mr. Hurdle was appointed leader of the radio club. W. Gerdes was appointed chairman of a committee to make arrangements.

△ △

PLANS have been completed for the installation of a radio outfit at the new headquarters of the Bronx Division, U. S. Junior Naval Reserve, at 283 E. Kingsbridge Road, N. Y. City. The Reserve is occupying the headquarters in conjunction with the William A. Brady Post, veterans of Foreign Wars.

The new home consists of a three story, brown shingled building which has been entirely renovated to suit the needs of the Reserve. On the lower floor is the commandant's office, regimental headquarters and a meeting room. The upper floor will be used for the instruction of cadets in seamanship, engineering and radio.

The radio equipment is expected to equal any in the Bronx. It will afford cadets practical experience in this popular and fast growing science and bring to headquarters concerts and other events which are broadcasted.

△ △

AT a special meeting of the Poughkeepsie, N. Y. Radio Ass'n, held in Columbus Institute the following officers were elected to serve until next October at which time the regular terms of office begins: President, Frank N. Mylod; Vice-President, George H. Underhill; Secretary, Robert Hawkey; Treasurer, Harold A. Decker. Directors were also elected at this meeting as follows: For one year, George H. Underhill, Harold S. Brower, William S. Merritt; for six months, Bernard A. Cruger, William H. Converse, Jr., and Robert Hawkey.

Several changes were made in the tentative constitution which is to govern the association for two months after which period it



Teacher at Lane Technical High School, Chicago, explaining the operation of a radiophone to a class of students

A RADIO club has been organized at the Havana, Ill., high school under the supervision of L. L. Scranton. The club is attracting much interest in Havana. On February 21, at the organization's second meeting, officers were elected, and further plans of organization were discussed. Officials to head the organization for the year are John Brunning, president; Eugene Wilson, vice-president; Gilbert Rengstorff, secretary, and Oren List, treasurer.

△ △

MARK CLEMENT, 14-year-old Pittsburgh boy who left his home on October 15 in company with David Poole, English sailor, and who was seen here about two weeks ago in company with the man, is being hunted all over the south by his father, George F. Clement, 7301 Perinsylvania avenue, Pittsburgh, Pa., a wealthy manufacturer. The father has offered a reward for information regarding the boy and has sent broadcast over the country messages by amateur radio stations, giving an accurate description of each.

Last week G. L. Hight, local wireless operator of Rome, Ga., received a message from the boy's father to be sent over the country, with the hope that it would be picked up by someone recognizing the boy.

△ △

BELIEF on the part of users of amateur radio telephone apparatus that the radio conference recently in session at Washington was directed toward restricting amateurs in their development of wireless telephony, as expressed by Paul F. Godley, of Cedar Grove, N. J., brought from Secre-

come radio enthusiasts. A complete wireless outfit has been placed in the workshop of the school. Daily, when the programs of songs, speeches and news reports are sent out from the various broadcasting stations, pupils are permitted to listen in. The outfit is the property of William A. Walsh, instructor in shop work. It was set up as a result of a suggestion by Principal Joseph A. Haniphy. A radio club is to be formed shortly.

△ △

THE speaker for the monthly meeting of the Mohawk Valley Engineers' Club, Utica, N. Y., which was held at Hotel Martin on February 21, was Calvin B. Rice, secretary of the American Society of Mechanical Engineers, and B. R. Cummings, engineer of the radio department of the General Electric Company. The latter demonstrated and explained, with the aid of apparatus, the sending and receiving of long distance messages.

This was followed by an address by Mr. O'Connor of the J. & M. Electric Co., terminating at 10 o'clock, immediately following which there was dancing until midnight.

△ △

THE Masonic club of Warsaw, N. Y., has installed a wireless receiving set in its club rooms in the temple. Amplifiers of large size have been attached, making it possible to hear lectures, instrumental and vocal music anywhere in the room.

△ △

A MATEURS interested in radio telegraphy and telephony are soon to be eligible for membership in the Radio Club

will be formally adopted if found satisfactory.

Chairmen will be appointed to head committees on membership, radio traffic problems, education, entertainment and publicity. These chairmen will be selected immediately in order to start the club's activities. All amateurs are invited to join this live organization.

△ △

NEWTON O. BURNETT of Cornell University, Ithaca, N. Y., station call 8XU, reports that excellent results were obtained using a fire escape on the south side of the building as an aerial and the following receiving equipment: Paragon RA-10 Regenerative Receiver, Radiotron detector tube, Baldwin and Brown phones. M. G. Pawley of 8BQV was operating the set on the morning of February 21 when the following stations were logged: 5ZA, 5XB, 5ZU, 5ZAP, 6ZZ working 6ZF at 1.35 A. M., and 6ZF working 6ZZ at the same time. We entirely disconnected the fire escape from the set and were still able to read both of

these stations using only the ground for receiving. On the morning of February 27 stations in every district were logged including the following: 5ZA, 6ZF, 6ZZ, 6XAD, 7ZM. All of the 6th district stations were using CW transmission and the 7th was using spark.

▽ ▽

HENRY B. JOY of Grosse Pointe Farms, Mich., reports that on Saturday, February 25, 1922, Clyde E. Darr, while working Mr. Joy's station, 8XAE, communicated by CW shortly after 11 p. m., with 3ZP, the station of Horace A. Beale, Jr., at Parkersburg, Pa., after which a shift was made to voice. The communication was very satisfactory (barring QRM) for the period of the talk, about 15 minutes. At times when QRM let up the strength and clearness of 3ZO was marked.

This test resulted in unsolicited reports from various localities, as follows:

L. B. Buchanan, Boston, Mass.; Walter Knight, Hudson, Mass.; Frank J. McKay,

Holyoke, Mass.; John R. Mansfield, Bondsville, Mass.; Bernard Y. Susman, Bridgeport, Conn.; Henry Opperman 3d, New York City; Burton C. Belden, Fredonia, N. Y.; E. A. Donahue, Raleigh, N. C.; R. L. Bowman, Wadesboro, N. C., (10 miles from S. C.); Minnich Radio Experiment Station, Weston W. Va.; Harry G. Miller, York, Pa.; Hugh T. Smith, Wyoming, O.; D. H. Stover, Freeport, Ill.; Lothrop Smith, Winterset, Ia.

△ △

ON Saturday evening, February 4, there was organized at New Brunswick, N. J., a club to be known as the New Brunswick Radio Club, with a charter membership of thirty-five. Officers elected were: President, Norman Van Hoeval, 2AYV; vice-president, John Cost; recording secretary, Clifford Holman, 2AZY; treasurer, Walter Shepherd, 2BME; corresponding secretary, W. H. Everson, 2BMC. The club meetings are to be held at 8 o'clock on the first and third Saturdays of each month.

Alternating Current for Filament and Plate

(Continued from page 46)

of the rudiments of electricity, it would probably be advisable to try the circuit. By experiment the amateur will grasp the idea as to the correct adjustments and will be surprised with the fine results obtained.

A careful study of figure 1 in connection with the key to the diagram which follows, together with another perusal of the original article, will be found to give you sufficient details to construct and operate this circuit.

KEY TO DIAGRAM

R¹—Filament lighting resistance 4 to 6 ohms, 1½ amperes carrying capacity.

R²—Potentiometer 200 to 400 ohms. The adjustment of this center contact will eliminate the line hum from the 60-cycle current.

R³—Potentiometer of 4,000 ohms. The correct adjustment of this potentiometer will supply the detector tube with the proper plate potential. This adjustment is quite critical, but once the proper setting has been found, the results obtained will be found to warrant the time necessary to make the adjustment.

P¹—One-half of the primary winding, 220 turns, No. 22 D.C.C., wound upon the long leg of the core. There is a layer of shellacked paper between this winding and the core and also on the outside of this winding, to come between the primary and the secondary winding when the latter is wound on top of the primary.

P²—Second half of the primary winding, also 220 turns, wound upon the core and insulated from it in the same manner as the first half of the winding.

S¹—One-half of the plate potential winding, wound upon the insulation which is on top of the primary wind-

ing. This secondary coil consists of 160 turns of No. 32 D.C.C. wire as specified in the original article.

S²—Second half of the plate secondary, also 160 turns, wound upon the second half of the primary and insulated from it.

S³—One-half of the filament lighting secondary, consisting of 12 turns of No. 18 double cotton covered wire wound upon the core, with two or three layers of shellacked paper between the core and this winding.

S⁴—The second half of the filament lighting secondary wound upon the core and insulated from it in the same manner as the first half.

Great care must be observed in winding the coils of the transformer in the same direction, so that if any two halves of one winding were removed from the core and placed end to end the winding would be continuous and not double back upon itself. If it appears to reverse its direction of winding, the two coils will "buck each other," and no voltage will be obtained from that particular winding.

