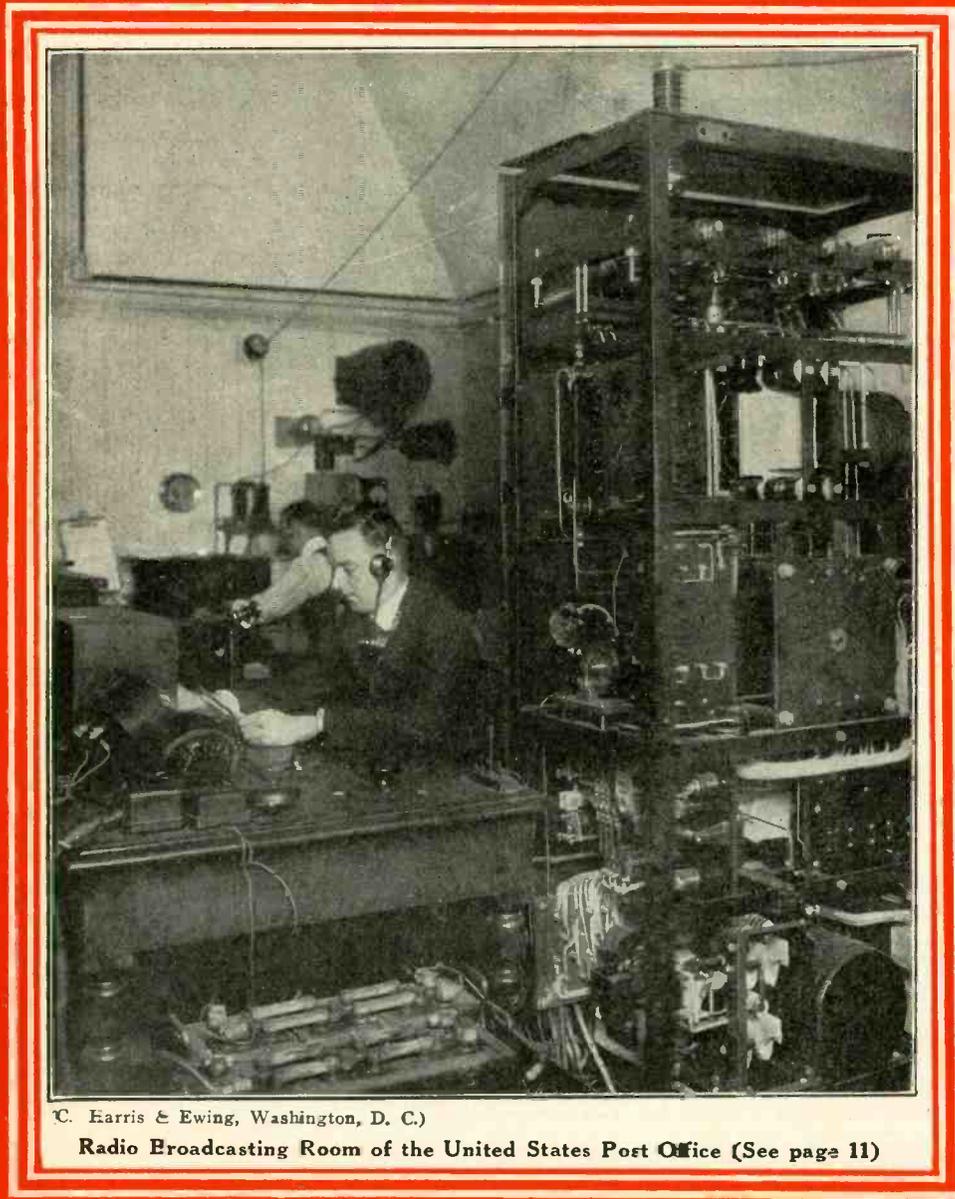


RADIO WORLD

Entered as second-class matter, March 28, 1922, at the post office at New York City, New York, under the act of March 3, 1879.

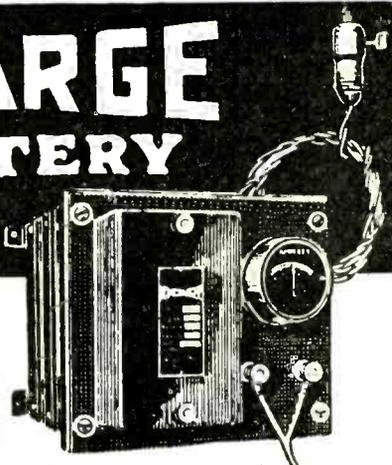
I L L U S T R A T E D



C. Harris & Ewing, Washington, D. C.)
Radio Broadcasting Room of the United States Post Office (See page 11)

**How to Convert an
Electric Heater
Into a
Loud Speaker**
(See page 8)

HOMCHARGE YOUR BATTERY for A Nickel



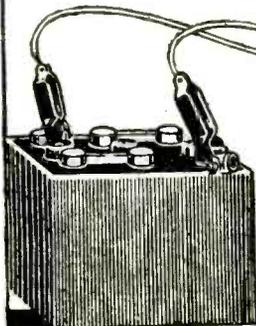
No muss, trouble, dirt—no moving of batteries—loss of time—no effort on your part—no technical or professional knowledge needed.

THE HOMCHARGER successfully meets all charging conditions, and is the only rectifier combining the following essential Homcharging features:

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2. No delicate bulbs to break or burn out. Only one moving and two wearing parts. These are replaceable as a unit, after thousands of hours' use, at small cost. Cannot be injured by rough handling.
3. Operation stops and consumption of current ceases immediately upon disconnecting battery.
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6. No danger of fire. Approved by the Underwriters.

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\$20 West of the Rockies



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Subscribe direct or through your news dealer. \$6.00 a year, \$3.00 six months, \$1.50 three months. Radio World, 1493 Broadway, N. Y. C.

The Radio "Colyum"

THE courts have decided that "marriage by radio" is a perfectly legal process. Mary Glynn, a British "movie" actress has decided to try the radiant route to matrimony. The radio divorce mill, however, is very much in the formative state. * * *

Man in Missouri objected when village constable asked him to open his battery case thinking the contrivance contained anti-Volstead liquid. "Show me!" is still the dominant motto out there. * * *

The old Poulson arc is finding its way to the discard in favor of the "peanut" tube. Alcohol is necessary to the life of the Poulson arc. It just has to perish. * * *

IN RETROSPECT

There were things that my grandmother never could do—
Pray, child, pray.
Dress like a flapper and make home brew—
Say, child, say.
Take in the cheer of a loud-speaker clear,
Chat about static and strays,
Lightning arrestors and bulbs and detectors—
Think what she missed in her days!

There were things that my grandfather never could do—
Pray, child, pray.
Ride in a motor-car built just for two—
Say, child, say.
Hear a prize fight at his bedside o' night.
Knew not cycle or circuit or core;
Lived in the dark in re coupling and spark—
His life must have been one long bore!

Complaint is made that some of the radio messages received from mid-ocean this summer are unintelligible. But, of course, it is not due to the fact that senders are "half seas over."—Pittsburgh "Chronical Telegraph." * * *

"Farmer up our way," writes J. D. Hawes, Ogdensburg, New York, "has named his pet cow 'Battery B.' Why? Discovered when milking her that her tail is full of switches." * * *

Logan Hemstreet, Muncie, Indiana, sends this society note: "Mr. Reo Statt was host at a party in honor of his fiancee, Miss Milly Henry."

Suppose a large number of guests were invited to meter. * * *

Our Own Broadcasting Station
OUCH for week beginning August 14, 1922.
7:01—Old Uncle Ebs' "Tales of the Pre-Cabaret Days," when he was a Night-Blooming Harold along the Great White Way.
7:23—Summer sports: Hunting Eggs in a Cuckoo Clock.
7:54—Reading: "Why Is an Ectoplasm?" by Professor Smudge of the Lapland University.
8:07—"The Flapper Curse and How to Cure It" A solo-symposium by Roy K. Moulton, cachinnatory expert of "The Evening Mail."
8:22—Deep-sea pastimes: "Dodging Rum Runners off the Atlantic Coast."
8:40—American Citizens Being Taxed to Support the Anti-Saloon League. Don't miss the peals of laughter that tune in with this number.
9:15—The latest dance craze: "Congressional Sidestepping."
9:30—Weather report: If it doesn't stop raining on Saturday afternoon, I'm going to take Sundays off.
10:00—Correct time from the Jupiter Pluvius Umbrella Factory.
—ROBERT MACKAY.

RADIO WORLD

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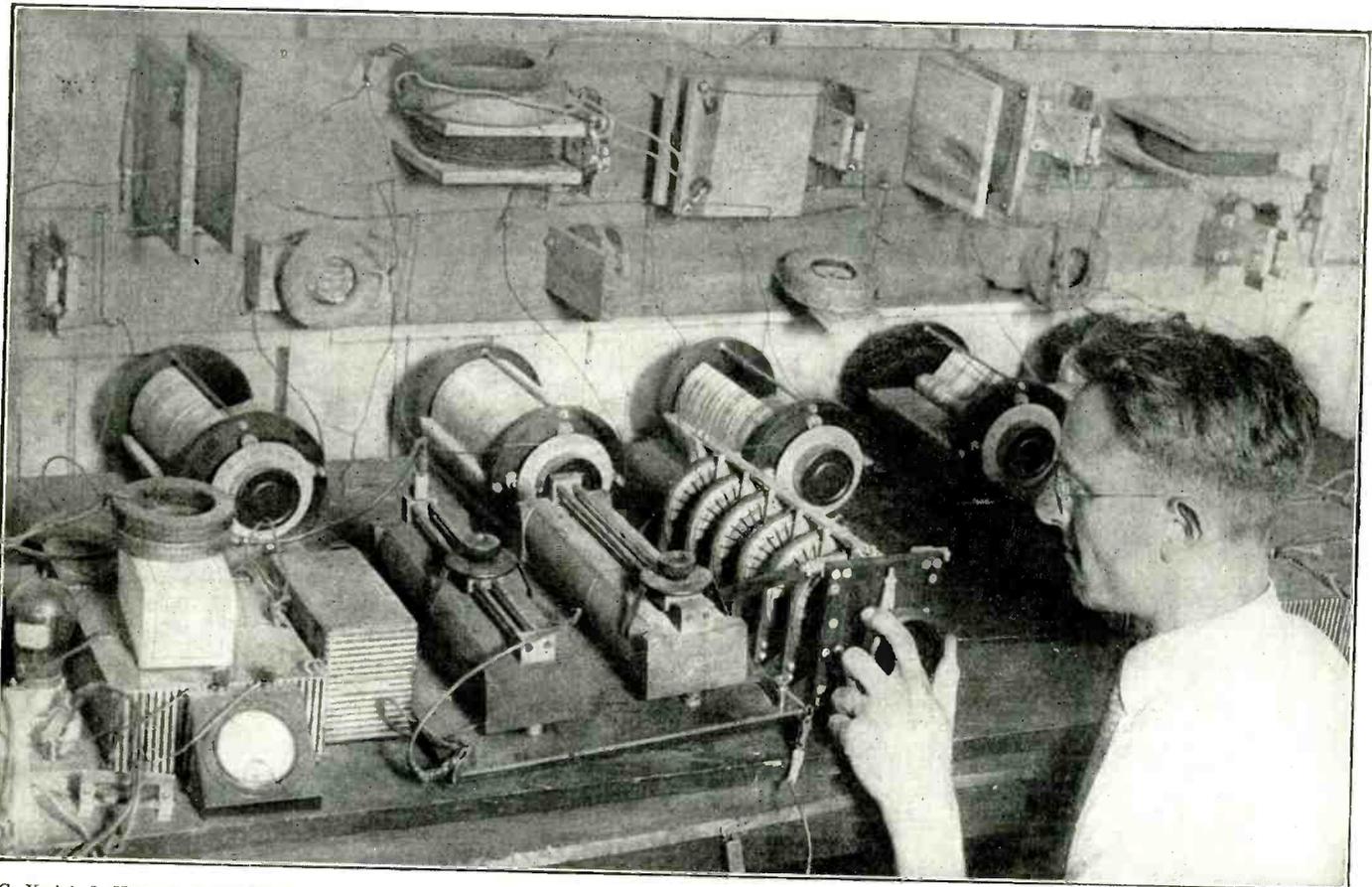
A Weekly Journal, Published Every Wednesday and Dated Saturday, By Radio World Company, from Publication Office, 1493 Broadway, New York, N. Y. Telephone: Bryant 4796

Vol. 1, No. 20

August 12, 1922

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High-Frequency Circuit for Receiving Transoceanic Messages



(C. Kadel & Herbert News Photos.)

The accompanying photograph shows A. Ringel, at the College of the City of New York, adjusting an instrument which tunes six circuits at one time. It is the new high frequency circuit used in receiving transoceanic radiotelegraph messages. When receiving more than 100 words a minute, by machinery, it is absolutely necessary to use a circuit of this type. Note the variable condensers on the back of the table. Above them are coils, placed at various angles. With the proper circuit it is possible to tune six circuits at one time.

451 Stated Broadcasters Wyoming Only Commonwealth in Union Now Without a Station

WHEN KDKA, the first broadcasting call, was assigned, nine months ago, to the Westinghouse Electric & Manufacturing Co., Pittsburgh, Pennsylvania, even the Chief Radio Inspector did not suspect that, to-day, there would be 451 stations broadcasting, one or more in every State except Wyoming. The growth has been phenomenal; but, at the same time, healthy, for applications for broadcasting-station licenses continue to pour in to the Department of Commerce at the rate of about three a day, with only about half a dozen withdrawals.

During the week ending July 29, twenty-six more stations were licensed, including the stations of the Wilmington Electrical Spe-

cialty Co., the first in the State of Delaware, which now leaves but one State without a broadcasting station.

Wyoming, last of the States alphabetically, is also the last to take up radio communication. There are no public service or broadcasting stations there, no experimental or technical operators and only three special or advanced amateur stations; one each at Douglass, Casper, and Elk. In the whole of the Seventh Radio District, comprising Wyoming, Oregon, Washington, Idaho, Montana, Alaska, there are only about 750 amateurs transmitting, while in other districts the number runs into two or three thousand. Evidently something must be done to awaken Wyoming to the call of the air, when even so small a State, Delaware, has one broadcaster.

Naturally the greatest number of broadcasting stations are operated by electrical manufacturers and dealers, but one of the keenest interests displayed is that of the press of America—68 papers broadcast.

May Have Talking Movies Illinois Professor Uses Loud Speaker and Amplification in New Invention

USING amplification and a loud speaker, Professor Tykocinski Tykociner, an instructor in the experimental station at the University of Illinois, believes that he has the solution of the talking movie. He produces a negative with the photographed subject on one side and the sound wave on the other, thus eliminating the ordinary problem of synchronization. When the light is thrown through this film on the wave side and concentrated on a photo-electric cell an electric current, varying with the volume of light is set up. The current is amplified many times and run through a loud speaking phone; it offers a curious field for experiment, inasmuch as there seems to be no reason for its failure.

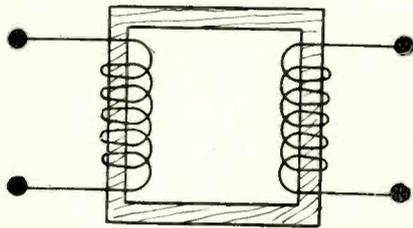
The Work of the Audio-Frequency Transformer

By George W. May, R. E.

WHAT is an audio-frequency transformer? Where is it used? What does it consist of? To the beginner these questions need explanatory answers. The audio-frequency transformer is a very important factor in radio reception.

Some experts credit these audio-frequency transformers as rectifiers, claiming that they rectify, or change, direct current to alternating current or vice-versa. Transformers are generally built in two ways, namely: to change an alternating current from a lower to a higher current; or, from a higher to a lower current.

A good illustration of just what takes place is presented by the bicycle. One knows that a bicycle has pedals which are so constructed so as to enable transmission from the pedals to



A closed-core audio-frequency amplifying transformer. It consists of two coils of insulating wire, forming a primary and secondary, wound upon a rectangular core. The core is built of sheets of iron, called laminations, to reduce the heating and increase the efficiency of the machine. Suggested by G. W. May. Drawn by S. Newman & Co.

the gear attached to the frame. It may be seen that the turning of the pedals rotates the gear in such a manner that if another gear should be coupled up by chain or belt, transmission could be had from one to another. Suppose we have a 5-inch gear on the pedal mount so that when the pedals turned, the 5-inch gear would rotate. On the rear wheel we have a 2-inch gear which, also, could be rotated. Now, if these gears were coupled by chain, or belt, and the pedals were made to rotate, we would have transmission of speeds. That is, every time the 5-inch pedal made one revolution, the 2-inch pedal would make, approximately, $2\frac{1}{2}$ revolutions. This would be a ration of 1 to $2\frac{1}{2}$, or vice versa. In fact, we would be creating transmission from a lower speed to a higher speed, or vice versa.

This illustration pertains to audio-frequency transformers. A transform-

er generally consists of a closed core made up of soft-iron laminations on which is wound two distinct coils, namely: primary and secondary. Their relation to the number of turns in both coils determines the effect of one coil upon the other. Let us assume that the primary coil is wound with 100 turns, and the secondary coil with 1000 turns or ten times the number of turns in the primary. We then exert a pressure of ten volts on the primary with a current strength of 5 amperes.

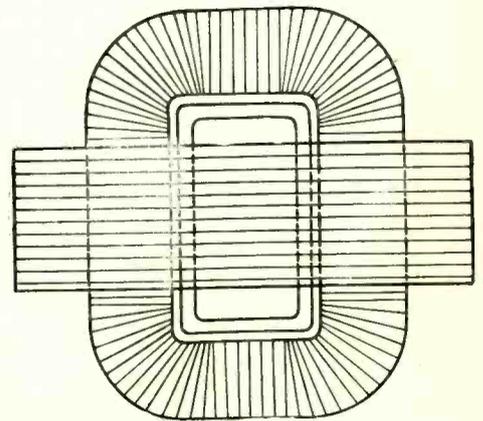
If the transformer is 100 per cent efficient, we could expect a current of .5 of an ampere at a pressure of 1000 volts in the secondary. When the number of turns on the secondary of a transformer is greater than the number on the primary, the voltage will be increased and, at the same time, the amperage lowered. When the secondary turns are less, this action is reversed.