It might be advisable, in order to construct a transformer which will have especially long life, to insulate the windings one from the other and from the core by means of Empire cloth, which is a special type of insulation employed in power transformers. This may be obtained from any of several electrical supply houses, whose advertisements may be found in this magazine.

Strips of lead and aluminum will probably be found to give better results in the rectifier than the two metals, tin and aluminum, mentioned in the original article.

To obtain the best results in the construction of the core, after each lamination has been cut out and given

one coat of shellac it should be allowed to dry and then be given a second coat. In constructing the transformer it will be found that the simplest method is to wind the coils upon a cardboard tube having the same shape as the core and then slip the coil on the core after it has been wound and bound to prevent it from coming apart. Before starting the winding of the coil lay several threads along the winding form parallel to its axis and spaced equally, four threads will be sufficient. Have each thread about four times as long as the coil is to be. Shellac each thread to the coil form at the ends in order to keep them out of the way while the winding is in progress. Now wind the coil on the form and after it is completed the ends of the threads can be unfastened from the form and tied around the coil before it is slid on to the core thus preventing it from coming apart.

It is to be expected that a great many different results will be obtained by various experimenters from the use of this device as there are a variety of considerations that enter into its use which cannot be changed by the constructor. One of these factors is the exact condition of the A. C. line upon which it is used, that is, the power factor of the line. The experimenter will have no means of knowing what the latter is, and even if he did, there would be no means of varying it, so the circuit must need a small amount of experimentation to obtain the best results.

The editors of this magazine would be very glad to hear just what results are obtained from this circuit by different experimenters so that any desirable matter can be passed through the pages of this magazine to others who are interested.

STATIONS WORKED AND HEARD

Stations worked should be enclosed in brackets. All monthly lists of distant stations worked and heard which are received by the 10th of each month will be published in the next month's issue. For example, lists received by November 10th will be published in the December issue. Spark and C. W. stations should be arranged in separate groups.

1BDI, 412 H. H. HALL, University of Maine, Orono, Maine. (February)

CW-1AIP, 1AKB, 1AOK, (1AR), (1ARY), 1AVR, (1AWB), 1AXI, 1AZW, (1BAS), 1BCF, 1BDC, 1BDT fone, 1BEA, 1BEC, (1BES), (1BFU), 1BH, 1BJH, 1BKQ, 1BKR 1BLA; (1BLE), 1BLN, 1BLT, 1BQQ, (1BQE), 1BTI, (1BTU), 1BUA, (1BWJ), 1BYG, 1CAC, 1CAK, 1CGG, 1CGO, (1CGS), 1CIK, 1CIT, 1CIV fone, (1CLI), 1CLN, 1CLZ, 1CMK, 1CNF, 1COD, 1COG, (1CRA), 1CRT, 1CTZ, 1CW, 1CY, 1IV, (1OT) Fone, 1PT, 1QN, (1QP), (1RD), 1RZ, (1TS), 1UN, (1XM), 1XX, 1XAD fone, 1YK, 1ZE, (2AAB), 2ABQ, 2AER, 2AFP, 2AFV, 2AJA, 2AJF, 2ALR, 2AOS, 2AOU, 2AWL, 2AWS, 2AXK, 2AYV, 2AZO, 2BAK, 2BAY, 2BB fone, 2BBB, (2BCF), 2BDM, 2BEA, 2BEB, 2BEH, 2BGI, (2BIG), 2BML, 2BNC, 2BNZ, 2BRC, 2BTW, (2BTZ), 2BUM, (2BXP), 2BYS, 2BZV, 2CAT, 2CAU, 2CBG, 2CCU, 2CCY, 2DK, 2DR, 2EH, 2FP, 2FG, 2JJ, 2KP, 2KV, 2LO, 2NZ, 2OF, 2OM, 2OU, 2PZ, 2SG, 2TP, 2UJ, 2VA, 2VD, (2WI), 2YE, 2ZY, 3AAV, 3ADT, (3AFB), 3ALN, 3ALU, 3AMH, 3AMP, 3ANO, (3ANJ), 3AOD, 3AOL, 3AQH, 3AQR, (3ASO), (3BA), (3BAG), 3BEC, 3BFV, 3BG, 3BHL, 3BIJ, 3BL, (3BLF), 3BNU, 3CA, 3CC, 3CG, 3CM, 3EM, 3FM, 3FS, 3IZ, 3KM, 3LC, 3LR, 3NH, 3NO fone, 3RF, (3SQ), 3VV, 3WF, 3ZAB, (3ZO), (3ZY), NZO, (NMW), 4BQ, (4BY), 4GL, 4FT, 4II, 5FV, 5UU, (8ADG), 8AGZ, 8AHR, 8AIM, 8AIO, 8AIZ, 8AMM, 8AMQ, 8AND, 8ANJ, 8ANR, 8AOA, (8AQB), 8AQQ, 8AQF, (8AQV), 8ARK, 8ASG, 8ASV, 8AVH, 8AWM, 8AWP, 8AWY, 8AXK, 8AYZ, 8BAE, 8BBD, 8BBK, 8BDO, 8BDU, (8BEF), 8BEL, 8BFU, 8BFX, 8BIL, 8BIZ, (8BK), 8BLT, 8BNJ, 8BOX, 8BRL, 8BUM, 8BUQ, 8BVR, 8BXH, 8BZY, (8CAZ), 8CFP, 8HMA, 8HT, (8JL), 8KS, 8LF, 8NB, 8NH, 8NI, (8LX), 8OS, 8QB, 8QM, 8SP, (8TB), 8UJ, 8UK, (8VJ), 8VY, 8XV, 8YAA, (9AAV), 9AG, 9AJH, 9AKR, 9ALS, (9AJA), (9AYH), 9BRL, 9DAM, 9DKH, 9DYN, 9DV, 9HW, (9IO), 9KP, 9NX, 9XAQ, 9XI, 9YAM, 9ZAF, 9ZJ.

Spark-1AA, 1ACO, 1ADL, 1ADP, 1AHD, 1AIT, 1AKC, 1AKG, 1AKY, 1AMD, (1APO), 1APT, 1ARY, 1ASF, 1AW, 1BCF, 1BDL, 1BDT, 1BFE, 1BGF, 1BGI, 1BHJ, 1BHO, 1BHR, 1BIR, 1BJE, 1BJS, (1BZ), 1BOQ, 1BRQ, 1BQA, 1BSD, 1BVB, 1CHJ, 1CM, 1CNI, (1CNP), 1CZ, 1DL, 1FU, 1GM, (1GQ), 1HO, 1ILZ, 1OJ, 1RV, 1SD, 1SN, 1UL, 1WQ, 1YB, 1ZE, 2AAC, 2AAF, 2AC, 2AHU, 2AJE, 2ASL, 2AWF, 2AXK, 2BJO, 2BK, 2BM, 2BSC, 2DA, 2EL, 2FP, 2JZ, 2OM, 2PB, 2PZ, 2TS, 2WB, 2WM, 3ARM, 3BP, 3FB, 3FF, 3HJ, 3OW, 3PB, 3RW, 3UC, 3UD, 3UQ, 3XM, 8AHH, 8AKQ, 8AMZ, 8AOA, 8ASO, 8AXY, 8AYN, 8BVS, 8TB, 8WH, 8WO, 9BP, 9DLX.

20M-F. B. OSTMAN, Ridgewood, N. J.

Spark-1ACK, 1ADC, (1ADL), (1AKC), 1AKG, (1AMD), (1APO), (1ARY), (1AW), (1AZK), 1BCF, (1BDT), (1BHR), (1BJE), 1BOQ, 1BQA, 1BQL, (1BRQ), (1BVB), 1BWY, 1BYG, 1CC, 1CDJ, 1CHJ, 1CK, 1CM, (1CNI), (1CP), (1CZ), (1DY), (1FM), (1GM), 1HO, 1IN, (1LZ), (1MA), (1OJ), (1RV), 1SD, (1SN), (1WQ), 1YB,

Distance Records

WHEN signals from a radio station are heard at unusual distances it is proof that the station is an efficient radiator of energy. The location, apparatus, construction and operation of an efficient station is therefore, of great interest to all amateurs, and THE WIRELESS AGE wants this information.

You are therefore requested to send us a monthly list of distant amateur stations heard, which will be published regularly. Report only stations located 200 miles or more distant from your station. Arrange the calls by districts in numerical order.

State whether the stations heard use a spark or C. W. transmitter. THE WIRELESS AGE will follow the records closely and whenever possible will secure and print illustrated articles on the stations consistently heard over long distances, for your benefit and the benefit of amateurs.

If a station is an efficient radiator of energy, it should be given proper credit in the history of amateur progress, and at the same time you will be given credit for efficiency in receiving in having heard it, as your name, address and call letters will be published with all lists submitted by you.—THE EDITOR.

1YD, (2AWF), (2GK), 2PV, 2SZ, 2XQ, 3AAL, 3AAM, (3AC), 3ACK, 3AGT, (3AHK), 3AIC, 3AJD, 3ALN, 3AOR, 3ARM, (3ARN), 3ATZ, (3AUW), 3BFU, 3BGT, 3BG, (3DM), 3FB, 3FP, (3GM), 3GX, 3HG, 3HJ, 3JL, 3NB, 3OO, 3OU, 3RW, (3TA), 3TH, 3TJ, (3UC), 3UD, (3US), (3XM), 3YV, (3ZZ) Canadians, (3BP), (3EI), (3GE), (3GN), (3KG), (4AG), 4AS, 4AU, 4BI, 4BQ, 4BX, (4CG), 4CP, 4CX, 4DH, (4DZ), (4EA), 4FD, 4GN, 4HS, 4XC, 4YA, 5AA, 5DA, 5EA, 5ER, 5FJ, 5HK, 5JD, (5PY), 5QS, (5XA), 5XU, 5ZL, 8AAV, 8ABG, 8ABO, 8ACF, 8AEC, (8AFA), 8AFD, 8AFG, (8AGK), 8AH, 8AHF, 8AHH, (8AHQ), 8AHS, (8AIT), 8AJT, (8AJW), (8ALO), 8AMB, 8AMK, (8AMZ), 8ANO, 8ANU, 8ANW, 8AOH, 8AOW, 8APB, (8ARD), 8ASL, 8AUV, 8AUX, 8AVD, 8AVO, 8AVT, 8AW, 8AWU, (8AXC), 8AXO, 8AXQ, (8AXY), (8AY), 8AYC, (8AYN), (8AYX), (8BA), (8BAZ), (8BBO), (8BBU), (8BCK), (8BDY), 8BEP, 8BFM, 8BFY, 8BHV, 8BK, (8BM), (8BN), 8BO, (8BRL), 8BTG, 8BU, 8BUN, 8BVS, 8BXA, 8BXX, (8BYP), (8CAY), 8CG, 8CP, (8EA), (8EB), 8EO, (8EW), 8FA, (8FI), 8FZ, 8HD, 8HG, 8IH, 8IN, (8IJ), 8JL, (8KK), 8KU, (8KY), 8LB, (8LH), 8MR, 8MZ, 8NO, 8NZ, 8PL, (8QQ), 8RQ, (8RZ), (8SP), 8TK, 8TT, (8UC), 8VH, 8VQ, 8VR, 8WV, (8WD), (8WE), (8WO), 8XE, 8YB, 8YV, 9AAW, 9ACB, 9ACN, 9AEK, (9AGR), 9AIG, 9AIP, (9AIU), 9AOE, 9APS, 9ASJ, 9ASN, (9AVP), 9AWZ, 9AZA, 9AZE, (9BP), (9CP),

9DCV, 9DCX, 9DFX, (9DGX), 9DHG, (9DKV), 9DLX, 9DRK, 9DSO, 9DUG, (9DWP), 9DYU, (9FK), 9GO, 9GX, 9IN, 9JO, 9LF, 9MH, 9NQ, 9OA, (9OX), 9PO, 9PS, 9TL, (9UH), 9UU, 9VL, 9VV, (9WK), 9WT, 9WW, 9YC, 9ZJ, 9ZN.

C. W.—1AVR, (1AZW), 1BDI, 1BES, 1BQE, 1BUA, (1CAK), 1ES, 1PT, (1UT), 1ZE, 3AP, 3APA, 3AQR, 3ARW, 3BG, 3BIJ, 3BLF, 3BMJ, (3CG), 3SM, 3UB, 3ZY, 4BY, 4EW, 4FT, 4GL, 4ID, 4II, 4ZE, 5BB, 5DA, 5EK, 5FV, 5KK, (5UU), 8ABB, 8ABV, 8ACB, 8AGZ, 8AIG, 8AKJ, 8ANJ, 8AQV, (8AWP), 8AXK, 8BDO, 8BNY, (8BUM), 8BVR, 8CAZ, 8NB, 8OS, 8UK, 8VL, 8ZV, 9BED, 9BM, 9DAX, 9IO, 9JL, 9KP, 9NX, (NOF), NZO.

2CIZ, PRESTON D. BALDWIN, Staten Island, N. Y. (February)

CW-1AFU, 1AMZ, 1ARY, 1AUR, 1BKQ, 1QW, 1ZE, 3NH, 3ZL, 8AZD, 8BKQ, 8BUQ, 8GW, 8LT, 8OS.

Spark-1AOP, 1ARY, 1BQL, 1CHG, 1CK, 1HO, 1LZ, 1ON, 1RV, 3AIC, 3AJO, 3AUW, 3AXK, 3DM, 3XM, 4EA, 8AFA, 8AFG, 8APB, 8ARD, 8AUX, 8AWN, 8AXY, 8AYN, 8AZD, 8BCK, 8BDY, 8BO, 8BOK, 8BRL, 8OD, 8UC, 8VW, 8WD, 8WO, 8YO, 9AGR, 9AWH, 9AZE, 9TL, NOF, Canadian 3GE.

SAXC, SYAA, EDWARD MANLEY, 325 Fourth Street, Marietta, Ohio. (February)

Spark-1AW, 1QP, (2BK), 2EL, (2OM), 2XI, 2AJE, 2BJQ, (2BSC), 3CG, 3DM, 3GM, 3GZ, 3HJ, 3PU, 3QW, 3TJ, 3XM, 3YP, 3ZO, 3ZS, 3ZZ, 3AHK, 3AIA, 3ALN, 3AOV, 3AUW, 3BFU, 4AG, 4AU, 4BI, 4CG, 4CH, 4CP, 4DH, 4GN, 4GU, 5DA, 5NS, 5PY, 5UC, 5WE, 5XB often, 5XI, 5XU often, 5YE, 5ZL, (5ZAB), 5ANY, 8BO, 8CH, 8EB, 8FT, 8HG, (8IN), 8OI, 8PT, 8SP, (8UC), (8UK), 8WE, 8WO, (8XE), 8YU, 8ZA, 8ZAA, (8ZAC), 8ZP, 8AAV, 8AFG, 8AHS, (8AJT), 8AJX, 8AKW, 8AMZ, (8AN), 8ARD, 8AUE, 8AUW, 8AVO, 8AYN, 8BBU, 8BDO, 8BFH, 8BHV, 8BUN, (8BXC), 8CAY, 8CHO, 9AR, 9AU, 9BP, (9CP), 9FX, 9HR, (9OX), 9RY, 9UH, 9UU, 9WT, 9XM, 9YB, 9YC, 9YQ, 9YAE, (9ZJ), 9AAJ, 9ACH, 9ACY, 9AEE, 9AGR, 9AIG, 9AIR, 9AIU, 9ASJ, 9ASU, 9AVP, 9AXU, (9AZA), 9AZE, 9BKH, 9DCX, 9DDV, 9DFX, 9DHz, 9DMJ, 9DMM, 9DQO, 9DSO, 9DZY, Canadians 3BP, (3GN), 3JO, 3KG, 3SL.

C. W.—1QN, 1TS, (1XM), 1YI, 1ZE, 1XAD fone, 1AGI, 1AQW, 1AVI, 1AVR, 1AWB, 1AYL, 1AZW, 1BDI, 1BEA, 1BGF, (1BKQ fone), 1BNI, 1BZE, 1CGS, 1COD, 2FP, 2KY, 2LO, 2NZ, (2WI), 2XQ, 2ZK, 2AAB, 2AFP, 2AGB icw, 2AJF, 2ARY icw, 2AWF, 2AYV, 2BEB, 2BFX, 2BFZ, 2BNC, (2BTJ), 2BUM, 2CBG, 2CBB, 2CCD, 3BA, 3BG, 3CA, 3CG, 3CM, 3FM, 3FS, 3HG, 3IZ, 3JJ, 3KM, 3OB, 3QV, 3RF, 3SQ, 3WF, 3XL, 3XW, 3ZO, cw icw fone, 3ZY, 3AAD, (3AAE), 3AAG, 3AAH, 3AAY, 3ADT, 3AFB, (3AHK fone), 3AJD, 3AEN, 3ALN, 3AMJ, 3AQR, 3BEC, 3BER, (3BHL), 3BIJ, 3BIY, 3BLF, 4AZ, (4BK), 4BQ, 4BY, 4CL, 4CO, 4CY, 4DC, 4EN, 4EU, 4FT, 4GL, 4GU, 4HW, 4ID, 4JH, 4YA, 4ZE, 5EK, 5FV, (5JB), 5JD, 5KP, 5KU, 5NZ, 5TG, 5UU, 5XA, 5XU, 5ZA, 5ZL, (5ZU), 5ZAP, (5AAM), 5ALE, 6ZF ten watts, 6ZZ, (8AK), 8BK,