Electrical transformers are subjected to losses, one form being copper losses occasioned by the resistance of the wire; and core losses which result from the inability of the molecules of iron to exactly follow the rapid alternations of the current to which a transformer is subjected.

The audio-frequency transformer illustrated is of the shell type utilizing a 14-mil., silicon steel core. The most effective function of the transformer is when its characteristics are diametrically opposite to good practice in ra-

dio resonance-design. If we have a low-coil resistance and comparatively high leakage tuned to a definite audio-frequency, we may then say that we have an efficient resonant-transformer. On the other hand, the amplifier transformer works at its best when the tables are turned or when the transformer has low leakage, tuning aperiodic, and the coils high resistance.

A simple way of making an open-



The completed core-transformer closed. When the transformer is completed, some method must be taken to prevent the wires from becoming injured. Tape is usually bound around these windings, as shown in the illustration. Suggested by G. W. May. Drawn by S. Newman & Co.

core type transformer audio-frequency, is to get a fiber, or cardboard, cylinder 1 inch in diameter and $2\frac{1}{2}$ inches long. On this cylinder place evenly spaced, 9 fiber washers with an outside diameter of $2\frac{3}{4}$ inches, and $\frac{1}{8}$ of an inch thick.

In each of these sections 1, 2, 4, 5, 7 and 8 wind a secondary winding of 1,000 feet No. 4 enameled copper-wire. In each section of 3 and 6, wind a primary winding of 1500 feet of No. 40 enameled copper-wire. Connect all primary windings in series with one another, also all secondary windings in series with one another. The binding posts may be connected and brought, as desired.

Transformers are generally used in receiving work in connection with vacuum-tube amplifiers. They do not act as amplifiers themselves, but merely step up the voltage of the plate circuit of the preceding tube. As a vacuum tube is a sort of valve, this increased grid current controls a relatively larger voltage and current in the amplifier plate-circuit. This is an important factor in radio work.

Functions of Reception

MOST radio enthusiasts know that there are various types of apparatus for the reception of radio broadcasting. Some of these sets are more sensitive than others. Sensitivity, in the sense we apply it to receiving sets, is a quality analogous to power in transmitting apparatus. Most receiving sets have five distinct functions: intercepting, detecting, tuning, amplifying and reproducing. It will be helpful to us later when we consider receiving sets as complete units, if these functions are understood.

Radio activity and public service will be harnessed. This will mean another step higher in civilization.—Hoover.

Early Days in Radiophone Broadcasting

Historic Dates in the Annals of the New Era of Radio News and Music

By Charles Gilbert

President and General Manager of the De Forest Radio Telephone & Telegraph Co.

SO much interest is being shown in the beginnings of radio broadcasting, in the present awakening of public interest in the radio art, and so many inquiries are being made regarding the pioneer broadcasting of Dr. Lee de Forest that a few of the historic dates in the development of this notably American art will be interesting to the growing population of radio fans.

The first broadcasting of music was not by means of the phonograph so generally used at present. The spring of 1907 saw the radio distribution of synthetic electrical music, generated and played in a building at the corner of Broadway and 37th Street, New York City. The plant itself consisted of many inductor alternators whose frequencies were those of the entire musical scale. Music furnished by this electrical organ was transmitted by wire to nearby theaters, hotels, and restaurants, where one or several horns, or loud-speakers poured into the ear this new electrical music. To connect this musical current into radio frequency and impress on the antenna—erected for this purpose on the roof of this building by Dr.

de Forest — was comparatively simple; and, thereupon, the demonstrations were made for the receiving stations in New York City. This experiment in broadcasting, however, lasted but a very short time.

The location of what may properly be described as the first actual radiophone broadcasting station of the world, however, was in the old Parker Building, 19th Street and Fourth Avenue, New York City. On the top floor of this building was the laboratory of Dr. Lee de Forest; two flag poles on the roof of this building furnished the necessary support for the antenna. It was in this same little old laboratory that, many months earlier, the inventor tested out his first three-electrode vacuum tube. Unfortunately, this historic laboratory, which saw the birth of the "tiny glass baby," known as the modern Aladdin's lamp, is no longer in existence. In January, 1908, a great fire completely destroyed the Parker Building, incidentally wiping out of existence notebooks and many precious samples of the earliest audion bulbs.

The first actual transmission of phonograph music was the result of

experimental tests by Dr. Lee de Forest, in 1907, on some twenty small telephone transmitters planned for installation on the late Admiral Evans's battleships and destroyers, prior to their historic round-the-world cruise.

The first actual application of the de Forest radiophone in reporting a news event was, no doubt, the reporting of the yacht races on the Great Lakes in the same summer of 1907; gramophone music was then furnished between the spoken bulletins.

During the operatic season of 1908-09, there was a temporary installation of a radiophone broadcasting station on the roof of the Metropolitan Opera House, New York City. Microphones concealed among the footlights of the stage, connected with the transmitting station, then gave the first radio opera in the history of the art.

The first opera artist to sing directly into the microphone of a de Forest radiophone transmitter was Madame Mazarin, Oscar Hammerstein's dramatic soprano, who sang at a special performance at the de Forest laboratory at 103 Park Avenue, New York City.

Radio news and music was first furnished on a regular program, in the fall of 1916, at the de Forest laboratory in Highbridge, New York. In connection with "The New York American," the election returns of the 1916 campaign were supplied to the radio amateurs of the Eastern States. Music for a radio dance was supplied by the de Forest Highbridge laboratories, on the evening of December 30, 1916, for a house party given in Morristown, New Jersey.

After several experimental tests, "The Detroit News," on Wednesday September 1, 1920, reported the fact that the Detroit News Wireless Service "for the benefit of the Detroit devotees of the radiophone will be a regular part of the news to the public."

It should not be forgotten that the year 1920 also saw the broadcasting of orchestral music on a large scale from the California Theater, San Francisco.

Hope to Radio Jazz to Death



(C. Kadel & Herbert News Service.)

Famous Dallas Choir of the Sacred Harp Singers representing 4,000,000 members, mostly from Southern States, recording old-time hymns to be broadcast to future generations. The Texans say that jazz does not appeal to the best that's in us. The photograph shows the Dallas choir. In the group are Mrs. C. A. Penniman, W. T. Coston, J. Roscoe Golden, T. K. Johnston, Lindsay M. Greene, Mrs. L. C. Bridges (director), E. W. Macon, A. A. Heartsill, and Harry J. Thomas.

New Chamber of Commerce to Make Radio a Public Utility

By Carl Hawes Butman

GOVERNMENT officials having to do with radio communication, including Herbert R. Hoover, Secretary of Commerce, who is charged with its regulation, believe that if the newly-organized Chamber of Commerce lives up to its plans and aims, the future of radio in this country is assured.

Based on sound principles of guaranteeing to the users of radio, and the public in general, standard and efficient radio sets and better broadcasting, and aiming to make radio a public utility, pioneer manufacturers have organized the first Radio Chamber of Commerce. Their first convention, held in Washington, D. C., was a huge success. It was a representative meeting, there being over thirty radio manufacturing firms, from all parts of the country in attendance, said to represent over 80 per cent. of the manufacturers. The possibility of "clique or sectional" control was eliminated by the constitution and by-laws adopted. The election of a board of governors, including eleven district vice-presidents, each of whom has a vote, guaranteed that each of the nine radio districts would have at least one representative on the governing board.

At the opening of the three-day session at the Wardman Park Hotel, Judge W. H. Davis, of New York, was made temporary chairman. In the absence of the Secretary of Commerce, detained by coal conferences, the chairman presented a message from Secretary Hoover approving of the formation of the national chamber, and carrying a promise of co-operation if the plans of the chamber to "maintain a high standard of quality and dependability in the manufacturing of radio apparatus" and to protect the public from inferior sets made by manufacturers who do not have the welfare of the industry under consideration, are carried out.

A committee of fifteen manufacturers nominated representatives of the radio industry for officers and directors, and the election resulted in the selection of the following temporary officers to serve until the first regular election set for November:

W. H. Davis, of Pennie, Davis, Marvin & Edmonds, New York, president; Harold J. Power, American Radio and Research Corporation; Medford Hillside, Massachusetts, vice-president; George Lewis, National Radio Chamber of Commerce, New York, executive secretary; Cloyd

Marshall, Dubilier Condenser Company, New York, treasurer.

Eight governors and one alternate were also elected: A. H. Grebe, A. H. Grebe & Co.; C. B. Cooper, Ship Owners Radio Service; A. G. Morgan, Adams & Morgan B. L. Moore, Federal T. & T. Co.; C. R. Rypinsky, C. Brandies Co.; C. E. Stahl, Connecticut Tel. & El. Co.; J. R. Crawford, National Carbon Co.; E. F. Harding, Holtzer Cabot Co.; and F. Washington, Cutting & Washington.

The following vice-presidents were also elected for seven radio districts, two remaining to be elected later: First—O. K. Luscomb, Clapp-Eastham Co. Second—A. M. Joralemon, National Carbon Co. Third—A. Keny, Atwater-Kent Co. Sixth—A. B. Kennedy, Colin B. Kennedy Co. Seventh—R. H. Mariott, United States Government. Eighth—Powell Crosley, Jr., R. B. Conrad, Westinghouse El. Mfg. Co. Ninth—Harry Bradley, Allen Bradley & Co., and Dr. Burgess, Burgess Battery Co.

Besides the officers mentioned above, the following took active interest in the outcome of the first convention:

Major L. B. Bender, Army Signal Corps; Harry L. Bradley, Allen Bradley Co., Milwaukee; Dr. L. Clement, Philadelphia; W. L. T. Davis, Eastern Radio Corporation, Wilkes-Barre, Pa.; Dr. J. H. Dellinger, Bureau of Standards; A. A. Dana, Fahnestock Electric Co., Long Island, N. Y.; William Dubilier and W. A. Eaton, Dubilier Condenser Co., New York; Alex Eise- mann and J. D. R. Freed, Freed-Eise- mann Radio Corporation, New York; Matthew Q. Glaser, New York; F. P. Guthrie, Shipping Board Radio Section; W. F. Hurlburt, Wireless Improvement Co., Jersey City, N. J.; Harold Hymans, Radio Service & Mfg. Co., New York City; Abraham Kutner, Philadelphia; F. F. Look, Allen-Bradley Co., Milwaukee; Arthur Lynch, "Radio Broadcast," New York; W. B. Nevin, Radio Distributing Co., Newark, N. J.; R. S. Ould, Bureau of Standards; F. W. Magin, Industrial Controller Co., Milwaukee; W. H. Taylor, A. H. Morton, G. Sleeper and J. C. Sleeper, Sleeper Rodes Co., New York City; I. P. Rodman, Gardner-Rodman Corp., New York City; E. Steinberger, Electrose Mfg. Co., Brooklyn; Paul G. Weiller, Gregg & Co., New York City; Dr. S. W. Straton, Bureau of Standards; Dr. Louis Cohen and Captain Guy Hill, United States Signal Corps; Com-

mander, S. C. Hooper, U. S. Navy; Donald Wilhelm, Department of Commerce; L. E. Whittemore, Bureau of Standards.

During the first day's sessions, Commander Hooper representing the Naval Radio Engineering Section, pointed out the value of an organization of reputable manufacturers to the country as an asset to national defense, and urged the co-operation of manufacturers with governmental radio apparatus specifications.

"The Navy Department," he said, "has practically made the present state of radio communication possible by its specifications of a standard vacuum tube and other devices." Standardization is one of the most important needs of the industry, he stated, explaining that we can not afford to have lamps made by one firm which do not fit into the sockets made by another. "Due to the inability of the radio manufacturers to cope with the tremendous demand for apparatus which swept the country recently," Commander Hooper pointed out, "practically a million men and boys have been forced to build their own sets, with the result that they know a lot about radio, as much perhaps as if they had taken an ordinary B. S., college course. When these young men enter college they will demand advanced radio-work, thus increasing our knowledge in radio development, besides being a potential asset in the number of operators in the event of wartime needs." Captain Guy Hill, Army Signal Corps, and Dr. L. duP. Clement also spoke on the future of radio development, regulation, and standardization.

A trip to the Washington Navy Yard was made by the delegates, and Commander Hooper escorted a number of the visitors through the big Arlington Station. All the delegates and a number of government officials attended a banquet, where Dr. S. W. Stratton, Dr. Louis Cohen and representatives of the Department of Commerce and Shipping Board Radio Section talked about radio. On the closing day, the manufacturers were the guests of Dr. Stratton and Dr. Dellinger at the Bureau of Standards Radio Laboratories.

Much remains to be accomplished before the Radio Chamber of Commerce completes its national scope and begins to function in the control of standard apparatus; but the officials expressed themselves as well satisfied with the progress made and the co- with the progress made.

Practical Measurements of Capacity and Inductance

By *W. A. Dickson*

THE calculation and measurements of capacity and inductance in radio-receiving circuits, besides being necessary for accurate design, presents a very interesting subject for the amateur experimenter. Provided the methods and formulas described herewith are correctly followed out no difficulty should be encountered by the beginner.

Where it is desired to determine the inductance and capacity of the antenna, a wave meter and standard units of inductance and capacity are

the wave meter, W_2 . As it can readily be seen, W_2 is less than W_1 .

$$\text{Then } C = \frac{W_1^2 - W_2^2}{W_2^2} \times C_1$$

Where C is the capacity of the antenna in mfd.

The capacity of the antenna, or of some other unknown condenser, may be measured by the bridge method. The condenser of which it is desired to determine the capacity, designated in Figure 2 by C_1 , is con-

sisting of a double-pole double-throw switch allows either condenser to be inserted in the circuit. The inductance is varied until maximum sound is heard in the phones using C_1 . The switch is then thrown, placing C_2 in the circuit, and its capacity is varied until maximum sound is again recorded in the phones. It will then be seen that

$$C_1 = C_2$$

With the same apparatus as in Figure 3 the effective inductance of a coil may be readily calculated. C_2 is shunted across the coil and the

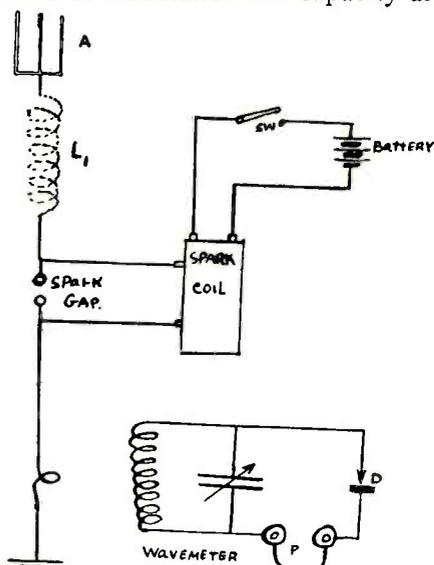


Figure 1. Schematic diagram showing how to measure or calculate the wave length of a circuit. With the aid of a wave meter the inductance coil L_1 may be measured. Drawn by W. A. Dickson.

required. The aerial is excited by a spark coil, or buzzer, and the wave meter placed in an inductive relation to it, as shown in Figure 1. The reading thus obtained we will call W_1 . With the standard inductance L_1 inserted in the antenna circuit, a second reading on the wave meter is taken which may be designated by W_2 .

$$\text{Then } L = \frac{W_1^2 L_1}{(W_2^2 - W_1^2)}$$

Where L is the inductance of the antenna in microhenrys.

L_1 is the inductance of the standard in microhenrys.

The capacity of the antenna may be measured in practically the same way. The natural wave length, W_1 , is found, and with a standard condenser C_1 , of .001 mfd. capacity, inserted, a second reading is taken on

nected across the X terminals of the bridge. C_2 is a standard variable condenser calibrated in microfarads. R_1 and R_2 are the variable resistance units of the bridge. An ordinary telephone-transformer is shown at T, the primary of which is in series with a buzzer and battery. The apparatus is excited and the values of R_1 and R_2 varied until a minimum of sound is heard in the phones.

$$\text{Then } C_1 = C_2 \times \frac{R_2}{R_1}$$

It must be borne in mind that the capacity of the antenna when measured by this method is only the simple capacity and is usually greater than the effective capacity which would be the value when the antenna is traversed by radio-frequency currents.

The effective capacity may be measured by the method shown in Figure 3. A variable condenser and inductance is excited by a buzzer and the oscillations act on a circuit containing inductance, capacity, crystal detector and phones. C_2 is a standard variable condenser calibrated in microfarads, and C_1 is the condenser of which the capacity is to be determined. An arrangement

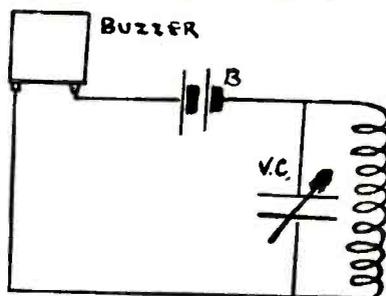
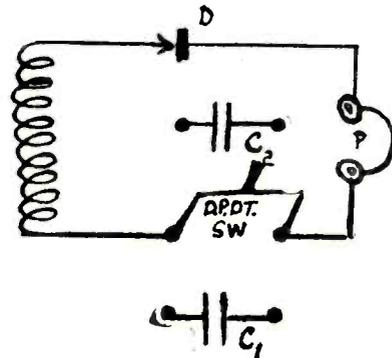


Figure 2. Schematic diagram showing how to measure the capacity of a condenser if the other values are known. Drawn by W. A. Dickson.



circuit adjusted to resonance with the oscillating circuit. If it is a standard wave-meter, the wave length, or natural oscillating period, of the coil may be read directly,

$$\text{then } L = \frac{W^2}{C_2 \times 35.5}$$

where L is the inductance of the coil in centimetres.