8BO, 8BU, 8CG, 8DR, 8HJ, 8JL, 8JW, 8JZ, 8NI, (8OC), 8OW, 8QB, 8SP, 8UJ, 8UK, 8VJ, 8VQ, 8VY, 8WR, 8XAE cw fone, 8ZG, 8ZP, 8ZV, 8ZZ, 8ZAE, 8AAO, 8ADG, 8AGO, 8AGZ, 8AIG, 8AIM, 8AIO, (8AJV), 8AMF, 8AMM, 8AND, 8ANT, 8ARD, 8ARI, 8ARU, 8ASB, 8AVD, 8AWP, 8AWY, (8AWZ), 8AXK, 8AYZ, 8BAE, 8BBD, 8BBK, 8BBU, 8BDU, 8BEX, 8BFX, 8BLT, 8BNJ, 8BNU, 8BOX, 8BOZ, 8BOM, 8BUM, 8BUN icw, 8BUQ, 8BUX, 8BXX, 8CAB, 8CAX, 8CBR, 8CGX, 8CLD, 9AS, 9CA, (9DV), 9EI, 9EK, 9EL, 9FM, 9GK, 9HW, 9IO, 9IZ, 9KP, (9LE), (9NX), 9OX, 9PI, 9PS, 9UK, 9VW, 9WC, 9WK, (9WU), 9XM icw, 9XAC, 9ZL, 9ZAC, 9ZAF, 9ZAI, 9AAS, 9AAV, 9ADF, 9AFF, 9AJA, 9AJP, 9ALS, 9AMU, 9AOF, 9APT, 9ARK, 9AWM, 9BBF, 9BED, (9BKZ), (9BLO dalite), 9BRL, 9BSG, (9DAM fone), 9DCF, 9DEH, 9DTA, 9DTS, 9DYN, 9DYQ, 9DZQ, Canadian (3KE), KDHW, KDKA fone, NMW, WBL fone, WDY fone, WHA, WOU icw, WXY fone, WUBC.

SVY. I. M. LOUWAERT, Kalamazoo, Mich. (February)

(1NE), (1XM), (2NZ), (3CM), (3EN), (3FN), (3ZY), (4BY), (4CO), (4FT), (4GL), (4YA), (5FV), (5ZA), (8CP), (8HJ), (8IH), (8QB), (8UK), (8YN), (8AIW), (8ALV), (8AVH), (8AXK), (8BDU), (8BEX), (8BLT), (8BLW), (8CGM), (8CLD), (9EK), (9FM), (9JL), (9KP), (9LE), (9PS), (9SJ), (9XI), (9XT), (9AAS), (9AFO), (9AIG), (9AJH), (9AJP), (9AUA), (9AVZ), (9AYS), (9BED), (9BJV), (9ADZ), (9DAZ), (9DTJ), (9DUN), (9DZQ), (9DZI), (9FLO), (9MDM), (9ZAC), (NOF), (WUBC).

SZAE, B. P. WILLIAMS, 3220 Orleans Street, Pittsburgh, Pa. (February and March)

CW—(1AFV), 1AGI, 1ANQ, 1ARY, 1AWB, 1IAZW), 1BAB, 1BKQ, 1BRQ, 1BH, 1BUA, 1CIK, 1DF, 1FF, 1II, 1PT, (1QP), 1QR, 1TS, 1UN, 1XM, 1ZE, 2AAB, 2AJW, 2AJF, (2AKO), 2AYQ, (2AWF), 2BG, 2BFZ, 2BGH, 2BEH, 2BNZ, 2BEB, 2BRB, 2BAK, 2BB, 2BEA, 2BML, 2BXP, 2CCU, 2CBG, 2FD, 2KP, 2NZ, 2SQ, 2VA, 2VH, 2WB, 2WP, 2XB, 2XJ, 2XI, 2YE, (2ZK), 3AAD, (3AAY), 3ALN, 3AQH, (3AQP), (3AQR), (3APA), 3AHK, 3AGN, 3ANY, 3AOU, 3ARY, 3ANJ, 3BZ, 3BHL, 3BLF, 3BG, 3BP, 3BEC, 3CA, 3CG, 3FM, 3FS, 3GH, (3HG), 3HJ, 3HQ, 3HEC, 3IQ, 3IZ, 3LR, 3NH, 3CM, 3SJ, 3RF, 3UN, 3VW, 3XAA, 3YV, (3ZO), (3ZY), 3ZAB, 4AS, 4BQ, 3BY, 4BF, (4DS), 4EN, 4EW, (4EL), 4EH, 4GL, 4HW, 4ID, 4II, 4XD, 4YA, 4ZE, 4ZF, 5DA, 5FY, 5FV, (5UU), 5ZA, 5ZAP, 6ZA, 6ZG, (8AM), (8AQV), (8ADG), 8AXC, 8AXK, 8ASV, 8AWZ, (8AGZ), (8ARW), 8AWP, (8AWY), 8AVD, 8AMU, 8AND, 8AIM, 8AFG, 8ANJ, 8ABV, 8AQB, 8AMD, 8AQZ, 8AQI, 8AQF, 8AJD, 8AMF, 8AMW, (8BK), 8BAE, 8BOX, (8BCA), 8BQV, 8BMV, 8BMS, 8BEF, 8BBK, 8BXA, 8BZH, 8CAZ, 8CAE, 8CGT, 8CFS, 8CGY, 8CGX, (8CLW), 8EA, 8EM, (8GE), 8GV, 8HJ, 8IB, (8JL), 8JS, 8NI, 8NB, 8PT, 8QR, 8RH, 8SP, 8VY, 8XB, 8XAE, 8XE, (8YAC), (8ZZ), (8ZG), (8ZV), 9AL, 9AAV, 9AAS, 9AAY, 9APV, (9AJH), 9AKR, 9BRL, 9DAM, 9DTS, 9DYN, 9DTJ, 9HK, 9HW, 9KP, 9LQ, 9IO, (9PS), 9WK, 9SV, 9ZAF, 9ZG, 9ZL, (NMW), NOF, NSF, WOC, WHA, WWJ, WJZ, WBZ, WYCB, WBL, WDY, WGY, NZO, KDOW, KYW, (DFI), BF-5, AN-5, DM-7.

Spark—1AW, 1AEV, 1AYL, 1BEP, 1BOQ, 1CC, 1HO, 1OE, 2AS, 2AJE, 2BK, 2OM, 2OR, 2TF, 2TK, 2TP, 2WB, 3ALN, 3BA, 3BP, 3BFU, 3EA, 3FB, 3G, 3FO, 3JL, 3JO, 3KG, 3HG, 3HJ, 3LI, 3QJ, 3US, 3XM, 3XT, 3XV, 3ZO, (3ZS), 4BQ, 4GN, 5AA, 5PY, 5XB, 5XK, 5XE, 5XA, 5XU,

5XS, 5YE, 5ZAA, 5ZAB, 7AN, 8AEA, 8AMZ, 8AXY, 8AKW, 8AWY, 8ABU, 8AYN, 8AHH, 8BEP, 8BIW, 8BUM, 8BXX, 8BKA, 8CEZ, 8CP, 8BCO, 8FI, 8IQ, 8QE, 8JJ, 8LB, 8LQ, 8LS, 8OI, 8PL, 8UC, 8VW* 8WE, 8WO, 8WZ, (8XE), 8XAE, 8YU, 8YV, (8ZA), 8ZAC, (8ZP), 8ZN, 8ZY, 9ACB, 9AAV, 9AAW, 9AVP, 9BPC, 9DFX, 9DZY, 9DHz, 9DSO, 9DFZ, 9HJ, (9OX), 9PC, 9KI, 9LZ, 9SJ, 9WK, 9XAC, 9YA, (9YAE), 9YB, 9YQ, 9ZJ.

SZG, A. J. MANNING, Salem, Ohio. (February)

Spark—1CK, 1AEV, Canadian 3GN, 3CA, 3DM, 3NB, 3TA, (3XM), 3ALN, 4BI, 4BQ, 4CX, 4EA, 4XC, 4YB, 5FJ, 5PY, 5SM, 5XA, 5XB, 5XC, 5XQ, (5XU), 5YE, 5ZO, 5ZZ, 8ZY, 9AP, 9HR, 9ME, 9MC, 9TL, 9UH, 9WT, 9XA, 9YC, 9YQ, (9ZJ), 9ACV, 9AGR, 9ANQ, 9DFX, 9DXM, 9DZY, (9YAE).

CW—1BH, 1MP, 1NE, (1TS), 1QN, 1AFV, 1ARY, 1AZW, (1BEA), 1BDI,

8AL, 8ALT, 8AOO, 8AQV, 8ARW, 8ASB, 8AVD, 8AWM, 8AWP, 8BK, 8BLW, 8BO, 8BOX, 8BSQ, 8BUM, 8BVT, 8BZJ, 8CAG, 8CFP, 8CLD, 8CW, 8GW, 8JU, 8OW, 8UJ, 8UK, 8VY, 8WY, 8ZZ, 9AJA, 9AKR, 9AMB, 9BED, 9BJV, 9BLO, 9BMD, 9DAM, 9DTW, 9DV, 9DYN, 9DZQ, 9FM, 9KP, 9LE, 9PG, 9PI, 9PS, 9WD, 9XAI, 9XAQ, 9ZAC, 9ZAF, 9ZE.

Phone—2XAI, 2XJ, 9XM, 9ZAF, NOF, KDKA, KDOW, KUXV (Avalon), KYW, WBL, WBZ, WHA, WJZ, WRR.

SXU, NEWTON O. BURNETT, Cornell University, Ithaca, N. Y. (February)

4BA, 4BQ, 4BT, 4CO, 4CX, 4DC, 4EU, 4EW, 4FT, 4GL, 4JE, 4YA, 4YB, 5AAM, 5DA, 5DO, 5EK, 5FV, 5HK, 5JB, 5NZ, 5UU, 5XB, 5XU, 5ZA, 5ZAK, 5ZAP, 5ZU, 6XAD, 6ZF, 6ZZ, 7ZM, 9AAP, 9AAS, 9AAU, 9AAV, 9ACB, 9ACE, 9ACV, 9AEK, 9AAF, 9AIR, 9AJA, 9AJH, 9AJP, 9ALP, 9ALS, 9AMR, 9AOU, 9ARG, 9AS, 9OAU, 9AUA, 9AVN, 9AVP, 9AWN, 9AXF, 9AXU, 9AVH, 9AYS, 9AZX, 9BBF,



A class of radio students at Union College, Schenectady, N. Y.

1BKQ, 1CGS, 2GR, 2OM, 2WB, 2WP, 2AAB, 2AAX, 2ADV, 2AFP, 2AKO, 2AYV, 2AZZ, 2BAK, 2BED, 2BFX, 2BFZ, 2BGM, 2BRB, 2CCD, 3BA, 3BG, 3CG, 3CM, 3EA, 3EM, 3FM, 3FS, 3FP, 3HG, 3HJ, 3HW, 3LQ, 3KM, 3LC, 3LR, 3PD, 3RF, 3RW, 3VA, 3ZO, (3ZY), 3AAD, 3ADT, 3AFU, 3AJD, 3ALN, 3ANJ, 3ASK, 3AQR, 3BIJ, 3BLF, 3CCD, (4BK), 4BQ, 4BT, 4BY, 4CA, (4EL), 4EN, 4FT, 4GL, 4ID, 4II, 4KK, 4LE, 4YA, 4ZC, 4ZE, 4ZF, 5DA, (5FV), 5JB, 5KU, 5NZ, 5QS, 5UU, 5YI, 5ZA, 5ZX, 6ZF, 7ZH, 8VY, 9AG, 9AZ, 9DV, 9EI, 9FM, 9GL, 9GO, 9HK, 9HM, 9HW, 9II, 9IO, 9KP, (9NS), 9NX, 9PG, 9PS, 9SJ, 9SS, 9QY, 9VD, 9WU, 9XI, 9XM, 9ZB, 9AAU, 9AAV, 9AFT, 9AJA, (9AKR), 9ANS, 9ANT, 9ARK, 9AUA, (9AXF), 9BBF, 9BED, 9BIK, 9BLO, 9BLY, 9BRL, 9DGM, 9DKI, (9DHB), 9DTJ, 9DWJ, 9DVA, (9ZAE), 9ZAF.

SVR, MIAMI UNIVERSITY, Oxford, Ohio. (February)

Spark—2BK, 2EL, 3GE Can., 3HJ, 3XJ, 3XM, 3XW, 3ZX, 5EW, 5PD, 5UC, 5XB, 5XU, 8AAR, 8AJT, 8AOK, 8AXY, 8CGZ, 8CHB, 8IN, 8SP, 8ZC, 8XA, 8ZP, 9AEY, 9ASN, 9BOO, 9CA, 9DIW, 9JN, 9XI, 9YAE, 9YAK, 9ZX.

CW—1ARY, 1AZW, 1BAI, 1BDI, 1BES, 1BKQ, 1BUA, 1BWJ, 1COD, 1EZ, 1QN, 1XM, 1ZE, 2AAB, 2BAK, 2BTJ, 2FP, 2NZ, 3AAD, 3ADE, 3AEY, 3ALN, 3AQR, 3BA, 3BED, 3BNU, 3CM, 3EM, 3HJ, 3IZ, 3LR, 3RF, 3XAA, 3ZO, 3ZY, 4BQ, 4BY, 4EW, 4FT, 4GL, 4GU, 4KA, 4XD, 4YA, 5AAM, 5FV, 5JB, 5KP, 5NZ, 5UU, 5XT, 6ZZ, 8ADG, 8AGO, 8AGZ, 8AIO, 8ALB,

9BDI, 9BED, 9BHE, 9BIK, 9BJV, 9BKZ, 9BLO, 9DV, 9DWP, 9DY, 9DYU, 9DZI, 9FM, 9HW, 9HY, 9JL, 9JN, 9KP, 9LE, 9LF, 9LW, 9NX, 9OX, 9OU, 9PG, 9PS, 9RC, 9SJ, 9UU, 9VAE, 9VE, 9WS, 9WT, 9WU, 9XAE, 9XAQ, 9XI, 9XM, 9YA, 9YAE, 9YAJ, 9YB, 9ZAC, 9ZAF, 9ZJ, 9ZL, 9ZN, 9ZT, 9ZV, 9ZX, 9BP, 9BFC, 9BRL, 9BSC, 9BVL, 9CA, 9CJ, 9DAX, 9DCK, 9DES, 9DF, 9DGE, 9DHB, 9DHz, 9DIW, 9DNG, 9DSO, 9DTN. Ones, twos, threes, and eights too numerous to mention.

SBXX, HOMER FORSCHNER, 7 Ford Ave., Norwalk, Ohio. (1 tube) (February)

Spark—1ARY, 1BVK, 2AZY, (2GK), (2JZ), 2OM, 3AJD, 3DM, 4CG, 5BY, (5HK), 5PE, 5PY, 5SM, 5TU, 5UC, 5AAD, (8AIT), 8AMK, 8ANO, (8AOI), (8ARS), 8AFG, (8ASL), 8AVT, 8AWT, 8AXC, (8AXN), (8AYX), (8BIU), 8CGJ, 8CKR, 8EB, 8LB, 8UC, 8WO, 8YV, (9AAW), (9AFK), (9AGR), (9AIG), (9AJH), 9ALM, 9ALO, (9ALU), 9AOG, 9AOJ, (9APH), (9APK), 9AQM, (9AR), (9ARZ), (9ASJ), (9AVX), 9AYW, 9AZF, 9BCF, (9BDC), 9BHM, 9BMN, (9BP), 9CP, 9CN, (9DEL), 9DHz, 9DKQ, 9DKV, 9DLQ, 9DNC, 9DNI, (9DPB), 9DQD, (9DSD), (9DWX), 9DXT, (9DYV), (9DZE), (9DZI), 9FK, 9IB, 9IF, (9IV), (9KI), 9LF, 9TU, (9UU), (9VL), 9WH, (9WT), (9WX).

CW—1ARY, (1BKQ), 2BNZ, 2FP, 3AQR, 4DS, 6XAD, (8ABO), 8AHR, (8AXK), 8BBK, 8BJC, 8BNY, 8BZO, 8CAZ, (9AAV), 9AJA, 9AJH, 9AJP, 9ALS, 9DCR, 9PS, AN5 fone, WJZ, WBL, KDKA, KDOW.

9AG, A. C. MERTZ, Mt. Carroll, Ill. (March)

CW—1ARY, 1BCG, 2BCH, (2BFZ), (2BGH), 2BIS, (2SQ), (2ZV), (3BZ), (3CA), 3CM, 3FS, (3ZO), (3ZY), 4BK, (4BQ), 4BY, 4CY, (4EL), 4FT, (4YA), 5FT, (5FV), 5HK fone (5KP), (5ZA fone), 5ZV, 5ZY, 6ZF, 6ZG, 8AGZ, 8AQE, 8AOV, 8ARW, (8AWP), 8AWY, 8BEQ, (8BFX), 8BOX, 8CFS, 8BO, 8EB, 8GE, 8ZB, (8ZG), (8ZZ), 9AAS, 9AAV, (9AFF), (9AFN), (9AJA), 9AKD, (9AMB), 9ABJ, 9ARO, 9AUA, 9AWM, (9BED), (9BIG), 9DKQ, 9DQM, 9ZAF, 9FM, 9HK fone, 9ID, (9NX), (9WC), (9ZE), (9ZY).