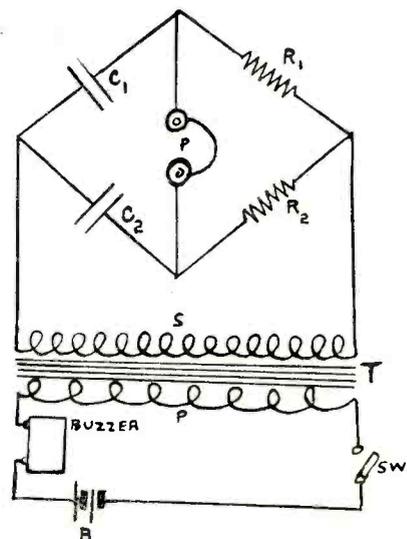


Figure 3. How the effective inductance of a coil may be readily calculated. Drawn by W. A. Dickson.

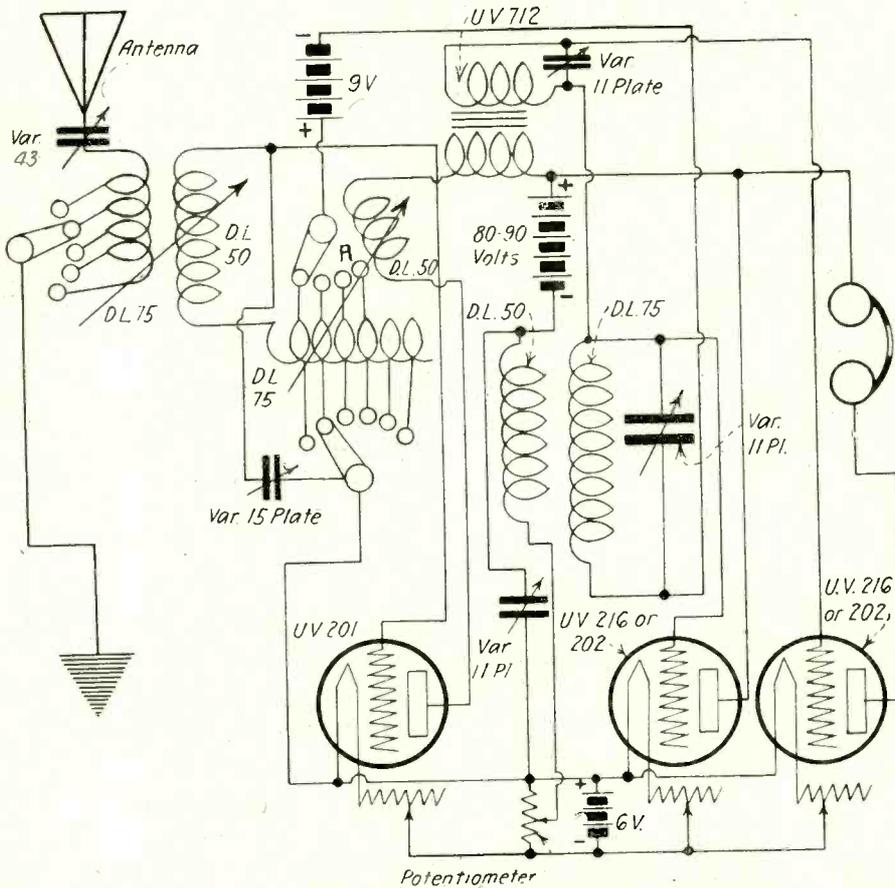
Experimenting with Armstrong Circuit, Oklahoma Doctor Produces Unusual Hook-up

Novel Makeshift Loud-speaker

By De Witt H. Thompson

(See photograph on front cover of this number of Radio World.)

THE radio fan who has at his disposal an electric heater has the basis for a novel loud-speaker. This is accomplished by removing the radio receivers from the headband, hanging them over the heating element, as shown in the accompanying photograph, and connecting them to the radio-receiving set with one or more stages of amplification. For best results, it will be necessary to experiment with various positions of the receivers, within the reflector of the heater, until the proper focus is found. While such a makeshift loud-speaker is by no means as efficient as a phonograph horn, the writer has obtained fair results with it on music and speech from WHA, about fifty miles away, using a short-wave regenerative set, one stage of audio-frequency amplification and Murdock 2,000-ohm phones. Furthermore, by experimenting with various positions of the receiver in regard to the reflector and noting the results makes an interesting experiment in acoustics.



Schematic diagram of Dr. Kelly's circuit, by which he secures remarkable results in amplification. The diagram resembles that of Major Edwin H. Armstrong, with several minor changes, which Dr. Kelly developed while experimenting with the Armstrong superregenerative circuit. Suggested by Dr. O. S. Kelly. Drawn by S. Newman & Co.

DR. O. S. KELLY, of Oklahoma City, Oklahoma, sends to RADIO WORLD the interesting hook-up published herewith. Dr. Kelly tells us that his circuit is the result of an accident while he was working on the Armstrong superregenerative circuit in connection with combined radio-frequency and audio-frequency after the French ideas of 1918 and 1919. He claims that his hook-up handles static in a very satisfactory manner and brings in signals. By experimenting and making changes on the transformer and coils of wire, when connected correctly, give remarkable amplification.

The apparatus used by Dr. Kelly in his hook-up are as follows:
 2 vario-couplers, 180-degree coupling.

- 1 50-turn duolateral honeycomb coil.
- 3 11-plate variable condensers.
- 1 15-plate variable condenser.
- 1 43-plate variable condenser.

Letter A represents 2 variometers in the place of the loose-coupling feedback, which will work satisfactorily.

UV 712 is the type number of the RCA audio-frequency transformer.

UV 201, UV 202 are type numbers of their tubes.

UV numbers may be purchased by anyone handling RCA material.

The Care of Crystals

IN receiving-circuits employing crystal detectors, the effective range depends a great deal on the sensitivity of the detector. As a rule, there are some crystals that are more sensitive than others, but even a sensitive

crystal may be ruined by improper care. There are times when the action of the air on the surface of these crystals starts oxidization and prevents them from functioning properly; but a more serious trouble is caused by

Schedule of Stations Broadcasting Press News from Various Parts of the World

(These stations use spark signals)

CALL	STATION	METERS	TIME
NAA	Washington, D. C.	2500	10 p.m.
NAR	Key West, Fla.	1500	10 p.m.
NAX	Colon, Panama	2400	10 p.m.
KHK	Honolulu, T. H.	600	11:30 a.m.
NPG	San Francisco	600	1:15 a.m.
NPL	San Diego, Cal.	2400	No Schedule
NAH	New York City	1832	9 p.m.
BZM	St. Johns, N. F.	1500	7:30 p.m.
VCU	Barrington Pass., N. S.	1500	8 p.m.
BZN	Falkland Islands	4300	3:30 p.m.
BZL	British Guiana	1300	6 a.m.
BYZ	Malta (Rinella)	2650	9 a.m.
OAZ	San Cristobel, Peru	1500	2 a.m.
BXY	Hong Kong, China	2000	9:45 p.m.
BXW	Singapore	2000	9:15 p.m.
UA	Nantes, France	2400	3:30 p.m.
FL	Paris, France	2500	3 p.m.
YN	Lyons, France	5000	8 p.m.

All stations along the Atlantic and Pacific Coasts broadcast their weather reports at 8 a.m., noon, 4 p.m. and 8 p.m., daily.

handling the surface of the crystal with the fingers. This generally pertains to the galena crystal. Where this has been done and the surface of the crystal is found to be less sensitive after continued use, it should be scraped lightly with a penknife. Sometimes a gentle rub off with a little alcohol will create a sensitive spot. If a crystal detector can be enclosed in a glass case where the hands cannot touch it, sensitive spots could be created more readily and stand less chance of jarring any sensitive spot that has been secured.

Radio World's Hall of Fame



MAJOR EDWIN H. ARMSTRONG

Inventor of the Armstrong Superregenerative Circuit

The incidents of Major Armstrong's struggle for recognition in radio comprise one of the most remarkable chapters of a life-story crowded with romance. He began experimenting with radio, as an amateur, when he was fifteen years old. It was during the period of this early work that he discovered and diagramed what is known as "the Armstrong feed-back circuit," without which long-distance telephone-communication and broadcasting, as it now exists, would be impossible. Litigation over this invention lasted several years, but ended in a complete victory for Major Armstrong. This legal battle ensued while the young inventor was in the service of his country during the World War. Major Armstrong was graduated from Columbia University in 1913. He holds a degree of electrical engineer. His fame as an investigator was recently enhanced to world-wide eminence by his discovery of the Armstrong superregenerative circuit. This is the most widely discussed and important development in radio reception. He is only thirty-two years old. When the World War broke out he was studying for a master's degree at Columbia University, and was experimenting with wireless in collaboration with Professor M. Pupin in the Hartley Research Laboratory.

The Radio Primer

A. B. C. for the Beginner Who Must Have the Facts Put Plainly and Tersely, and all Terms Fully Explained

The Beginner's Catechism

By Edward Linwood

CAN more than one set operate successfully, utilizing the same aerial?

Don't operate more than one set at any one time utilizing the same aerial. If this is done one set will tune the other out.

* * *

May iron wire be used as an aerial in place of copper wire? What is the reason for using copper wire?

Iron, steel, or galvanized wire is never used for aeriels, because they have too low a resistance. Copper is used mostly by everyone simply because it is a better conductor of electricity than any of the other conductors mentioned.

* * *

What is the best aerial that can be erected for the short wave lengths?

A single copper wire from 100 feet to 150 feet long, and, at least, 50 feet high should answer this purpose. It is a good thing to remember that the lead-in should be taken off the end that points towards the station you desire to hear. This type aerial is known as the inverted-L type. It is directional.

* * *

Should the aerial be well insulated; or, can it be erected in most any fashion?

The aerial, being the first element depended upon for the reception of signals must, in all respects, be properly insulated. If the aerial is not insulated, considerable energy will be lost and signals received will be weak. Insulators should be placed at each end of the aerial with the wire between them.

* * *

Can loop aeriels be safely operated during a thunderstorm? Can they be used to eliminate static? Do loop aeriels require a ground when operating? Are they directional?

The indoor, or loop, aerial is coming rapidly into favor. During a lightning storm, the danger of listening in amounts to nothing. This is the advantage of the loop. Furthermore, this type aerial is directional and has another main advantage of eliminating

static to a greater degree than that of the outdoor type. Ground connections are not used with loop aeriels.

* * *

How should antenna wires be erected? Should joints be soldered? What effect will the signals have if aerial is run close to power light lines?

All antenna wires should be constructed and erected in a durable manner, and should be located so as to prevent electrical contact with any power-light wires. When run near power-light wires, the aerial should be run at right angles to such wires. If this is not done, serious trouble will be encountered and may be traced direct to this very problem. All splices and joints should be soldered unless made with the approved splicing devices or clamps. Care should be taken that the lead-in wires are properly brought in through a non-combustible, non-absorptive insulating bushing when entering the building.

* * *

What is this so-called static and when is it present? What steps can be taken to prevent this disturbance?

Usually in the late spring, summer, and early fall the air is filled with static. It is a disturbance which creates much disfavor with radio fans. This bugbear cannot be eliminated at the present time as nothing has been invented that will keep it out entirely. Several methods may be used to help eliminate a part of static, particularly by using the indoor loop and by the employment of radio-frequency circuits.

Static is the heat and moisture of the clouds created by an accumulation of electricity above the earth. When this charge is of sufficient strength to discharge itself, it jumps to earth. This is called lightning. It causes that drum-banging noise in the ear pieces. This is a signal for the approach of a storm.

Radio World's Revised Radio Dictionary

By Fred. Chas. Ehlert

Protective resistance rod—A high resistance made of graphite, carbon, or other material in the form of a rod. It is used to prevent high-frequency currents from coming in contact with low-frequency circuits. Usually the ends are connected across the terminals of the power lines with the center of the rod grounded. This rod allows the high frequency electrical surges to be grounded, thereby preventing the blowout of the power apparatus and instruments.

Quenched Cap—A spark gap generally made up of a number of gaps separated by insulating washers of mica or fish paper.

Radiation—The transmission of energy through space in the form of electromagnetic waves.

Radio frequencies—Vibrations not audible to the human ear. Frequencies above 10,000 cycles per second are termed radio frequencies.

Reactance—See Impedance.

Reactance Coil—A coil wound upon an iron core and so arranged that the number of turns can be varied or the position of the iron core can be adjusted. It is used to regulate the power input of a transmitter.

Receiving detector—A device arranged so as to change the incoming oscillations, so that they may become audible in the head telephones.

Rectifier—A device for rectifying the alternating currents into pulsating direct-current.

Receiving Inductance—The aerial tuning inductance allows adjustment of the aerial circuit to wave lengths greater than the natural wave length of the aerial circuit.

Regenerative—(Known as the Armstrong circuit). A circuit using a vacuum tube so arranged that after detection and rectification, the signal introduced in the plate circuit is led back to or caused to react on the grid circuit, thereby increasing the original energy of the signal received by the grid and greatly amplifying the response to weak signals. Usually a coil, known as a tickler, is placed in the plated circuit of a vacuum-tube receiver to transfer part of the energy of the oscillating plate-current back into the grid circuit in order to produce amplification and to enable the tube to generate oscillations of high frequency.

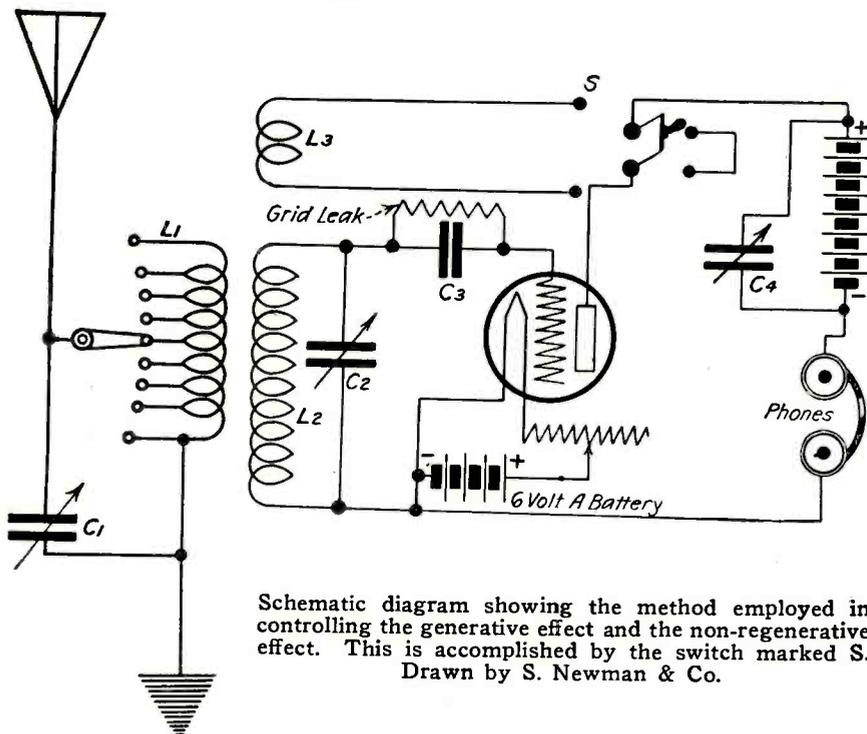
Resistance—All metals have more or less electrical resistance, copper is used universally, due to its low resistance, low cost and ready supply. Resistance is opposition to the flow of an electric current through a conducting medium.

Rheostat—A resistance coil usually provided with a means of varying the amount of resistance necessary to use.

Rotor—The movable part or inner part of a variometer or induction motor.

The Radio Primer has been published regularly in RADIO WORLD since issue No. 1, and will be a regular department in order to instruct and aid the many thousands of amateurs who are joining the ranks of radio enthusiasts every week.

How to Secure Perfect Regeneration



Schematic diagram showing the method employed in controlling the generative effect and the non-regenerative effect. This is accomplished by the switch marked S. Drawn by S. Newman & Co.

FOR short wave-lengths many amateurs use tuning circuits employing the principles of Major Edwin H. Armstrong's super-regenerative circuit. However, with the various wiring diagrams, many do not get a maximum of result. This, probably, is due to the fact that the manipulation is too much for the average amateur. To overcome this, the accompanying hook-up will show the use of the regenerative effect in the Armstrong circuit.

L-1 is the primary circuit of any loose-coupler or vario-coupler set. L-2 represents the secondary winding, while L-3 is the so-called "tickler" coil which is connected in series with the plate circuit and placed in inductive relation to the high potential end of the secondary coil, L-2.

The tickler coil may be cut in or out of the circuit by the switch marked S. When the switch is placed at the right, a "plain detector circuit" is the result; but when thrown to the left the tickler coil is connected in the circuit and the regenerative-amplification effect then obtained.

This regenerative connection will amplify the incoming signals about six times. It is possible to design the primary and secondary coils L-1 and L-2 of the tuning coil so that for the range of wave lengths—200 to 600 meters—tuning may be accomplished by the condensers C-1 and C-2 alone.

In this circuit the experimenter may learn how to employ the tickler coil and understand its uses. Keep the switch at the right until the incoming signal is heard in the head phones. After the adjustments are made, throw the switch to the left, cutting in the tickler coil. By adjusting this coil the amplification process will take place and the strength of signals immediately noticed. By the adjustment of the other instruments, signals should come in loud and clear. This is one of the best methods of learning the regulation of the tickler coil in a circuit. When a compact set is purchased, some knowledge of the tickler coil will be gained. To-day there are scores of amateurs who do not understand regeneration.