Spark—3XM, 4BQ, 5BY, 5EK, (5FO), 5HK, 5IS, 5XB, 5XJ, (5XU), 5ZL, 5ZZ, 8BEP, 8FG, 8FI, 8NZ, 8UC, 9ACH, (9ACL), 9AEG, 9AOJ, 9AQE, 9ASF, 9AUH, 9AWX, 9AYW, 9AZA, 9BHD, (9BJA), 9BUO, (9AXO), (9DFX), (9DHD), 9DQQ, 9DUG, (9YAK), (9CS), (9EE), (9GC), (9MS), 9YN.

Amateur Station Call List

Owing to lack of space in this issue of THE WIRELESS AGE the List of Amateur Station Calls will be published in the May issue instead of this issue as announced last month.

Queries Answered

ANSWERS will be given in this department to questions of subscribers, covering the full range of wireless subjects, but only those which relate to the technical phases of the art and which are of general interest to readers will be published here. The subscriber's name and address must be given in all letters and only one side of the paper written on; where diagrams are necessary they must be on a separate sheet and drawn with India ink. Not more than five questions of one reader can be answered in the same issue. To receive attention these rules must be rigidly observed. Positively no questions answered by mail.

H. W., West Concord, Minn.

Q. 1. Will it make an difference in the strength of signals received, if the aerial is close to lightning rods?

Ans. 1. No appreciable affect.

Q. 2. What makes the squealing and whistling in receivers?

Ans. 2. Probably due to improper tuning of your receiving set.

E. T. C., Highland, N. Y.

Q. 1. What type of tuner using three honeycomb coils do you consider most effective?

Ans. 1. Standard wiring diagram employing primary, secondary and tickler coils.

Q. 2. May a given type of amplifier be used just as efficiently for short wave length as long?

Ans. 2. Yes.

Q. 3. Please publish formula for determining the wavelength?

Ans. 3. Approximately 4.4 to 4.8 times the total length of the aerial from the extreme far end to the apparatus.

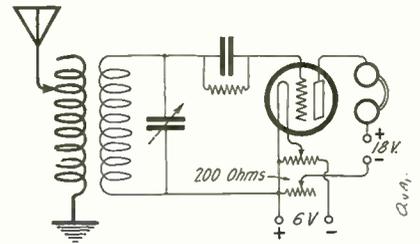
M. B., Canajoharie, N. Y.

Q. 1. Dr. Goldsmith in his book Radio Telephony refers to the Dieckmann Electrostatic shield. Is there any description of this shield published?

Ans. 1. We are unable to ascertain the location of any exact constructional data as this electrostatic shield has not been applied commercially. Its construction would necessitate considerable experimenting but will undoubtedly repay you for the time spent.

C. H., Moorhead, Minn.

Q. 1. What is the most satisfactory way of varying the "B" battery voltage, either potentiometer or switching arrangement. Does a potentiometer shorten the life of the battery?

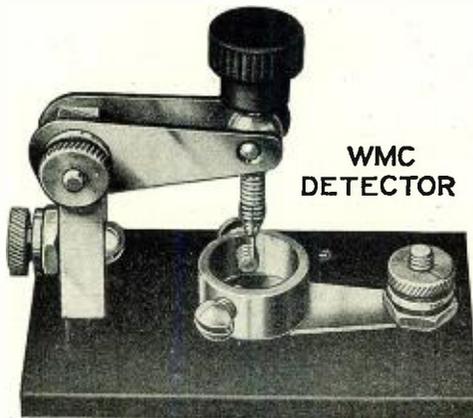


Ans. 1. This is the most satisfactory circuit for use in connection with the UV-200 detector tube. The adjustment is very critical but when used the results are surprising. A tapped B battery does not permit of close enough adjustment. The adjustment of the A battery current and B battery potential are both very critical. The potentiometer in this case will not affect the life of either A or B batteries.

Q. 2. Could you give me some simple directions for the winding of an efficient dual-lateral coil?

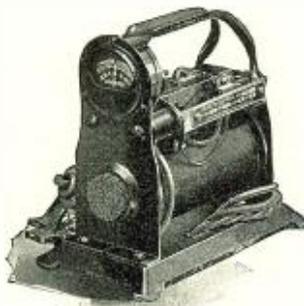
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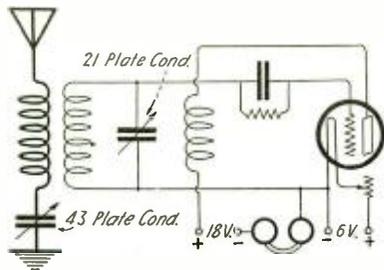
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Ans. 2. We are unable to give you any data on this coils as it has not been released by the manufacturers. Hints on this subject have appeared in previous articles of this magazine.

Q. 3. Please give me specifications—number of turns and gauge of wire, and number of coils needed to receive the shortest wavelengths up to those emitted by the Long Island station. Ans. 3. See above.

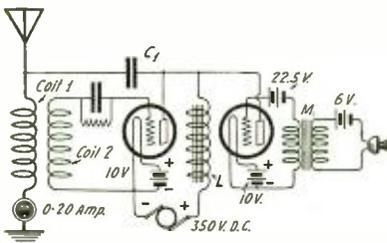
Q. 4. Please give the best circuit using 1 bulb; 2 variable condensers, (21 and 43 plate); 1 fixed condenser and a set of three coils. Including the proper batteries and resistances.

Ans. 4. Here is your diagram:



G. S. H., Suffolk, Va.

Q. 1. Would you be so kind as to give the writer detailed specifications for the building of the radiophone as per the sketch shown on page 31 of the January, 1922 issue of THE WIRELESS AGE; that is, a list together with the capacities, inductances, etc., of the different parts? I expect to use two five-watt Radiotron tubes.



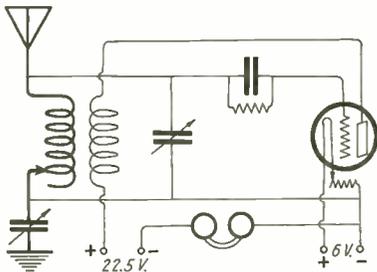
Ans. 1.
Coil 1, 25 turns spaced 1/2"-6" diameter.
Coil 2, 25 turns spaced 1/2"-5" diameter.
C₁—0.02 mfd.
L—1 1/2 Henry Choke.
M.—Any standard microphone transformer.
R. C. A. UP 414 is designed to be used with the UV 202 tubes.
Leak—2500 or 5000 ohms.
Grid Condenser—.002 mfd.

F. R. K., Bremerton, Wash.

Q. 1. Why are the systems shown in

Fig. 1A, 1b, Fig. 2a, Fig. 2b and 2c not successful?

Ans. 1. These are only satisfactory in the case of very small power outfits on account of the fact that microphone is in the high potential circuit and is required to handle considerable current which would result in



burning out the microphone if used with larger outputs.

Q. 2. Why are they not used very much?

Ans. 2. See answer No. 1.

Q. 3. What are the disadvantages?

Ans. 3. See answer No. 1.

Q. 4. What is the most satisfactory tuner, the loose coupler or coils?

Ans. 4. Either will work well if handled properly.

T. W., Grass Valley, Calif.

Q. 1. I have a loose coupler, rheostat,

socket, grid leak, grid condenser, A and B batteries. I have used several hook-ups but I cannot hear any telephone stations although I am but 40 miles from three large stations. Kindly give hook-up to receive telephone stations with the above instrument using either a Radiotron or Cunningham U. T. 1.

Ans. 1. Here is your diagram:

Q. 2. How is a regenerative coupler made? I have seen this shown in many loose coupler hook-ups. The hook-up No. 4, page 27 of the October, 1920 issue of THE WIRELESS AGE shows one.

Ans. 2. There are a good many types of couplers using three coils for regenerative reception but the hook-up given in the previous answer will regenerate with the ordinary loose coupler. You would do well to use both variable condensers but the circuit will work without either, although results will not be as satisfactory.

I. S., Coshocton, Ohio.

Q. 1. I would like to build a 5-watt vacuum tube transmitter, but having 32 volt direct current from a farm lighting plant, I do not know just how to build the transformer to suit this current.

Ans. 2. In this case you would have to employ a motor-generator as D. C. cannot be stepped up or down by a transformer. You may use the batteries to light the filament of your tubes. Be sure the voltage is correct.