Transmitting at the United States Post Office

(Describing photograph published on the front cover of this issue of Radio World)

THE up-to-date farmer and the business man in the remote sections and smaller towns no longer depend on the newspaper for important news pertaining to weather, crops

and finance. Their needs in this direction are supplied by the powerful radio broadcasting station operated by the United States Post Office at Washington, D. C. The photograph on the

The Importance of Correct Tuning

By Harold Day

UNDER ordinary circumstances, while listening in, the set may be kept closely coupled. This broadens the tune, particularly if a considerable amount of inductance is used. The aerial circuit should be tuned with a variable condenser in series for short waves, and in shunt to primary for long waves. When the calling station is well tuned in—and if there is interference—the coupling will have to be loosened. This should be done gradually, adjusting both the open and closed circuits with each change of coupling, until a point is reached where signals are readable through the disturbances.

For further improvements in tuning the closed-circuit condenser should be made as large as possible and the closed-circuit inductance considerably reduced. The practice of loosening coupling, while receiving, should be made obligatory on all who operate a set; for it not only cuts out existing interference, but prepares for any interference which may arise during reception. Owing to the change of effective self-induction, in both circuits, both require readjustment (retuning) with each change of coupling.

Two aerials in the immediate vicinity, as on the same ship, have an influence on each other; so that if both are used for receiving at the same time, the tuning of one will effect the other. This effect may be observed between aerials if they are very close together.

front page of our cover of this issue of RADIO WORLD shows the radio room where information of vital importance to miner, rancher, orchardist, and lumberman is being disseminated by means of the radiotelephone. By this new plan, many of the farmers and business men throughout the country, equipped with receiving sets, may listen in.

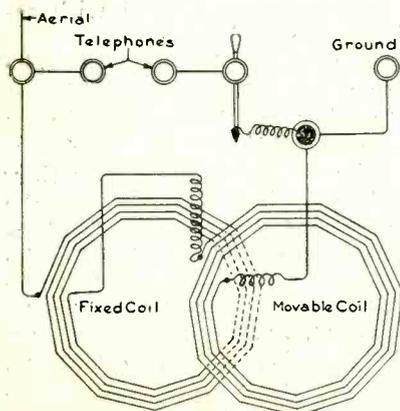
Turn to the photograph. The operator, seated at the table, is broadcasting. At his left hand may be seen the shift handle which enables him to change to the various wave lengths in a moment. At the left corner of the table, is the hot-wire ammeter, which tells him the exact amount of power that is being radiated from the aerials. To the right is the giant transmitter with all its necessary equipment. On the upper shelf of the stand are the four pilotrons that make radiotelephony possible.

How Two Young Women, Radio Secretaries, Became Radio Experts

By C. D. Wagoner

IT seems rather a far cry from preparing technical reports on high-frequency radio alternators and multiple tuning to winding a spider-web inductance on a piece of cardboard that once held a hair net; or from writing a lengthy report on activities of the radio department of a big electrical concern to putting up an antenna in the backyard and finding the sensitive points on a second-hand galena crystal, yet this is what has been accomplished by Miss B. M. Apkes, secretary to E. F. W. Alexanderson, chief engineer of the Radio Corporation of America, and Miss Esther McInnis, secretary to David Sarnoff, general manager of the Radio Corporation.

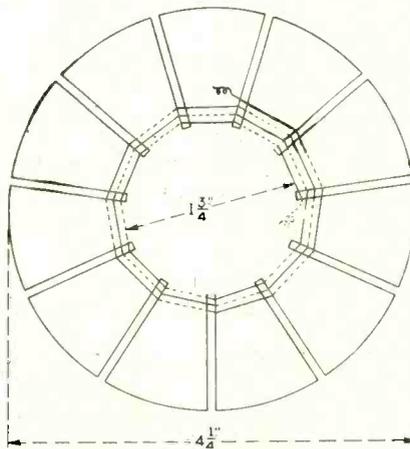
Miss Apkes became interested in the manufacture of a home receiver soon after the broadcasting station at WGY was opened. Schenectady dealers, at that time, were just as shy of receivers as dealers in all other parts of the country, and so, in desperation, Miss Apkes decided to build her own set. Bits of conversation held with Mr. Alexanderson in his office, extracts from letters and reports written by him, came to her little by little. Finally she made a rough sketch of the set she planned to build. No sooner was the drawing finished than the actual work began. A piece of cardboard nearby served as a basis for winding the coils; a few dozen feet of enamel-covered wire on a discarded spool furnished the conductor itself; the ever-present scissors were available to cut the slots in the pasteboard for the in-and-out winding.



Schematic diagram showing wiring of receiver.

Soon the coils were wound, the number of turns necessary being "guessed at." The top of a cigar box made a nice, smooth surface to use as a base. Now nothing remained but binding posts and a detector.

Here is where the advantages of friendship came in. Miss Apkes appealed to some of her associates in the radio department showing them the coils she had made, as evidence of good faith. At once she awakened interest. One friend offered her a galena crystal and showed her how a fine wire "point" could be made up easily; another donated a



Schematic diagram showing the 27 turns of No. 24 B. & S. enamel-covered copper wire.

few binding posts; a third loaned her a pair of head telephones. A few gouges of the scissors, and holes were made in the base for the binding posts; a few turns of the pen-knife, and the posts were screwed in place and wired up.

Miss Apkes now put up a single-wire antenna at her home, running about ninety feet from the top window of the house to a tree, and then the set was connected up. At first nothing was heard, and her enthusiasm fell considerably; but soon she thought of the coil windings and began removing turns. After a number of turns had been removed from each coil, faint signals began to come in from the powerful Schenectady broadcasting station. Moving one coil over the other slowly, Miss Apkes heard the signal come up gradually to a maximum, when clear, loud reception was



MISS B. M. APKES

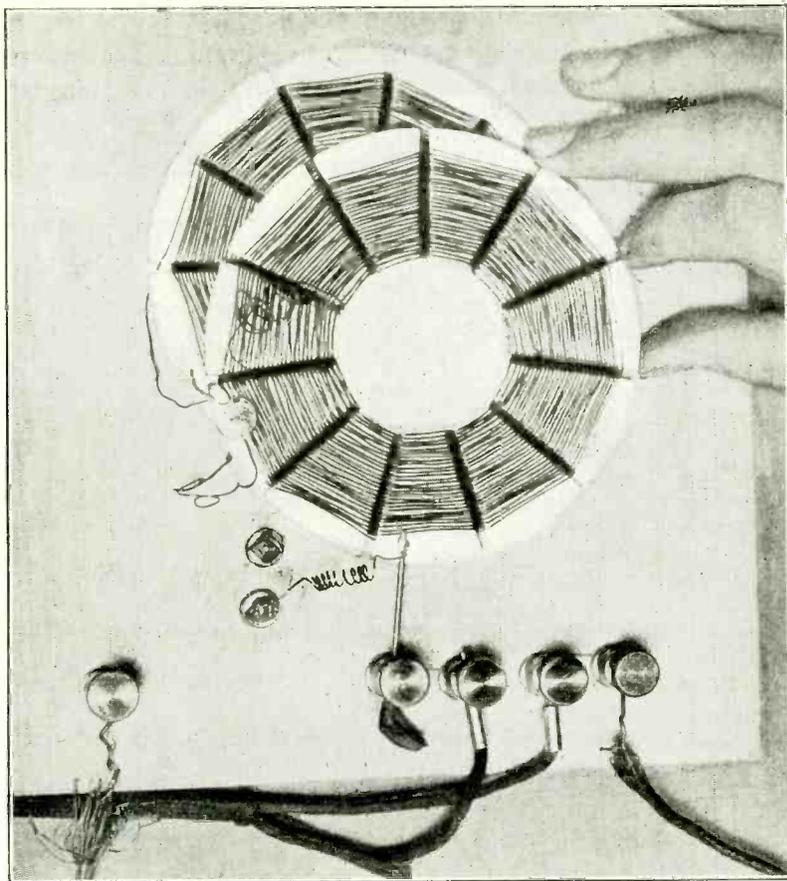
Secretary to E. F. W. Alexanderson, chief engineer, Radio Corporation of America.

heard. It worked. Marconi, fifteen years ago, hearkening to the three S's across the Atlantic, was no prouder than this fair radio enthusiast receiving the General Electric band "over the radio."

Since that time, Miss Apkes has gone into quantity production and has turned out a set for Mr. Alexanderson, which he and his family enjoy nightly. She also sent a set to the Radio Corporation offices in New York. No sooner did this arrive, than Miss McInnis saw in it a way of trying out in practice what Mr. Sarnoff so constantly was preparing memoranda on; and that very evening an improvised antenna was strung from a window in a New York apartment to another building not far away—and WJZ came in well! Two radio fans were added to the million or more already in existence.

Miss Apkes' design is a single-circuit receiver with a variometer inductance in series with the antenna, and across this a crystal detector. The inductances are two in number, both of the same size, and are wound in the spider web form for convenience of construction. Twenty-seven turns are wound on each coil, the wire being No. 24 B. & S., enamel covered. A galena crystal is used as detector.

Although obviously this receiver suffers in comparison with a standard-crystal detector set, both as to ease and flexibility of adjustment and as to sensitiveness, nevertheless the underlying idea of starting out with a set as near to fundamentals as possible is right. Too many radio listeners have worked with advanced type sets only. These amateurs;



How the set is operated. Fully described in the accompanying article.

(Continued from preceding page)

lack the perspective and knowledge of what they are doing, the knowledge possessed by those who have struggled upward from more humble sets. It is no idle prophecy that it will not be long before both Miss

McInnis and Miss Apkes will be owners of sets embodying all the latest devices in tuning, detection, and amplification. Their mastery of the simpler set first will mean that they will more easily master the



MISS ESTHER McINNIS

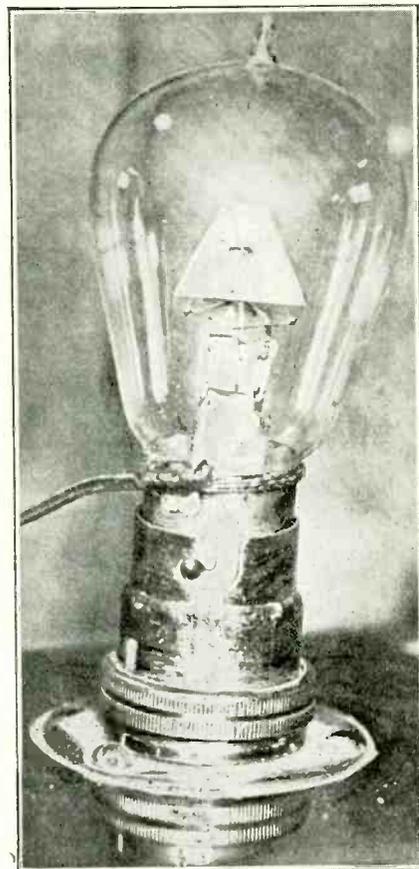
Secretary to David Sarnoff, general manager, Radio Corporation of America.

more complicated sets that follow.

Then, of course, the element of expense comes in. One naturally feels timid at investing money in a receiver until one feels sure that it will work. The receiver described is really about the ultimate limit in the matter of cost, for, provided one's friends come across with binding posts, galena crystal, and head phones; and provided, also, that one can stumble over an unattached spool of enamelled wire, the total cost of the set is about one cent, for pasteboard, and even that may be eliminated if one uses a shoe-box cover.

Best of all, however, is the fact that Mr. Sarnoff and Mr. Alexander-son now give only a skeleton outline of the reports that they want, confident that their secretaries, now wise by personal contact with radio's mysteries, will fill out the missing data without further instruction.

Daddy of the Vacuum Tube



(Central News Photo Service.)

Model of the first vacuum tube invented by J. A. Fleming, famous British radiotrician, and carefully preserved at the College of the City of New York in its research laboratory. This valve contains only a filament and plate, and is the daddy of the present-day three-element tube, without which the radio art would still be in the spark-coil-and-crystal-detector stage.

Radiograms

Latest Important News of Radio Garnered from the World Over, and Reduced to Short Wave-Lengths for the Busy Reader.

SYMPTOMS of a strange malady were diagnosed at sea by radio. Dr. Lee Brown, of the Royal Mail liner "Oropesa," which arrived Saturday from Southampton, was called upon, during the voyage, to prescribe for several of the crew on the Danish freighter, "A. T. Lanterhavet," who were suffering from a mysterious malady. The Danish vessel, which was then many miles distant from the "Oropesa," had come from Malta and was bound for New York. Dr. Brown, who had been connected with the British squadron stationed at Malta during the World War, at once recognized from the Danish captain's description of the symptoms that the men were suffering from Malta fever, a species of malaria. He sent a message by radio prescribing the necessary remedies and outlining a course of treatment which had the desired effect, he claims, as no other call for aid was received.

* * *

A prescription relayed by radio was the means of saving another sailor's life. The man was aboard a British vessel in the Mediterranean and was taken critically ill. His captain broadcast a report of his condition, asking medical advice. A French vessel picked up the message, but no one could read English, so the operator relayed it to another French ship. On this vessel the doctor understood English but could not prescribe in the language. He, in turn, broadcast a prescription in French to another French ship, where it was translated into English and forwarded to the original vessel, where the captain followed instructions and the sailor recovered.

* * *

Captain Amundsen, the arctic explorer, has sent a radiogram from Nome, Alaska, that he has postponed his proposed trip over the North Pole in a radio-equipped airplane for one year.

* * *

Radio communication between this country and Norway may become a reality when the new station now being built on the summit of Rundemandon, a 2,500-foot mountain near Bergen, Norway, is completed. The improvements now under construction consist of arrangements for a radio telegraph station with a 3,000-kilometer radius and an 800-kilometer phone for communication with England. The service will be in operation in one month.

* * *

For a period of two years, licenses for broadcasting, granted in Great Britain, should contain the provision that only British instruments should be used. This is the recommendation of the postmaster general, and, according to "The Evening Times," London, has been approved by the Cabinet.

* * *

Radio messages recorded during the operator's absence is the latest. A radio relay recorder that receives and copies messages without the use of a trained radio-operator, operates mechanism automatically in accordance with the signal received and acts as an automatic call system has been perfected by F. W. Dunmore, of the radio laboratory of the Bureau of Standards, Washington, D. C. It is sensitive enough to convert, accurately, the most insignificant radio-signals into records, yet will operate in a vibrating airplane.

* * *

The United States Department of Labor is to broadcast. Not to be outdone in radio activities by the Agricultural, Post-

office, Commerce and other civil departments of the Government, Secretary Davis has decided to put the Labor Department on the radio map and tell the world what it is doing. To this end he has officially asked the co-operation of the Navy Department in broadcasting labor activities and news relative to immigration quotas, labor arbitration, employment and child labor, as well as other official business.

* * *

If the broadcasting fever hits Great Britain as hard as it has hit the United States the subject of the government splitting the tax on receiving sets with the companies carrying on the broadcasting will prove no mean source of revenue. American amateurs little realize the advantages of living on this side of the water, as every single British station, both for sending as well as receiving, is forced to take out a license and pay a substantial fee.

* * *

The entire question of patents in crystal-set construction will shortly be aired in open court as the result of a suit by the Freed Eisemann Radio Corporation against the Wireless Specialty Apparatus Company, in the Supreme Court of New York County, alleging unfair business competition by the latter firm, in publishing a series of trade advertisements containing a series of patent warnings. The plaintiff asks an injunction and \$150,000 in damages. In the mean time the defendant in this suit is in turn suing in the United States District Court of the Southern District of New York, alleging infringement of three of its patents by the Freed Eisemann Corporation.

* * *

"This resort has gone wild over the radiophone!" writes the Lake George, New York, correspondent of "The World," New York. Most of the hotels, restaurants and even the small tea rooms have their outfits for giving radiophone concerts and special stock market reports to their patrons. At Newport, Bar Harbor, and throughout the Adirondack region, many of the leading hotels and private residences consider radio a necessity this summer.

* * *

A woman from Chicago went to Coney Island to hear her daughter back home singing by radio and being heard in one of the concessions at the park.

* * *

Do you love adventure? Here's a rare radio trip. The following advertisement appeared in the New York City newspapers last week:

WANTED—A radio operator who also is an experienced mechanic, one with aviation experience preferred, to fly from New York to Brazil, up the Amazon for a thousand miles, the final destination being the World's Exposition at Rio de Janeiro, celebrating Brazilian independence. Write (do not call), telling of experience. Hinton-Martins Flight to Brazil, Room 1608, No. 111 Broadway, New York City.

If it is achieved, the flight to Brazil will not only be an historic feat in aviation but in radio as well.

* * *

Giving "radio equipped" as one of the attractions, two New York City residents advertised their furnished apartments for tenants.

Cleveland Bank's Radio Service

Up-to-the-Minute, Four-Times-a-Day
"Newspaper" for Benefit of Patrons

THE Union Trust Company of Cleveland announces, through A. H. Scoville, vice-president in charge of the bond department, the installation of a radio-broadcasting station which will be in operation on or about August 15. The new station will be a 500-watt outfit of the very latest design which, under favorable conditions, has an effective radius of 500 miles. From 9 until 9:45, and from 10 to 10:45 in the morning; and from 2

to 2:45, and from 3 until 3:45 in the afternoon the new Union Trust Radio Broadcasting Station will send out full and authoritative information on the major movements in the stock and bond market, together with latest prices on farm and dairy products. Intervals between quotations will be filled with the important financial news accumulating over the private wires of the company.

The new station will bring not only to the city dweller who owns a receiving set, but to the farmer as well, up-to-the-minute information on the major movements of the financial world, together with the vital news of all the markets. It will enable the farmer who does not himself own a receiving outfit to call up his local bank and obtain the very lat-

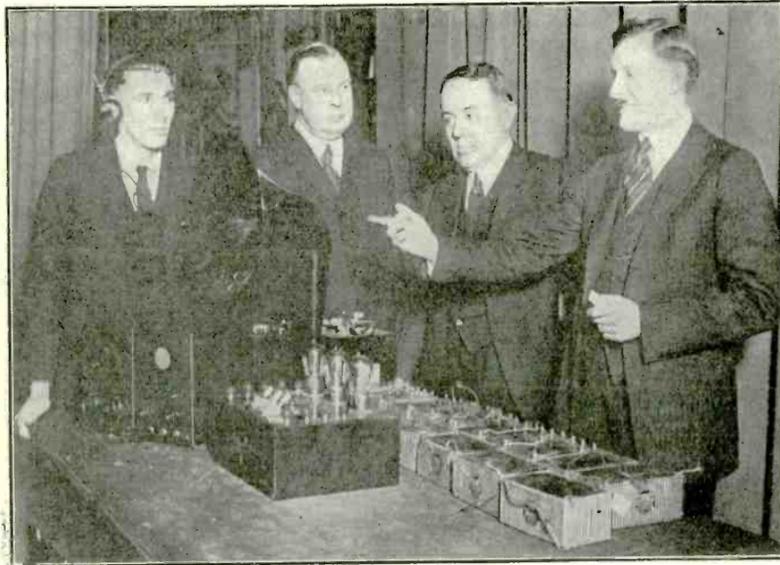
est quotations on his farm and dairy products, insuring proper buying and selling on the farmer's part. It will enable the city dweller within a radius of 500 miles of Cleveland to obtain the very latest news from the financial world.

In effect, the Union Trust Radio Broadcasting Station will supply practically the entire Fourth Federal Reserve District with an up-to-the-minute four-times-a-day newspaper of the events of importance in the commercial and financial world.

Once a week, in the evening, from 7 to 8, the very best entertainment program available in Cleveland will be broadcast.

Radio World, 52 issues, \$6.00

Photographic News of the Week Shows No Decline in Radio's First Big Midsummer

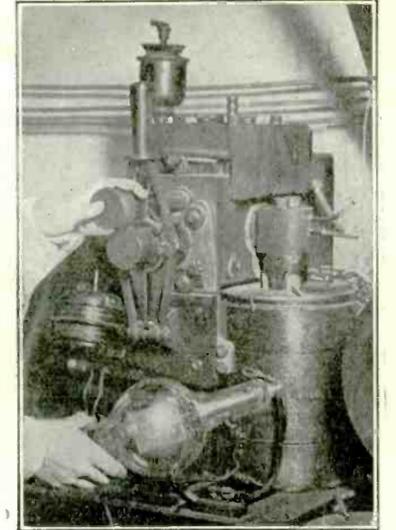
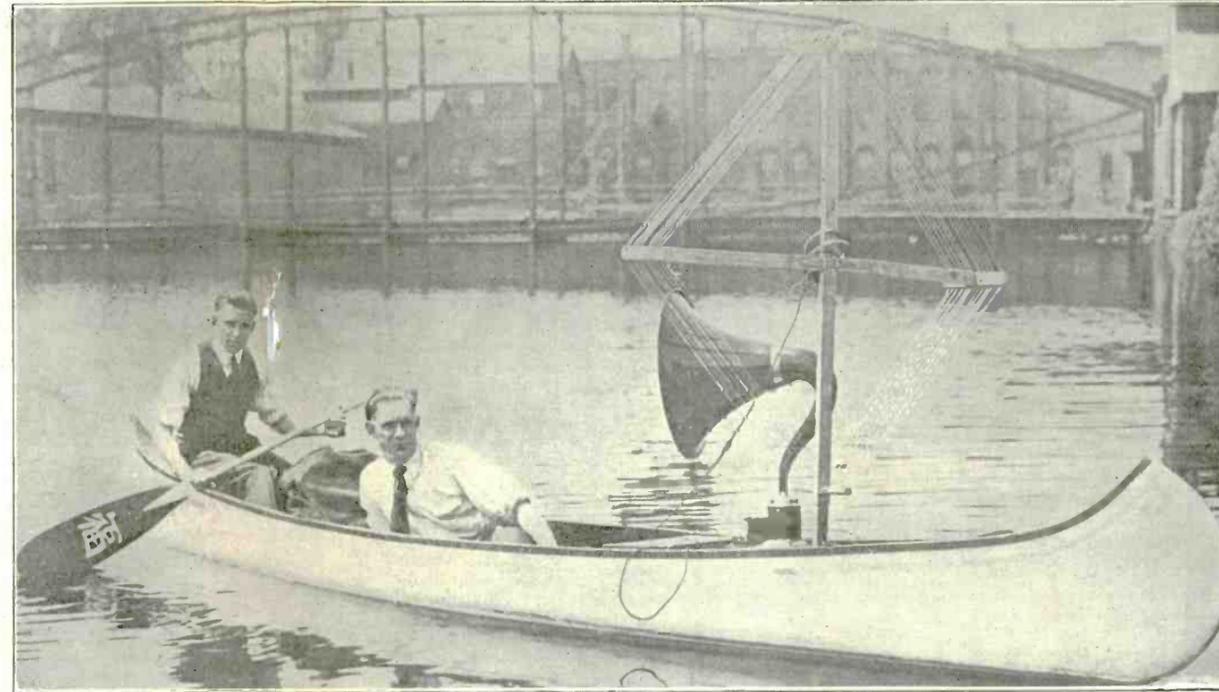


(Left) Morgan L. Eastman, director of radio concerts at the Westinghouse broadcasting station KYW, divulging some inside information regarding the marvels of radio. By stretching a single copper-wire across the Cameo Room of the Morrison Hotel, Chicago, and grounding a wire on the radiator in the room Mr. Eastman succeeded in picking up broadcast music. No exterior aerials were used; the apparatus was confined within concrete walls.

(C. International.)

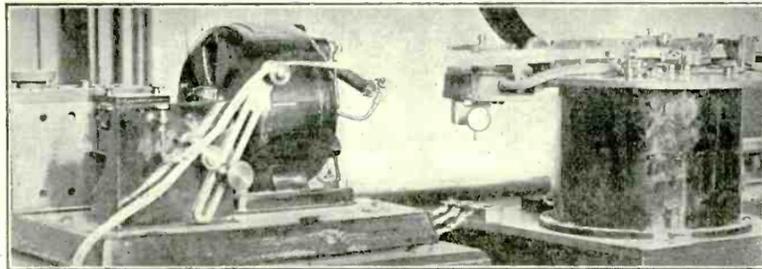
(Right) These up-to-date canoe radio fans have rigged up in their frail craft a practical amplifier and aerial. When the proud owners of the canoe were asked for information regarding their stunt they exclaimed: "It works!"

Underwood & Underwood.



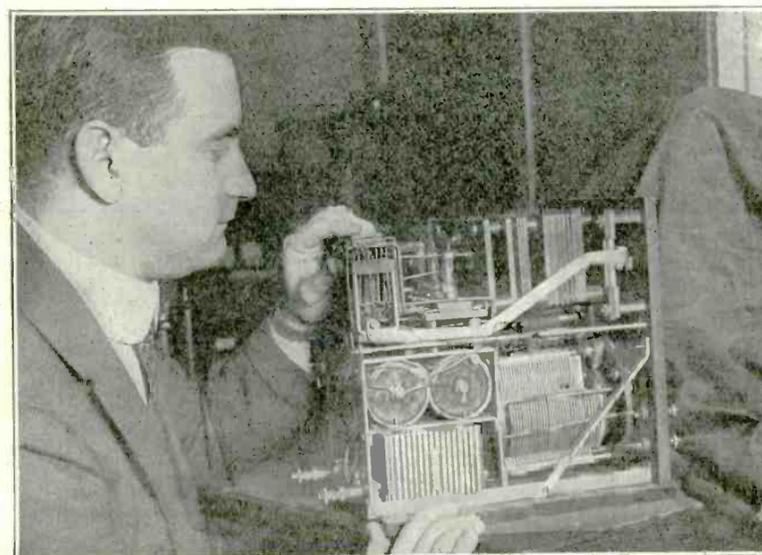
What this large generator once accomplished is now being done with greater effect by the plotron tube—the device shown in the hand at the lower part of the photograph. It is largely a matter of the smaller object giving greater power—of the more compact apparatus taking the place of the bulky one.

(C. Kadel & Herbert News Service.)



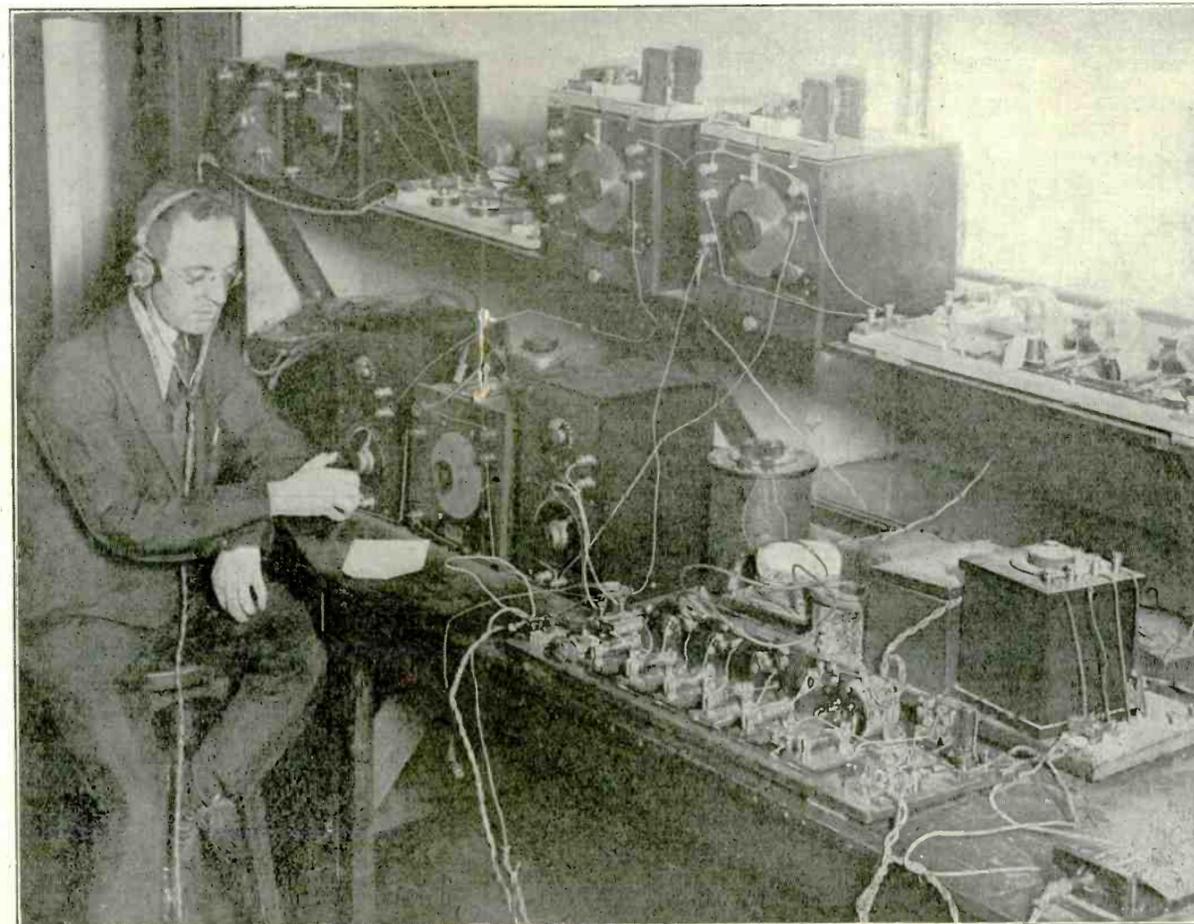
(C. Central News Photo Service.)

This is a new device for recording high-speed radiotelegraph signals, particularly those received from Europe. The signals are amplified and then applied to a coil which is made to move in a powerful magnetic field. The motion of this coil is recorded on moving tape by means of a tiny glass pen attached. A record of the dots and dashes is faithfully reproduced.



(C. Kadel & Herbert News Service.)

Dr. A. N. Goldsmith and his new uni-control receiver. No taps are used, the inductance being varied by means of copper plates rotating alongside a coil. A complete detector and two-stage amplifier, using the new "peanut" tube, together with the accompanying filament and plate batteries, are included.

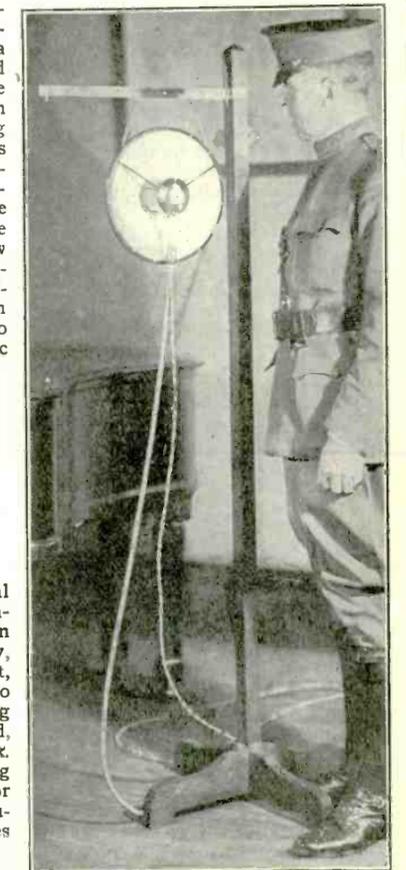


(Left) A radio set for research work on long-distance reception. Such a set is very complicated and requires considerable apparatus, as will be seen in the accompanying photograph. On this elaborate set Julius Weinberger is conducting extensive investigations in the radio laboratories in the College of the City of New York. These investigations are to perfect long-distance reception from European stations, and to ascertain atmospheric conditions.

(C. Kadel & Herbert News Service.)

(Right) Major-General Robert Lee Bullard, commander of the Eastern United States Army, Department of the East, giving instructions by radio from the broadcasting station at Fort Wood, Bedloe's Island, New York. General Bullard is talking into the phonotron, or "soup plate," used exclusively by the United States Army at WVP.

(C. International.)



Radio Manufacturers Form National Organization

Radio Section of the Associated Manufacturers of Electrical Supplies to Stabilize Industry and Support Broadcasting

By Walter K. Emmet



C. E. HAMMOND Vice-President
Pirle Macdonald M. C. RYPINSKI Chairman
Alman CHARLES GILBERT Treasurer
U. & U. N. Y. ELMER E. BUCHER Secretary

Four leaders of the Radio Section of the Associated Manufacturers of Electrical Supplies

PUBLIC interest in radio and, also, the manufacture and sale of radio apparatus, is utterly dependent on broadcasting. If the few broadminded radio manufacturers who now transmit music and speech at their own expense were to abandon their stations, the radio industry might collapse over night. Since broadcasting is directed to the public as a whole, the radio industry must consider the public as a whole. The situation thus presented calls for united action by the industry, for a clear vision of radio's possibilities, and for a certain degree of self-regulation.

The manufacturers of ordinary commodities may flourish without necessarily becoming members of an association formed to further the interests of their industry; but an association of radio manufacturers that think and act together must exist if the public interest in broadcasting and, hence, in radio, is to be maintained. Moreover, the radio industry must supervise itself and correct some questionable practices that have already manifested themselves. Radio corporations have been chartered literally by the hundreds, too many of them for the purpose of selling stock rather than of advancing the radio art.

In order to develop the support broadcasting, in order to stabilize trade conditions, an association must be organized with only reputable membership made up of members of the radio industry interested in the future development of radio. For this reason, the radio apparatus section of the Associated Manufacturers of Electrical Supplies has been formed to place the radio industry on a sound basis, to study the public taste in the matter of broadcasting programs, and to support and promote broadcasting stations. This Radio Apparatus Section was organized on March 19, 1921, at a meeting held at the Hotel Pennsylvania, New York City. At the second annual meeting, which was held at Spring Lake, New Jersey, during the week of June 19, the Radio Apparatus Section of the Associated Manufacturers of Electrical Supplies, definitely announced its program and the part that it intends to play in promoting the best interests of radio. At this meeting, the object to be attained by the Radio Apparatus Section was proclaimed as follows:

"To advance and protect the interests of

the manufacturers of radio apparatus; to promote the standardization of radio apparatus; to collect and disseminate information; and to promote cooperation among the members."

The membership of the Radio Apparatus Section is confined to bona fide and trustworthy manufacturers. That this ideal will be realized, may be inferred from the names of the following members who constitute the section at present:

Acme Apparatus Co., American Radio and Research Corporation, L. S. Brach Supply Co., C. Brandes, Inc., Burgess Battery Co., Clapp-Eastham Co., Cutler-Hammer Co., DeForest Radio Telephone and Telegraph Co., Dictograph Products Corps, Edwards and Co., Electrical Products Mfg. Co., General Insulate Co., A. C. Gilbert Co., Holtzer-Cabot Electric Co., Manhattan Electrical Supply Co., W. J. Murdock Co., Pacent Electric Co., Radio Corporation of America, Signal Electric Co., Stromberg-Carlson Telephone Mfg. Co., Telenduron Co., Western Electric Co., Westinghouse Electric & Mfg. Co.

Of equally high standing are the officers. M. C. Rypinski, vice-president and sales manager of C. Brandes, Inc., is chairman of the radio apparatus section. The eastern vice-chairman is C. E. Hammond, secretary-treasurer of the Signal Electric Co. Charles Gilbert, president of the DeForest Co., is treasurer of the association. The secretary is Elmer Bucher, sales manager of the Radio Corporation of America.

M. C. Rypinski, chairman of the executive committee of the Radio Section has long been associated with the electrical industry in general. An engineer of high standing, he is also a sales and merchandising expert, having been in charge of the radio sales of the Westinghouse Electric and Manufacturing Co. He early advocated the commercial exploitation of the radiophone and assisted in the direction and operation of the first Westinghouse stations. This pioneer work of Mr. Rypinski has given him an insight to the commercial side of broadcasting and radio-merchandising problems possessed by few other men.

Mr. Rypinski is a native of Texas, of the Rose Polytechnic Institute at Terre Haute, Indiana. He was graduated in the class of 1897 and entered the employ of the General

Electric Company as assistant to the chief of the Standards Laboratory. From 1903 to 1906, he was engaged in instrument manufacturing after which period he joined the Westinghouse Electric and Manufacturing Co., Dictograph Products Corp., Edwards association with the Westinghouse Company, he joined C. Brandes, Inc. Mr. Rypinski's organizing ability is manifested in the work he has done in the National Electric Light Association, the American Institute of Electrical Engineers, the Illuminating Engineering Society, and the Electric Power Club.