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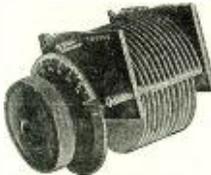


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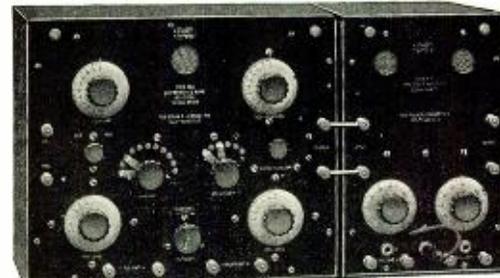
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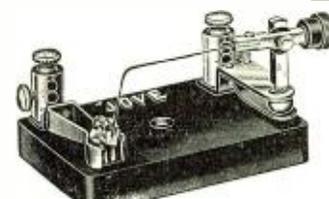
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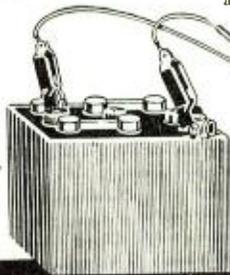
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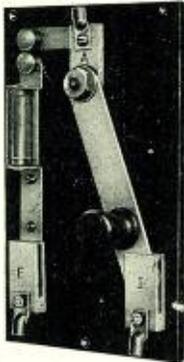
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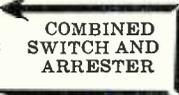


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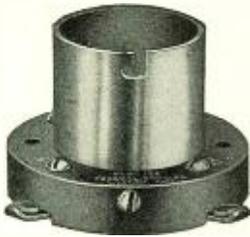
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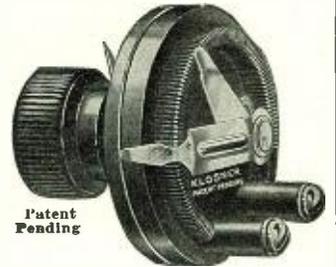
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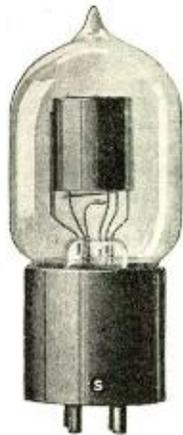
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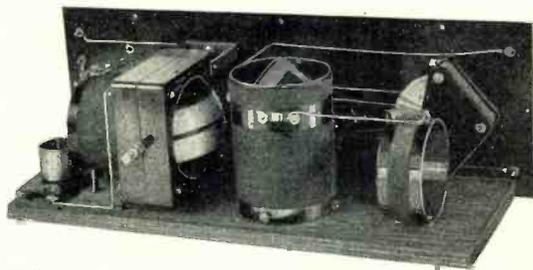
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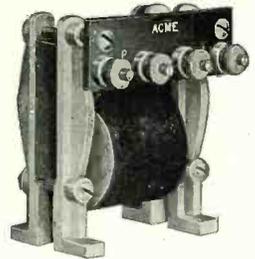
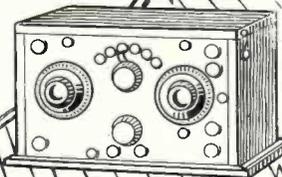
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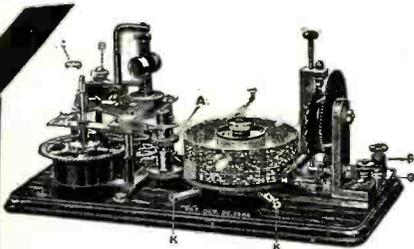
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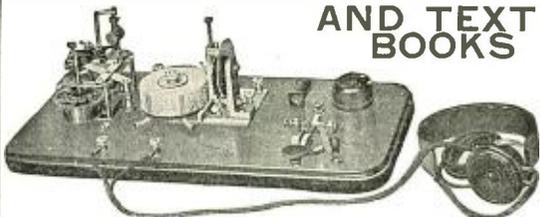
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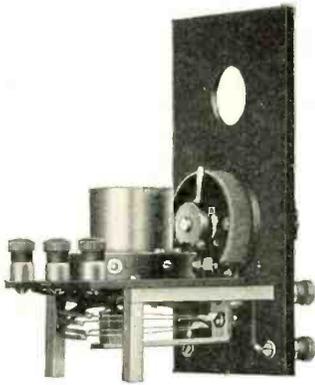
This wonderful set for learning the code furnished free with our course. We furnish free to all students, during the course, the wonderful receiving and sending set exactly as reproduced in the illustration. This set is not loaned but given to all students completing the Course.

The Transmitter shown is the celebrated Omnigraph used by several Departments of the U. S. Government and by the leading Universities, Colleges, Technical and Telegraph Schools throughout the U. S. and Canada. Start the Omnigraph, place the phone to your ear and this remarkable invention will send you Wireless Messages, the same as though you were receiving them through the air, from a Wireless Station hundreds of miles away.

When you apply for your license, the U. S. Government will test you with the Omnigraph—the same model Omnigraph as we furnish to our students. Ask any U. S. radio inspector to verify this.

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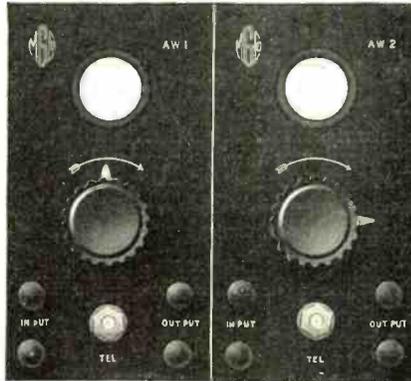
Marshall - Gerken "Distinctive Apparatus" New Series of Interpanel Units Detectors & Amplifiers



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Detector

These new Detector panels incorporate the latest developments in instruments of their kind and have that distinctive touch, characteristic of Marshall-Gerken products. These units match perfectly with our amplifiers.

Type A. W. 1-0 in individual cartons, each \$11.50. Equipped with Standard Federal Jack.



Detector-Amplifier Combination



Detector—Front View
Amplifier

The Amplifier units, made to match with the new detector panels, are identical in their design and construction with the addition of an amplifying transformer that has been built to our own specification. Two of these units are sufficient to use with any loud speakers. Amplifier—Individual cartons, each \$15.50. Equipped with Standard Federal Jack.

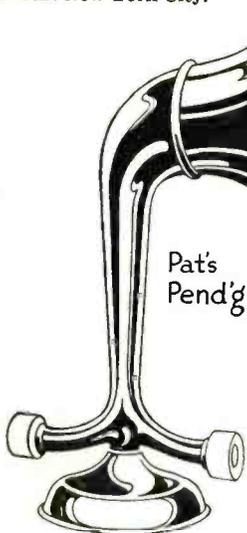
To these units can be added additional single stages of amplification until the desired volume is obtained. To add these additional stages of amplification, it is only necessary to connect the "in put" binding post of the added unit to the "out put" binding post of the last unit employed. This combination of detector and amplifiers can be placed in a cabinet to match the receiver.

DEALERS—We are territorial distributors for RADIO CORPORATION, WESTINGHOUSE, MAGNAVON, BALDWIN, REMLER, CUNNINGHAM, REILLY-KLOTZ "ARKAY HORN", FEDERAL, RHAMSTINE, ACME, WESTON AND JEWELL METERS, HIPCO BATTERIES, COOPER STORAGE BATTERIES, A. P. TUBES, etc.