Louis G. Pacent, eastern vice-chairman of the association, has been identified with the industry for the past fifteen years. Mr. Pacent started his career as an amateur. To-day he is a well-known engineer, inventor, manufacturer, and merchandiser of radio apparatus. Before becoming president of the Pacent Electric Company, Inc., he was, for several years, in charge of the radio sales and manufacturing department of the Manhattan Electrical Supply Company, New York City. Mr. Pacent's contributions to radio literature have been numerous and varied.

Elmer E. Bucher, the secretary, has been active in the radio field since 1903, when he joined the De Forest Wireless Telephone and Telegraph Company as a research engineer. Four years later, he became a member of the engineering staff of the United Wireless Telegraph Company, engaging in research and experiment work in that company's laboratory. Later he was made chief inspector. He was responsible for the installation of a large number of land stations throughout the United States. At that time he began the preparation of a series of radio books that have since become standard in the amateur field. Mr. Bucher was the first man to interest the Y. M. C. A. in the teaching of radio and, as a result of his activity along this line, he joined the Marconi Wireless Telegraph Company of America, in 1913, as instructing engineer, later organizing the Marconi Institute of which he became director. He was technical editor of "Wireless Age" from 1913 to 1917. When the Marconi Wireless Telegraph Company of America was merged into the Radio Corporation of America, Mr. Bucher was appointed commercial engineer in charge of domestic and export sales and, later, was made sales manager of the company's entire merchandising activities.

Charles Gilbert, president of the De Forest Radio Telephone and Telegraph Co., is the treasurer. Mr. Gilbert joined the De Forest interests in 1915, having in his charge all of the financial and commercial affairs of that company. Before joining the De Forest Company, he was a chief certified public accountant. Although Mr. Gilbert is not an engineer he is thoroughly conversant with all the commercial and financial angles of the radio industry and his experience in this work will make his services of great value to the association as treasurer.

The following standing committees have been created to fulfill the purposes indicated by their names:

Committee on Publicity, Committee on Receiving Sets and Equipment, Committee on Aural Devices and Accessories, Committee on Standards, Committee on Support of Broadcasting, and the Executive Commit-

Radio and the Woman

*By
Crystal D. Tector*

Only Woman Announcer



(C. Kadel & Herbert News Service.)

Station WOR, Newark, New Jersey, boasts the only woman radio-broadcast announcer in the United States. She is Miss Jessie E. Koewing, and is known to radio fans as "J. E. K." Many radio amateurs will be pleased to see Miss Koewing's likeness, having heard her voice many times.

I NOTE with pleasure—for I am one of the keenest believers in the future of radio—that it is meeting with great favor, this summer, at many of the more fashionable resorts, notably Newport, Lake George, and the Adirondacks, and that, too, sets are being installed in some of the fine houses at Tuxedo which, as we all should know, throws open its doors when the autumn foliage turns from green to gold. It is amusing, however, to note that the resort reporters stress the fact that the men are benefiting by the radio because, while sojourning at mountain and shore, they may keep in touch with the everlasting market quotations.

I suppose such things are as necessary to the average man's existence as his cigar. Friend Husband says they are, though he is not a speculator—just an ordinary human being who does as his wife tells him. But I have received letters from several of my friends who are summering at some of the resorts mentioned, and they tell me that the women folk are being benefited by the radio just as much as the men. Don't imagine for a moment that the average woman who is so lucky as to pass an entire summer at some well-appointed country place, spends all her time sitting on a porch reading fiction and planning winter frocks. If she is of the up-to-date, smart, American type, she will golf or play tennis or swim or row—and she will have just as full-blooded an interest in the big things of the day as any of the male persuasion of her immediate family.

For that reason she will take the radio-receiving set as an integral part of her household. She will want to hear the daily news and, being feminine, all that is being broadcast about fashions. She will want to listen in whenever the report of a big tennis match, or a notable golf or polo event comes through the ether. She will, if she is like the friends I want to cultivate, feel the necessity of keeping an unrelenting interest in all that is important in world affairs—and radio misses nothing today—for she is now a very important part of our citizenry. She has the vote!

I think I told you that I interested Friend Husband in radio. He had but a small idea of its importance at first. He's a lawyer, specializes in wills, though he hasn't made enough to think it necessary to have a will of his own (I mean one of those legal documents wherein every well-appointed F. H. leaves all he has to his wife), and he didn't have the time or the inclination to read up on the newer things in science. My! how I used to bore him with what I read about radio. Finally, in sheer desperation, I suppose, he took it up and went into it heart and soul. Now it is a question as to which is the more enthusiastic "bug," he or I.

One of the fair summer boarders up here at Lake Hopatcong tried out her receiving set in her canoe, one day last week. She rigged up a loop aerial—she confided to me that she had taken her tip from a photograph published in RADIO WORLD—and paddled to the middle of the lake where she let the canoe drift while she tuned in. She picked up Newark and an amateur whose call she could not quite make out. She is quite an enthusiast. Next week, when she returns from a visit to New York, she promises to take me out with her. It must be a rare sport.

Last Thursday night I tuned in for the Leonard-Tendler fight. F. H. was so fussed up about it that I felt it my duty. At first he wanted to journey down to Dover, New Jersey, and get the returns at the local newspaper office, but I told him to stay at home and save himself the trouble. He was afraid, at first, that something might happen to prevent perfect reception—told me that he couldn't go to bed that night unless he knew who won and interjected several other mild objections. But I answered that he would get an earful regarding the affair if he would only be patient. Well, it worked in fine style. I spread the news among the neighbors. F. H. feared to do so lest some interference might spoil it all and they would be disappointed. We had a house full. Even the sheriff was present. I made another big bowl of my radio punch—which is, I can proudly say, the popular drink of the "lake," as we Hopatcongists call this neck 'o' the woods.

The news of the big fight came through our loud-speaker without a blemish. We heard the man who gave it out, round by round, clearly and distinctly. F. H. was delighted, because he could air his prize-fighting knowledge and explain to the

uninitiated all the various technical terms. He was as lousy as a bee in a meadow abloom with daisies. And he was pleased with the smart manner in which everything went off. I have always said that radio will keep husbands at home when nothing else will.

There is a young bride sailing for Europe next week to meet her husband-to-be. She wants to surprise him with a telephone call by radio when she is approaching the French coast. I understand that her parents, wishing to give in to every little whim that she may show, have gone to no end of trouble to bring the thing about—even to advising the young man to be on hand for the call lest his heart's desire pine away with disappointment.

A motor party journeyed through these parts, the other day, with the most thoroughly equipped radio set I have ever seen on an automobile. Their unusually large touring-car carried a foot above the roof, and a special stand inside held the receiving set. Just to prove to me that it "worked," I accepted their invitation for a tour of the lake district and we caught several messages while in motion. At one place we stopped, made a ground, and caught a message from Arlington. And, the entire radio apparatus was in charge of a young lady of the party.

From my mail-bag:
Miss B. H. J., Staten Island, N. Y.—"Dear Mrs. Detector: I have just returned from a trip to South America. On the way home, I spent most of the time in the radio room of the steamer. Now I am a thoroughly dyed-in-the-galena radio fan. I want to be a radio operator on an ocean liner."
Mrs. L. P. R., Bloomington, Ill.—"I think that I can safely say that the women of my town are taking greater interest in their dress since fashions were radioed."

(Continued from preceding page)

tee which is composed of the chairman and treasurer of the Radio Section and of the chairmen of the standing committees.

This is the nucleus of an organization which will eventually include every important enterprise in the radio industry.

In Support of Broadcasting

Although broadcasting stations have been established by newspapers, department stores, dealers, a few universities, and the United States Government, the public turns for its entertainment and instruction chiefly to about half a dozen stations maintained by a few enterprising broad-minded manufacturers, at their own expense. Time and time again the question has been raised. "Who is to pay for broadcasting?" When this question is satisfactorily answered broadcasting may be placed upon a sound, permanent basis. The character of programs, the qualifications of feature directors, the territory to be covered by a given broadcasting station, all these matters will be speedily disposed of when the all-important problem of supporting the broadcasting stations has been satisfactorily solved.

At present, the industry as a whole contributes nothing to the maintenance of broadcasting stations, nor does it exercise any control over the programs broadcast or the territory covered by a station. That dozens of manufacturers and hundreds of dealers who are dependent on the continued maintenance of broadcasting stations contribute nothing to broadcasting, is not to be attributed to any unwillingness on their part to keep alive the interest of the public in radio, but solely to the fact that the industry has been unorganized and that no contact has been established with the broadcasting stations. The Radio Apparatus Section of the Associated Manufacturers of Electrical Supplies has already considered this highly important matter of supporting the broadcasting stations. It is one of its chief objects to devise a plan of promoting broadcasting which will enable the individual members of the industry to contribute their just share of the expense now incurred for entertaining and instructing the public through radio. Just what plan will be adopted, it is too early as yet to predict. In all probability, a tax of some kind will be levied on the members of the Radio Apparatus Section, the amount of the levy depending upon the annual gross sales of each member.

In all probability, the members, all of whom have pledged themselves to support broadcasting by financial contributions, will be authorized to affix to their apparatus and to include in their advertisements the insignia of the association. Thus, the public will be enabled to show its preference for the apparatus made by a manufacturer who has assumed part of the financial burden of broadcasting and who accepts his responsibility to the public. Inasmuch as the Radio Apparatus Section through the proper committees, will voice its approval or disapproval of the sets made and sold, the insignia may well become a valuable trade-mark, a symbol of quality.

Explaining Policies to the Public

Because of the public utility character of broadcasting, the Radio Apparatus Section of the Associated Manufacturers of Electrical Supplies, recognizes the need of explaining the possibilities and the limitations of radio to the public, as well as its own attitude. The central stations, the electric light companies, the traction companies, telephone and telegraph companies, have all been forced to take the public into their confidence, largely under the pressure of legislative action. It is far better that radio should explain and regulate itself at the outset of its career than under compulsion. Moreover, radio is still a mystery to the

general public and even to many dealers. Because it is new, it needs explaining. The policies advocated by the Radio Apparatus Section, policies which will govern the future course of the industry must be laid bare, all the more so since they will be adopted as much in the public interest as in the interest of radio itself. Hence, a committee on publicity has been appointed which is charged with this educational task.

It is evident that the scope of the work that must be done by the committee on publicity must be broad. No doubt, cooperative advertising must be undertaken to familiarize the public and the trade with broadcasting programs and broadcasting policies.

Broadcasting is now subject to more or less governmental regulation. Laws are bound to be enacted which will have a marked influence on radio. Before the Radio Apparatus Section was formed, manufacturers opposed or advocated legislation individually. Because the industry was unorganized legislators found it difficult to determine the attitude of the radio industry and the public as a whole to the proposed laws. It would obviously be to the advantage of Congress, to radio, and to the public if the technical knowledge and experience of the Radio Apparatus Section can be applied to guide legislators. The Radio Apparatus Section plans to do what useful work it can in thus avoiding well-meant but ill-advised federal action and in recommending really necessary legislation.

Standardization of Apparatus

If we may judge by the experience of electrical and automobile manufacturers, as well as manufacturers of engineering products in general, standardization of radio apparatus must some day be undertaken. Radio is still so young and is growing with such startling rapidity that, as yet, it is inadvisable to frame any rules comparable with those that have been adopted by the standardization committees of the various engineering societies. The committee on standards will decide when the time is ripe for recommendations that should be followed by manufacturers.

Federal Radio Activities Increasing

WASHINGTON, D. C.—Since the establishment of the Interdepartmental Radio Board, radio activities in several of the United States governmental departments and bureaus have been increasing rapidly. The Army and Navy are constantly going full tilt and increasing their official and public service almost daily, while the Post Office, with fifteen stations, is perfecting radiophone broadcasting and planning control of its cross-country air mail-planes. The Public Health Service and the Bureau of Education now expect to open broadcasting services for the dissemination of information and educational matter.

The Veterans' Bureau is broadcasting employment advertisements weekly. Secretary Davis wants a labor radio-news service. The Department of Commerce has just authorized its thirty-three co-operating offices to arrange with local broadcasting stations to release all cable and radio information on foreign markets in the form of a daily world survey.

Interesting items are expected daily concerning foreign trade and commerce, from broadcasting stations at Akron, Atlanta, Baltimore, Boston, Bridgeport, Chattanooga, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, El Paso, Indianapolis, Los Angeles, Milwaukee, Newark, New Orleans, New York, Norfolk, Omaha, Pensacola, Philadelphia, Pittsburgh, Portland, Richmond, Rochester, San Francisco, St. Louis, Seattle, Syracuse and Manila.

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Subscribe for Radio World, \$6.00 a year, \$3.00 six months, \$1.50 three months.

Rocky Point Receives Regularly from Five European Stations

RADIO messages from five European stations are received regularly at the Rocky Point, Long Island station—from Carnarvon, Wales; Stavanger, Norway, the Lafayette station at Bordeaux and two German stations near Berlin. Facilities also can be made adequate at this station for the reception of wireless from the San Paula station near Rome, the new Polish Government station now being erected near Warsaw, and the proposed new Belgian station near Ghent.

Nearly ten miles of antennae at Rocky Point snatch electrical impulse out of the ether, and the messages are relayed, automatically, over seventy-five miles of land wire to the receiving operators' headquarters in the Broad Street station, New York. The messages also are re-recorded mechanically so that a permanent record of them is kept.

Operating on these five great wireless circuits—three more than are run into any other station on earth—the engineers are faced with the problem of keeping static down to a minimum. They have

succeeded to the point where all the circuits are kept open daily.

One method for combating static is the building of an antennae system between nine and ten miles long, pointed in the direction whence the wireless messages are received from Europe, so that the electrical impulses, on a wave length about as long as the antennae, strike the end of this stretch of wire and travel along its two strands to the station, with elimination of much of the static.

Short Waves Being Favored

BROADCASTING stations will be using a wave length of from ten to fifty meter within the next three years and wave lengths as short as 100 meters will be in use before this year comes to a close, is the prediction of a writer in "The Evening Mail Radio Review," New York. This may sound like idle speculation now, but it must be remembered that things are moving rapidly in radio. That which is a fact to-day is history to-morrow. Radio is a science in the making.

There are many things in favor of the shorter waves, although engineers up until a few months ago were willing to concede nothing along this line. The short wave was an outcast left upon the scrap-heap of radio. But like many other waste products, the short waves are beginning to hold out some possibilities. They are ideal for radiotelephony, and sharper tuning is possible with their use. If they were pressed into service, interference would be greatly reduced and there would be more freedom in the choice of wave lengths for use in broadcasting.

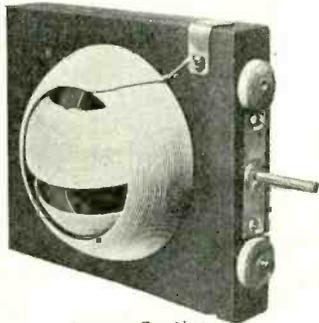
At one time it was thought impossible to bridge the Atlantic Ocean with short waves. Engineers thought that only the longer waves could be used for such purposes. Our radio amateurs surprised the long-wave school when they successfully bridged the Atlantic last year with their little 200-meter transmitters, using only a few watts of power. That accomplishment emphasized the possibilities of the short wave, and it brought many engineers out of a coma that had troubled them for a number of years.

Signals Heard

20Y—Connecticut

- Spark: 2 KT, 2 TS, 3 HT, 3 RW, 3 ARN, 3 BKW, 4 EA, 8 BO, 8 RQ, 8 ACF, 8 AFB, 8 AJT, 8 BAZ.
- 3 NB, 3 XM, 3 HN, 3 ZY, 3 ALN, 3 YP, 3 GE, 3 CN, 3 TA, 3 ARM, 3 QW, 3 QR, 3 BLF, 3 BZO, 3 BZK, 3 ZO, 3 BNU, 3 GA, 3 IL, 3 UV, 3 BG, 3 BOF, 3 BIJ, 3 BEC.
- 4 ABL, 4 DC, 4 BZ.
- 5 BM.
- 8 ATU, 8 XK, 8 AGZ, 8 HJ, 8 ANY, 8 SP, 8 AXY, 8 AWP, 8 APL, 8 ASH, 8 AFD, 8 GW, 8 ACF, 8 AFV, 8 PX, 8 BFG, 8 CBJ, 8 LB, 8 WO, 8 AUH, 8 ZW, 8 IZ, 8 HM, 8 AFA, 8 HO, 8 TB, 8 AIT, 9 IO, 9 CU.

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Patent Pending

The Reasons Are Apparent!

No dielectric is used around the coils—yet they are as strong as metal. Nickel plated brass bearings. Our design is exclusive, making it the best appearing variometer on the market.

RADIOMART VARIOMETERS when used in your receiver will produce loud, clear signals and music and bring in long distance work too. Sold on money-back guarantee. Wave length, 150-600 meters.

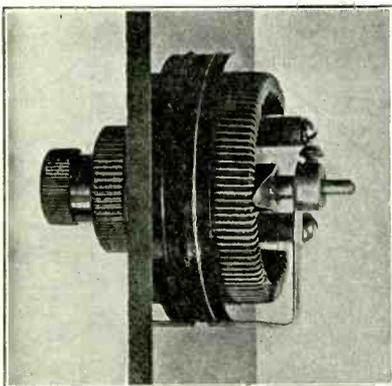
Price, \$5.00 prepaid. Cash or C. O. D.

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An absolute necessity in the new Armstrong Regenerative and in Radio Frequency Amplification



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We are the only manufacturers selling a regular rheostat with dial for \$1.50.

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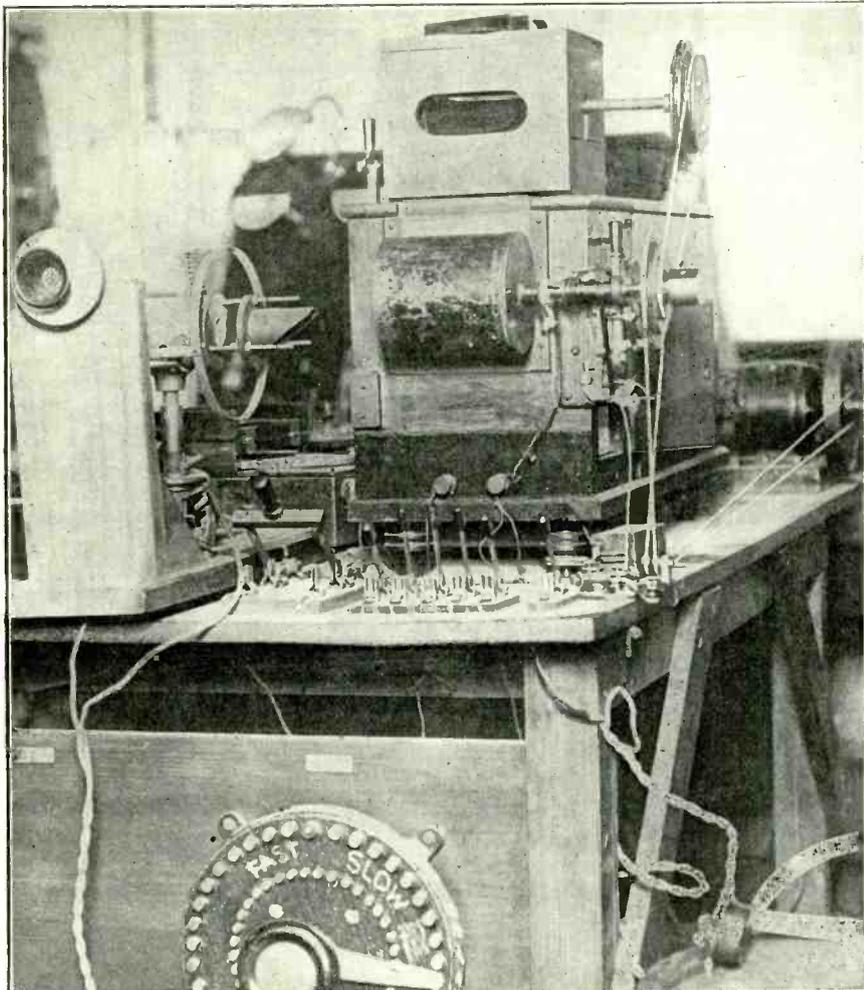
Factory: 165 High St., Waltham, Mass.

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If you did not get a copy of Radio World No. 1 send us \$6.00 and we will send you the paper for one year, and start it with our first issue, which will be mailed you as soon as possible after receipt of order. (Adv.)

The Oscillograph and Its Work



(C. Central News Photo Service)

One of the most interesting pieces of radio apparatus, recently developed, is the oscillograph. Although in the experimental stage, it has proved of great merit. Its functioning is based on the principles of the moving-picture machine. Its principles are the same except that radio circuits are applied. It is used in radio stations, especially those of the transatlantic type, for the reproduction of radio signals. This enables the high-powered sending machine to be pressed into service at the transmitting station. With the aid of the oscillograph at a receiving station thousands of messages may be recorded from a distant transmitting station. With the terrific speed maintained messages are sent thousands of miles in a few seconds. The oscillograph also photographs speech waves.

Radio News Distribution

FROM long and systematic experiments the German Post Office has come to the conclusion that radio telegraph is the simplest and cheapest means of distributing news from a central point, says "Scientific American." The post office administration entered into an agreement with a news distributing agency for the circulation of market prices of stocks, prices of material and so on. Subscribers to the service pay 4,000 marks per annum to the post office for installation and maintenance and a subscription for the news service to the press agency. Reception of news services which are subscribed for is partially prevented by changing the figures which have to be decoded by the subscribers entitled to the particular service. The apparatus consists of a single-wire antenna, loop antennae not being used since they involve expensive amplifying receivers. A single-tube receiver is supplied, supplemented where necessary by two audio-frequency amplifying tubes, while filament and plate currents are taken from the mains through suitable resistances.

Fifty-two issues for \$6.00. Sub. Department, Radio World, 1493 Broadway N. Y. C.

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 6900 Retail Radio Dealers, covering the United States, price per M.....\$7.50
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Miracle Radio Mfg. Co.
 Interurban Bldg., Dallas, Texas

Latest broadcasting map 15c. That is, a complete broadcasting map appeared in Radio World, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, N. Y. C.

SUPER-REGENERATION

cannot be accomplished without certain fixed inductance values.

We have for immediate delivery:

5 M. H. Choke Coils - - - - - \$2.50
 100 M. H. Choke Coils - - - - - \$3.00
 12000 Ohm Resistances - - - - - \$3.00
 .005 MFD Tested Condensers - - - 75c

The above parts have been tested in our Demonstrating Set, using the

ARMSTRONG CIRCUIT

and are known to be of correct value.

DURHAM & COMPANY

Radio Engineers

1936 Market Street

Philadelphia, Penna.

Advertising Rates, Display, \$5.00 per inch, \$150.00 per page

Radio Merchandising

Classified Quick-Action Advertisements, 5 cents per word

Telephone Bryant 4796

Let Radio World Test Your Goods

Manufacturers, send a sample of your goods to our Technical Editor, Fred Charles Ehlert, 9006 Pleasant Street, Queens, Long Island, N. Y. It will be carefully tested and returned. If your goods satisfy our experts, RADIO WORLD'S endorsement will be published in our merchandising department without charge or obligation of any kind on your part.

Rusonite Detector

Radio Chemical Co., 1361 Fortieth St., Brooklyn, N. Y.

A CHEMICAL crystal which comes in a small can nicely made up with a copper-whisker wire to be used for contact. A sample of this crystal termed "Rusonite," was tested out in a single circuit and a two-circuit receiver. The surface was uniform in sensitivity. It is mounted in an alloy ready to be used in the cup of a crystal holder.

Passed the test of RADIO WORLD'S experts and awarded letter of excellency.

* * *

23-Plate Variable Condenser

National Radio Co., 50 Union Square, New York City.

A WELL - CONSTRUCTED condenser of 23 plates. Capacity .005 mfd. stationary plates firmly held in machined pillars. All burrs have been removed. This reduces the leakage effect when using them in conjunction with C-W transmitters. The rotary plates fit into machined slots on the shaft and are pinned by a special method. Contact is made with shaft through a spring member which can be adjusted by a screw at the base of the condenser. The insulating ends resembles radioplate. Means are provided also for holding the condenser to panel or testing board. Tests on this condenser show that its manufacturer has made every effort to produce an honest product.

Passed the test of RADIO WORLD'S experts and awarded letter of excellency.

A Variable Condenser

Pioneer Radio Products Co., 329 East Twenty-ninth St., New York City.

A 23-PLATE variable condenser of good construction. The plates, which are punched, are mounted between aluminum bushings. The shaft of the movable plates is of copper well mounted with a copper contact arrangement. Insulating material resembling radioplate makes up the end plates of the condenser. All burrs are removed from sharp corners, thereby preventing leakage when used in conjunction with C-W transformers. The capacity of the condenser was found to be .0005 mfd.

Passed the test of RADIO WORLD'S experts and awarded letter of excellency.

* * *

Uses Bakelite End Plates

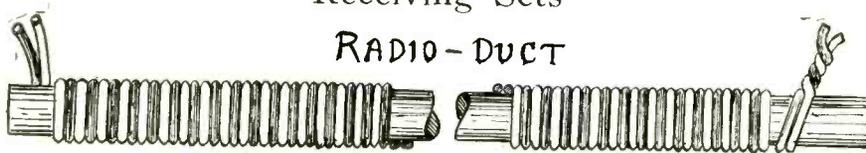
United Manufacturing and Distributing Co., 536 Lake Shore Drive, Chicago, Ill.

A 23-PLATE variable condenser of good construction. Bakelite end-plates are used with inserted brass bearings. The shaft of the moving plates is of brass with brass plate separators. Plates are of aluminum properly finished, with round etchings throughout. Proper facilities are made for connections. All parts finished in nickel. All burrs are removed from the edges of plates and sharp corners have been rounded off. In the event of this condenser being used in connection with C-W transformers, leakage is reduced to a minimum. The capacity was found to be .0005 mfd.

Passed the test of RADIO WORLD'S experts and awarded letter of excellency.

Radio-Duct, the New Conductor for Wiring Receiving Sets

RADIO-DUCT



IT has been established in radio engineering, just as in electrical engineering, that conductors of electricity—herein we specifically refer to copper wire and regular commercial conductors—when placed at right angles to each other and electrically charged, one will not influence the other; each will maintain its own resultant magnetic field and no induction will be set up. On this principle, Radio-duct has been developed.

This new conductor is self-shielded which permits it to be run parallel or angular in the set, connecting part to part, transmitting the intended current acceptedly without loss or change. This is accomplished by a two-circuit conduction, each circuit independent of the other.

The main conductor consisting of copper wire, enameled cover, serves as the trunk in transmitting the intended current from part to part

Radio Business Brisk in Northwest

EDITOR RADIO WORLD: You may enter the following data in your "New Firms and Corporations" column, if you will:

Intercity-Marine Wireless Electric Co., Inc., Radio Jobbers, Contractors, Manufacturers. Capital stock \$100,000. Incorporated 1921. 83 Columbia Street, Seattle, Wash.

We are interested in securing exclusive representation of radio lines, particularly radio hardware and small parts of all kinds. If you can put us in touch with responsible people who are manufacturing such equipment we believe you will be doing both them and ourselves a favor. We desire to communicate only with bona-fide manufacturers who can give us a proposition which will enable us to sell the jobber and dealer on a reasonable basis. We carry six radio salesmen who make the territory of Alaska, Western Canada, Washington and Oregon. We are covering this territory thoroughly and can give any desirable apparatus a fair show.

Our sales record during the summer has been remarkable, and we feel that we can sell more of any firm's products through the personal call than can be disposed of by circularizing from the East.

For the interest of your readers, we might say that radio business in Alaska is rapidly picking up. They did not get in on the broadcasts to any extent last year; but, this winter, they will have a broadcaster at Juneau and one at Nome. Indications are for a big year in the North. Western Canada practically dropped out of radio during the summer and is not picking up as fast as Washington and Oregon. Oregon, today, has a large number of broadcasters, and there has been a healthy demand for radio apparatus in the Willamette Valley during the summer. Portland dealers have not noticed the summer slack as have the dealers in Seattle, Washington, where it was quite noticeable.

INTERCITY MARINE WIRELESS ELECTRIC CO., 83 Columbia Street, Seattle, Wash.

By John C. Mitchell, President-Manager. July 21, 1922.

in the set. Virtually, without any loss or change, this is accomplished by the shield (spiral) winding which is placed over the entire periphery of the main conductor. This shield winding consists of many turns of small-sized copper wire, enameled covered, wound two-in-hand, each turn is snug up to the other and this winding (called the shield winding) accomplishes the purity of conduction in the main conductor by collecting or taking the stray currents—that is: ethereal eddy currents or static building up within the set—and neutralizing these pests within its circuit.

It may be seen by consulting the drawing that the lines of force created by the shield winding across the lines of force of the main conductor at right angles: This will not permit electrical influences to bother the main conductor in its work. So, with a "pure" conductor in the receiving set, reception is free of noises and the audibility is very distinct, mel- low, and clear.

New Firms and Corporations

Notices in this department are considered as purely interesting trade news and published without compensation to us. We welcome trade news of this nature. All notices having an advertising angle are referred to our Advertising Department, and are placed under Classified Advertising at 5 cents a word, or as Display Advertising at \$5 an inch.

(The firms and corporations mentioned in these columns can be reached by communicating with the attorneys, whose addresses are given whenever possible.)

Radio Export Corp., Manhattan, \$10,000; J. Kuris, G. T. Baum, S. Edelson. (Attorney, M. Joondeph, 44 Court St., Brooklyn, N. Y.)

Reddi Radio Corp., Manhattan, \$10,000; I. Lecker, H. Birkmier, L. Braff. (Attorney, C. Fay, 15 Park Row, N. Y.)

Wagner Electric Corp., Wilmington, Del., apparatus and machinery, \$11,000,000. (Corporation Trust Co. of America.)

Echo Radio Corp., Wilmington, Del., apparatus, \$250,000. (Corporation Trust Co. of America.)

Prima Radio Corp., New York, radio, \$1,000,000. (United States Corporation Co.)

The Pennsylvania Radio Corp., New York, has increased its capital from \$1,000,000 to \$2,000,000.

Radio Construction & Supply Co., Willard, Ohio. Haldon V. Cole, sales manager.

Harold M. Schwab, Manhattan, radio equipment, \$25,000; H. M. and F. L. Schwab, A. Fischer. (Attorney, R. Kent, Jr., 154 Nassau St., New York.)

Lewal Service Company, manufacturers of radio cabinets, 565 Fifth Ave., New York City, N. Y.

Coming Events

The editors of RADIO WORLD will gladly publish news items of all contemplated radio shows and expositions. Keep us posted by mailing full information.

ANNUAL SHOW OF THE ST. LOUIS RADIO ASSOCIATION, St. Louis, Mo., October 4 to 7, inclusive.

CHICAGO RADIO SHOW, Coliseum, Chicago, Ill., October 4 to 22. U. J. Hermann, managing director, 549 McCormick Building.

INTERNATIONAL RADIO EXPOSITION, Grand Central Palace, New York, December 21 to 30.

KANSAS RADIO EXPOSITION will be held at the Kansas State Fair, Hutchinson, Kansas, September 16 to 22 inclusive. A. L. Sponsler, secretary.

MERCHANTS' COOPERATIVE ADVERTISING AGENCY RADIO SHOW, Robert Treat Hotel, Newark, N. J., October 4 to 7, inclusive.

"RADIO DAY," Pittsburgh, Westview Park, August 24. Under auspices of Radio Engineering Society. C. E. Urban, secretary.

RADIO CLUB OF AMERICA. First autumn meeting will be held the last Friday in September. Renville H. McCann, secretary, Columbia University, New York.

CLEVELAND RADIO AND ELECTRICAL EXPOSITION, Cleveland Public Auditorium, Cleveland, O., August 26 to September 4, inclusive.

CINCINNATI RADIO-AND-ELECTRICAL EXPOSITION, Music Hall, Cincinnati, O., October 2 to 7, inclusive.

No Free List

RADIO WORLD has no free list. The only copies sent out by the publishers are to fill the ever-increasing orders of the American News Company, the large numbers of subscription orders received at the office of publication, and one voucher copy to each advertiser and advertising agent represented in current issues.

RADIO WORLD, 1493 Broadway, N. Y.

Last-Minute Radio News!

*Important Items Tuned in by Radio World Reporters
Just Before Going to Press*

IT is estimated that over 800,000 radio fans enlisted in a search in New Jersey and nearby States for three escaped prisoners from the Monmouth County Jail at Freehold. WJZ sent out a complete description of the prisoners. This aerial alarm was picked up in the Far West. The men were caught.

Guglielmo Marconi reports that a quartz-vacuum tube of high power is being constructed in England. It will put 75 kilowatts in an aerial.

A radio message, dated July 27, has been received at Portland, Me., stating that all the members of the arctic expedition headed by Donald B. McMillan, spent the winter in Southwestern Baffin Land and had met with much success in its observations in terrestrial magnetism.

The one hundred and thirty-second anniversary of the United States Coast Guard was celebrated by a message of praise and congratulation broadcast by the Navy Department from Anacostia.

Radio World, last week, received annual subscriptions from Ernest Paul, Prague III, Pinci II, Czechoslovakia, and Czechoslovak & American Corp., Ulice Karoliny, Svelte 4, Prague, Czechoslovakia.

Reuter's Trade Service states that the radiotelephone circuit between Copenhagen and Bornholm was recently opened to the public. The arc system is used for transmission and the rates charged are lower than for similar service by telegraph. This is the first public radiotelephone circuit to be placed in service in Scandinavia.

A musical program will be given between 11:00 A. M. and 12:00 M. and 4:30 P. M. and 5:30 P. M. week days over the new radio broadcasting station WBAY, which was recently erected on the Walker Street building of the American Telephone & Telegraph Company. A program will also be given on Thursday evenings from 7:30 P. M. to midnight, to be later announced.

July showed a gain in the value of radio shares. Many preparations are being made to float new radio concerns this fall and winter and investing promises to be brisk. Mr. Reynolds, of the Reynolds Spring Company, whose stocks is now held around \$45 a share, says that he expects big developments in radio this year.

New York's New Broadcaster

Metropolis to Have Largest Station on Atlantic Coast.
Better and More Attractive Programs Will
Be the Result

NEW YORK CITY is to have another broadcasting station, to take the place of WJZ, Newark, New Jersey, which is to be discontinued.

The new station will be erected on the Aeolian Building, 42nd Street, between Fifth and Sixth Avenues, the heart of the busiest section of the metropolis.

This will give New York City, when all are completed, three of the largest broadcasting stations in the United States. The other two are those of the American Telephone and Telegraph Company, the one to be operated by the City of New York, now under construction in the Municipal Building. Besides these three, are the stations of John Wanamaker and Bedloe's Island.

The new station on 42nd Street will be particularly accessible for artists, which should mean a great deal to broadcasting. Inasmuch as those who talk and sing and tell stories for the vast army of amateur receivers

do so gratis, it is to be commended that they will not have to journey beyond the heart of New York City in order to give their services.

The new station in Aeolian Hall, RADIO WORLD is informed, will be one of the most complete and best-equipped in the world. It should be hailed with delight by all radio fans within broadcasting range of New York, for it means increased and more varied programs.

Working jointly, the Radio Corporation of America, Westinghouse, and General Electric, plans have been made so the transmitting apparatus will be erected on the roof of Aeolian Hall, but will be operated by means of "remote control system" from offices on a lower floor.