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Price \$12.00.
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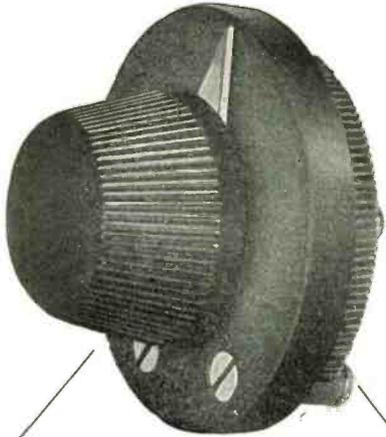
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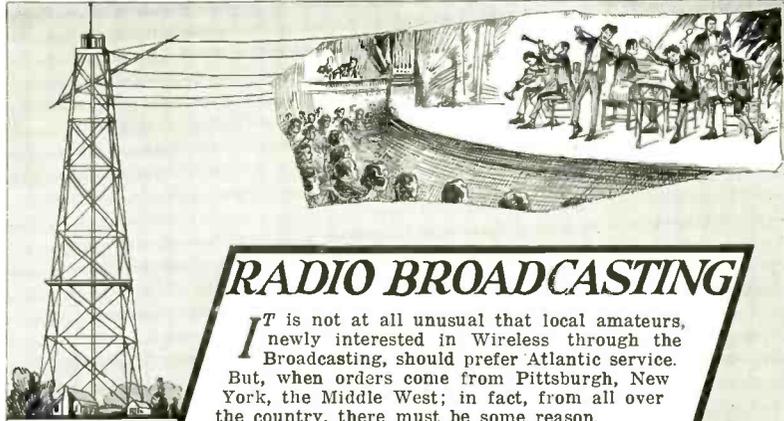
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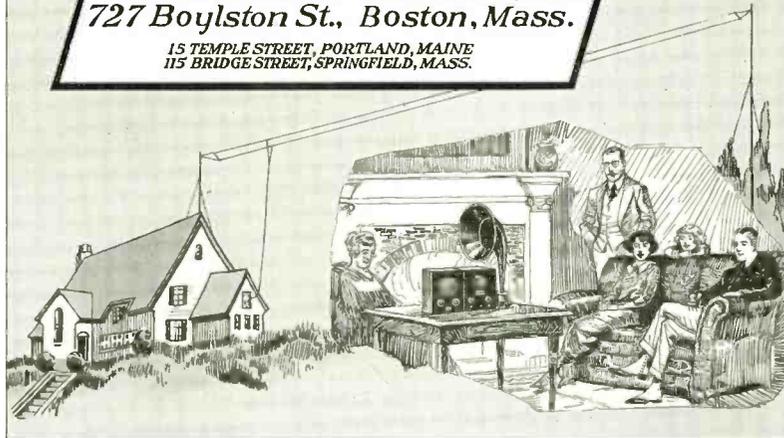
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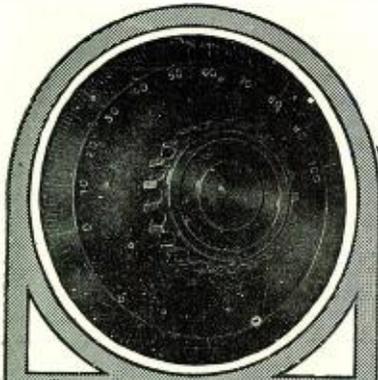
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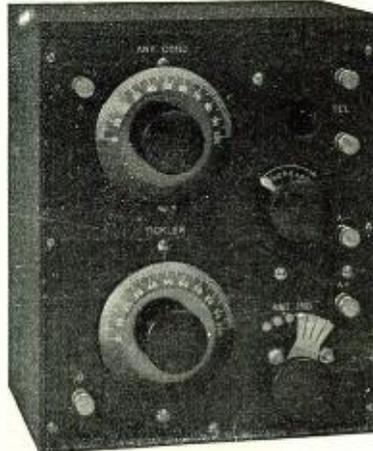
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The specifications tell the story to the expert and the C-E guarantee of satisfaction protects every purchaser of a Clapp-Eastham Type H. R. Regenerative Receiving Set—expert and amateur alike.

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- Panel—Formica, handsomely finished.
- Cabinet—Solid Mahogany.
- Condenser—Balanced type, 2 rotary, 3 stationary plates. Built on Vernier.
- Dials—Indestructible metal. Wide figures on black ground.
- Antenna Inductance—Wound in Formica Tube.
- Plate Inductance—Wound on moulded ball.
- Binding Post—Black Rubber Covered.
- Switch—Fan Blade.
- Rheostat—C. E. Type H 400.
- Circuit—Single circuit regenerative. Licensed under Armsong U. S. Patent No. 1,113,149.
- "B" Battery—Contained in compartment inside cabinet or external as desired.

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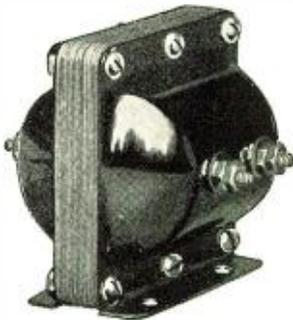
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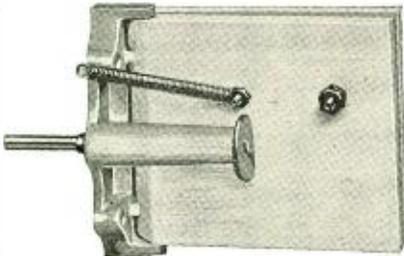
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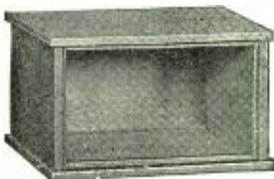
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	Price
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" " "A" with knob and dial mounted in mahogany finished cabinet complete with binding posts	2.50
" " "B" without knob and dial	1.75
" " "B" with knob and dial	2.25
" " "B" with knob and dial mounted in mahogany finished cabinet with binding posts	3.00
" " "C" without knob and dial	2.25
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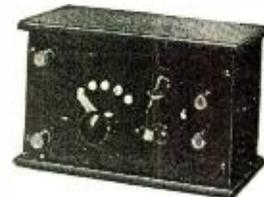
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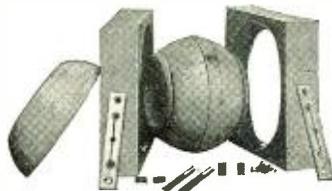


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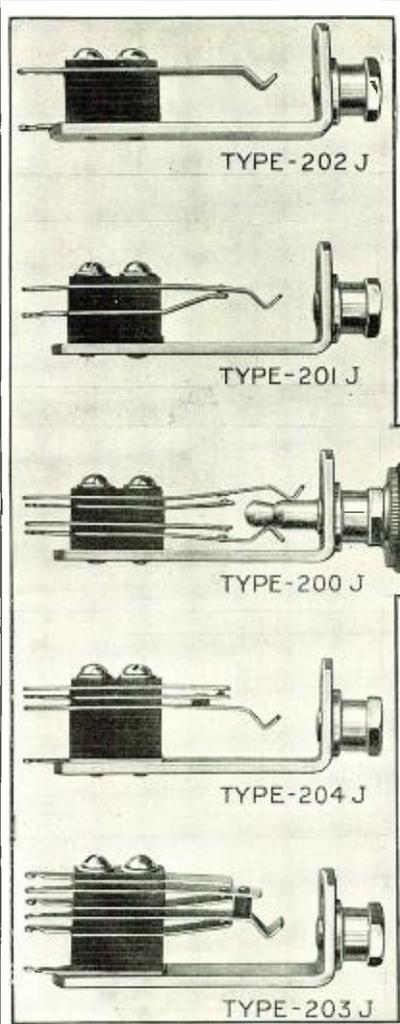
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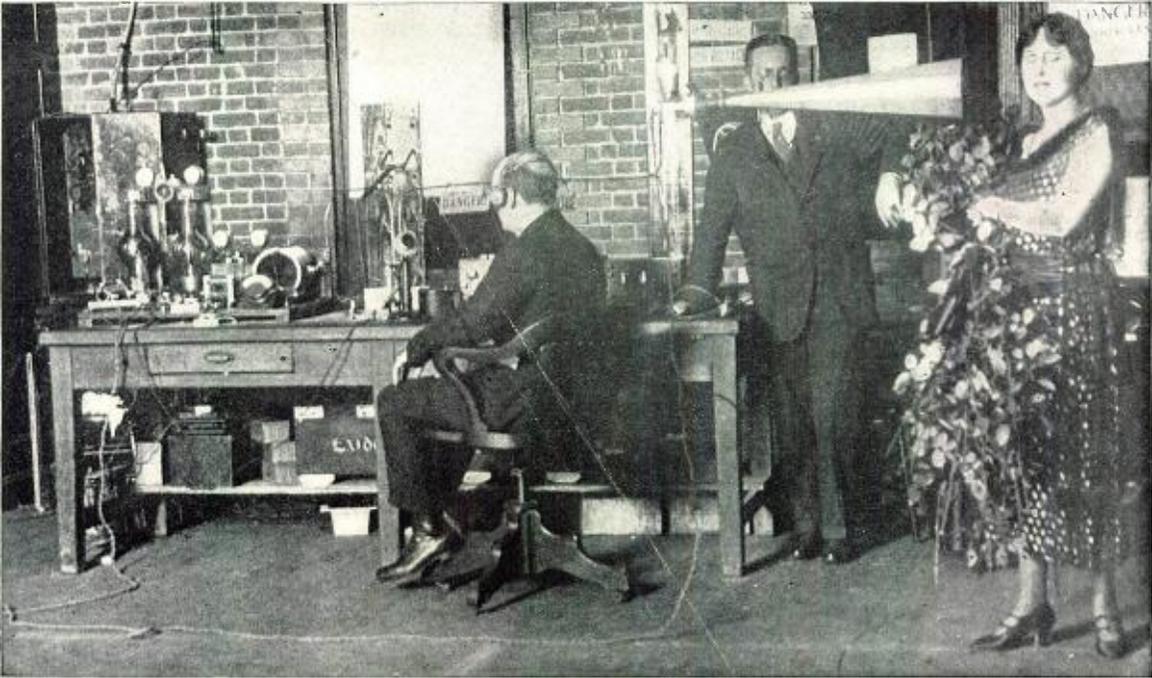
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