When the license is granted by the Department of Commerce, this station will employ two or more wave lengths which may be utilized without interference from the same aerial system in order that different concerts may be transmitted.

RADIO WORLD

TELEPHONE, BRYANT 4796
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ASSOCIATE EDITORS:

Robert Mackay Fred. Chas. Ehliert

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 RADIO WORLD mailed to them after sending in
 their order, is automatic acknowledgment of their
 subscription order.

Advertising rates on request.

Entered as second-class matter, March 28, 1923,
 at the Post Office at New York, New York, under
 the act of March 3, 1879.

IMPORTANT NOTICE:

While every possible care is taken to state
 correctly matters of fact and opinion in technical
 and general writings covering the radio field, and
 every line printed is gone over with a scrupulous
 regard for the facts, the publisher disclaims any
 responsibility for statements regarding questions
 of patents, priority of claims, the proper working
 out of technical problems, or other matters that
 may be printed in good faith and on information
 furnished by those supposed to be trustworthy.
 This statement is made in good faith and to save
 time and controversy in matters over which the
 publisher cannot possibly have control.

School Boys Ambitious to Build Sets

ELIZABETH, New Jersey, was among the first places to encourage boys in building radio sets, and thus far 251 sets have been made in the manual arts departments of the grammar schools. More than 100 sets have been made by the boys in the vocational schools. One hundred and fifty sets have already been completed by grammar school boys in Hasbrouck Heights.

In the schools of West New York the study of radio has been carried on in the mechanical drawing department. Very efficient drawings have been developed and used by the boys while building their wireless sets. There have been made, so far, 131 sets. The Plainfield public schools have given considerable thought to the study of wireless and more than 110 sets have been made by grammar and high school boys.

Interest in this project has been encouraged in places quite close to broadcasting stations, and in virtually all of the school shops of the Newark public schools one may see boys working on wireless sets. More

than 500 sets have been completed by the boys during their manual training period. Kearney and Nutley public schools have given their boys an opportunity to use the manual training departments for the construction of radio sets, and report that nearly 300 sets have been completed.

Recently a radio show was held in Paterson, and a vacuum tube set which had been built in Grammar School No. 6 won first prize. Reports from other districts throughout the State indicate that during this school year more than 4,000 wireless sets have been made in school shops of the New Jersey public schools.

Radio in Great Britain

FROM Mr. W. H. Smith of the editorial staff of the "Illustrated London News," we have received a most interesting letter in which he writes, in part: "Although the British daily papers have been booming radio day by day since the beginning of April, and the public has responded magnificently, there is at present very little to 'listen in' to. Every Sunday, 2-5 p. m., Dutch concert from the Hague, 1,070 meters. Every Sunday, about 3-4 p. m., Paris concert, consisting of songs and speech, 2,600 meters. Every Tuesday, 8-8:30 p. m., Marconi concert, 400 meters. Nearly every night, 9-9:30, unofficial broadcast test, consisting of four or five gramophone records, transmitted by Burndept, of Blackheath, London, 400 meters. Being only four miles away, I get these very strong on one valve. Most evenings, 8-11 p. m., a few amateurs talking 'tests' and sometimes an occasional gramophone record. So far as the Dutch concert and Paris are concerned, these only just come in on one valve, and not at all on a crystal, so that the greater majority of wireless beginners, that is to say, those who have bought sets owing to the daily booming of the press, don't get much at present for their outlay, unless they happen to be rich and can afford the four-valve sets, costing fifty pounds or more. In the meantime, all of the wireless firms are flooded out with orders for receiving apparatus and parts, but, at the present moment, for some reason or other, they are hanging up their arrangements for broadcasting, which, unless something is done, and done quickly, will react on them. Naturally, once in possession of the means for getting the broadcasts, we want to know times and programmes, especially after business hours; otherwise one might listen all day and night to nothing but ships' Morse, and C. W. from the big stations. So, at the present moment, we are 'all dressed up, and nowhere to go.' However, a few gentle hints from the daily press are now being started, so things may buck up in the near future."—"Scientific American"

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VARNISHED TUBING
 "EVERYTHING IN INSULATION"
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MITCHELL-RAND MFG. CO.
 24 VESEY ST., NEW YORK, N. Y.

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Wanted in every city and town to sell radio apparatus. Good commissions. A few stocking agencies open to reliable parties.

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 Couplers, Everett Head Sets,
 Variometers, Transformers,
 1700 Meter Loose Couplers,
 Dials and Knobs.**

Send 50c for 20 Blue Print
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Radio Sets Made to Order
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 71 3rd Ave., New York City

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 There is no charge.

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RADIO WORLD

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 1493 Broadway, New York City.

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please find enclosed \$

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OUR TRADE PRICES
 AFFORD GOOD MARGIN.

Write for catalogue and price list.

**WIENER WIRELESS
 SPECIALTY COMPANY**
 21 ACADEMY STREET
 NEWARK NEW JERSEY

Latest broadcasting map 15c. That is, a complete broadcasting map appeared in Radio World, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, N. Y. C.

**If it's RADIO
—we have it!**

Condensers\$1.50
French Head Sets, 4000 Ohms.....\$8.00

Immediate Deliveries.

Pioneer Radio Products Co.
329 East 29th Street New York City

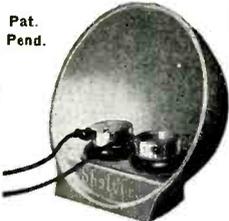
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HIGH DIELECTRIC RESISTANCE

8 in. x 14 in..... 50c.
12. x 21 in.....\$1.00
14 in. x 24 in.....\$1.25

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Box 68, Merchants Station, St. Louis, Mo.

"How to Make the Vacuum Tube Wire-
less Receiving Set, Detector and Two-
Stage Amplifier Sets 50 Cents
Dealers, send trial order, 12 copies...\$4.00
"How to Make Your Own Wireless Re-
ceiving Set" 25 Cents
Trial order, 12 copies\$2.00

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LOUD SPEAKER**

THE SHELTONE COMPANY
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factured according to U. S. Navy specification, stands 74,000 ohm
resistance, does not warp, drills without a burr. It is highly polished
and costs about 1/3 less than other panel material of equal standard.
We carry three standard sizes in stock. 7x10x3/16—7x18x3/16—12x14x
3/16. Send for your testing sample free and special prices in
quantities desired.

MICA adjustable DIAPHRAGMS

will make your phones

Fits any phone

LOUDER — CLEARER — BETTER TONE

Ask your dealer or send \$1 for a single diaphragm on trial. No fussing—
just slip it in to replace the black tin disc. Satisfaction or your money back.
Give name of phone.

Radio Mica Products Co., 156 East 43rd St., New York City

**SELLS MORE RADIO WORLDS THAN ANY OTHER
RADIO PUBLICATION**

Times Building, New York City, June 9, 1922.

RADIO WORLD, 1493 Broadway, New York City.

It may interest you to know that of all the radio publications handled on our
stand in the Times Building, more copies of **RADIO WORLD** are sold by us each
month than of any other radio publication.

Yours truly,

(Signed) **David J. Farley, Times Bldg., Newsstand.**

Answers to Readers

IN RADIO WORLD, No. 16, dated July 15,
you have an article on assembling a
detector and two-stage amplifier. You
also publish a list of material re-
quired. Can you tell me where the three
jacks go and, also, why it is necessary
to use them? Are the jacks used in this
circuit of the open or closed type? Where
does the variable condenser go that has
a capacity of .001 mfd? What is the re-
sistance of the phones to be used in this
circuit?—Barney Walpert, Rich-
mond, Va.

The jacks are used for the convenience
of cutting in any amount of stages of
amplification desired. They are con-
nected between the plate circuit and grid
circuits of the tubes used. The jacks
used are as follows: 2 of the two circuit
type and 1 of the open-circuit type, for
this set. The variable condenser is con-
nected in series with the antenna circuit.
The resistance of the phones may be be-
tween 1,000 and 2,000 ohms.

Publish a hook-up of a two-stage
amplifier. Show the necessary jacks in
diagram?—Letter unsigned, Fairmount,
W. Va.

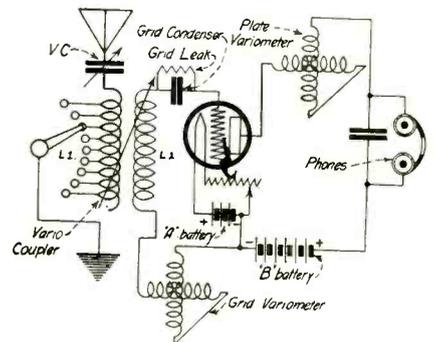
This problem was fully explained in
RADIO WORLD No. 14, dated July 1, in
an article entitled Novel Unit-Detector
and Amplifier, by Frederick J. Rumford.
He describes and illustrates just what
you are seeking.

What distance may be received with
the set described by H. S. Stanford in
RADIO WORLD, No. 16, dated July 15?—
S. T. Bortoff, 112 North Olympia St.,
Tulsa, Oklahoma.

This depends on the builder. If the

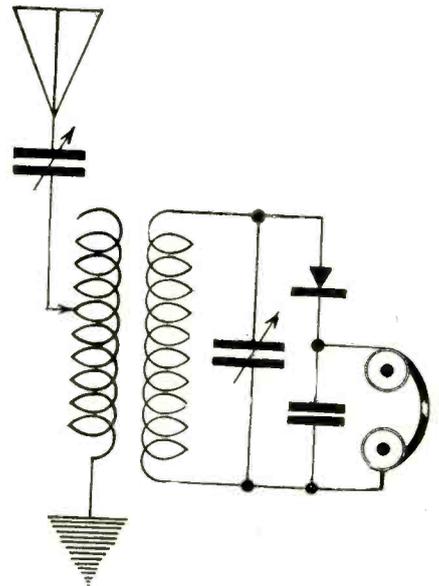
assembly of the set is wired up correctly,
some hundred of miles could be covered
provided weather conditions are such
that the static interference is practically
eliminated.

Show a diagram and hook-up of a
single-tube set, employing two variome-
ters in the circuit. Show the taps on the
primary and position of the batteries
used.—Paul Mohap, Yonkers, New York.



The above diagram shows the neces-
sary data for making the regenerative
set. Follow each connection with great
care.

I am sending several hook-ups
of my radio set. I have used them all
and it seems that all I hear is code.
Although I live only eight miles from
WGR, Buffalo, I cannot hear any of the
concerts. Why is this? I am using a
crystal detector and 2,000-ohm phones.
—Richard Palmer, Bladell, New York.

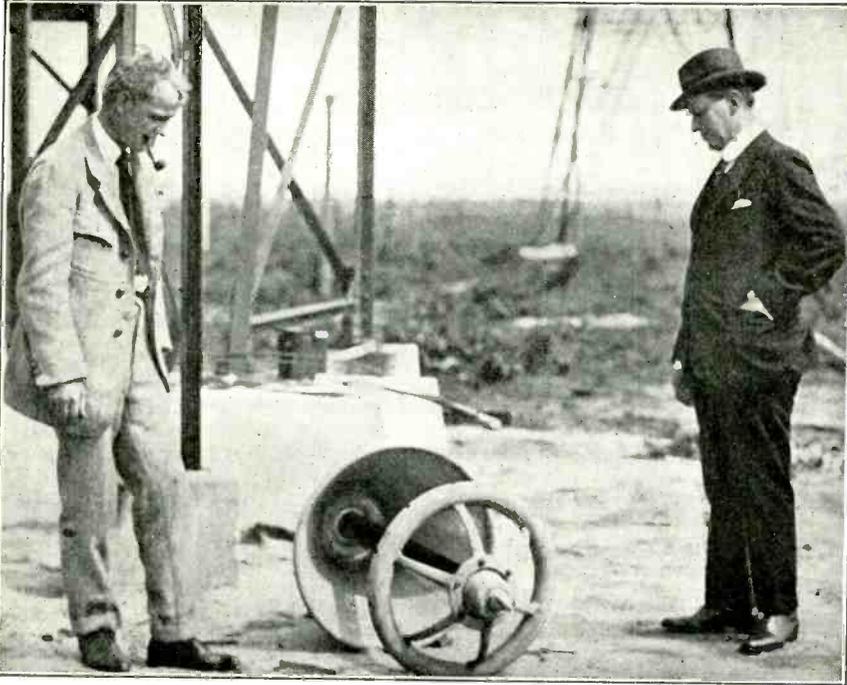


The accompanying sketch will show
you proper connections for your set.
Probably you are right about your
crystal. Always have a few good tested-
crystals on hand. Look carefully over
your wiring and lead-in from antenna.
Inspect your telephones.

Give me the addresses of manufacturers
of radio frequency transformers?—O. N.
Williams, Albany, N. Y.

As radio frequency is in its infancy, there
are few manufacturers who are turning out
transformers. We refer you to the Radio
Instrument Co., Washington, D. C.

Necessary to High Voltage



(C. Central News.)

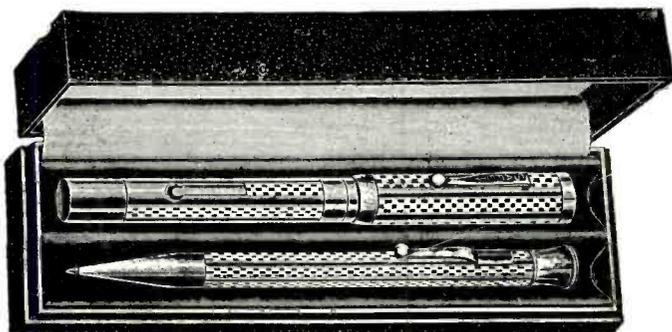
One of the most useful instruments in radio communication is the insulator. When huge masses of high voltage are used it is of utmost importance that every particle of energy be utilized. To accomplish this it is necessary to have the proper insulating devices to carry such high voltage without leakage or breakdown. This is an important factor, especially when thousands of miles must be covered to establish and maintain communication. In the above photograph Guglielmo Marconi and Roy G. Weagant, consulting engineer of the Radio Corporation of America, are inspecting an insulator used at the most powerful station in America—at Rocky Point, Long Island, New York.

The Human Side of Marconi

MARCONI'S humor was displayed when he met Dr. Charles P. Steinmetz, the noted electrical engineer, at the General Electric plant at Schenectady—the first meeting of these two masters of electricity in several years, says "The Times," New York. It might have been expected that when these two minds met the remarks would be on some great electrical problem of the age, but the actual conversation was on the state of health of the reptile zoo formerly maintained by Dr. Steinmetz at Schenectady. "How's the gila monster, Doctor?" asked Marconi, with that smile that always presages one of his sallies. "He's dead," replied the noted scientist. "He was too lazy to eat, and the alligator ran away." "That's too bad," said Marconi. "Now you'll have to go to work." That is only one flash of the lighter side of the man who is one of the elec-

trical wizards of the age, and whose name will go down through all history as the inventor of the first system of wireless communication. In this mood he is as quiet and modest as in his scientific discussions, and one of the most noticeable points about the great Marconi is that he rarely uses the personal pronoun, either in his humorous stories or in his scientific discussions. He has a low-pitched voice and he talks slowly, with no show of the egoism sometimes displayed by men of great achievements or attainments. His laugh also is low and contagious, because behind this great figure in the scientific world is a great human personality that exerts itself in the same way under all conditions.

Subscribe for RADIO WORLD. \$6.00 a year, \$3.00 six months, \$1.50 three months.



Publisher's Promotion Bureau, 120 Patchen Avenue, Brooklyn, N. Y. Gentlemen: Without any obligation on my part, please send me particulars of the above offer.

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Short Cuts in Receiver-Circuit Design, by O. C. Roos.
Making a Short-Wave Regenerator, by Fred. Chas. Ehlert.

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Mounting Crystals in Your Detector, by E. L. Bragdon.
Storage Batteries for Radio, by Fred. Chas. Ehlert.

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First Principles of Electricity as Applied to Radio, by John P. Miles.
Your Storage Battery, by E. L. Bragdon.
What Makes Radio Possible, by Edward Linwood.
Ground Connection as Vital as Antenna, by Fred. Chas. Ehlert.

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Solving the Puzzle of the Honeycomb, by Fred. Chas. Ehlert.
More About Your Storage Battery, by E. L. Bragdon.
Vacuum Tubes as Applied to Receivers, by Walter J. Howell.
How to Build the Loose Coupler and the Variometer, by Frederick J. Rumford.
The Best Aerial for a Receiving Station, by Edward Linwood.

APRIL 29.

Valuable Pointers on Aerial Construction, by Edward Linwood.
What Is Meant by Tuning, by E. L. Bragdon.
Radio-Frequency Amplification and Regeneration, by Frank Armstrong.
Honey-Comb Coils and Condensers, by Edward Linwood.
Charging the Storage Battery, by E. L. Bragdon.
How to Construct the Variocoupler, by Frederick J. Rumford.

MAY 6.

The Advantages of Radio Frequency, by Harold S. Potter.
How to Construct, Protect and Operate a Storage Battery, by George W. May.
The Beginner's Catechism, by Edward Linwood.
Tuning and What Is Meant by It, by Fred. Chas. Ehlert.
New Frequency Amplifier Brings Faintest Waves in Strong, by G. W. May.

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The Design of an Amateur Receiving Set, by C. White.
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Simple Method of Recharging a Storage Battery, by John Grayson.

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Are You a Member of the N. O. D. C.? by E. L. Bragdon.
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JUNE 17.

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Test of Inductance Coils, by Fred. Chas. Ehlert.
Short Waves from a Simple Receiver, by Stanley Bryant.

JUNE 24.

How to Make Your Radio Cabinets, by W. S. Standford.
How the Crystal Detector Is Used to the Best Advantage, by C. J. Williams.
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Tested Invention of Major Armstrong Amplifies Set 100,000 Times, by John Kent.
Repairing Cracks in Hard-Rubber Storage Battery Jars, by W. S. Standford.
The Beginner's Catechism, by Edward Linwood.

JULY 1.

Novel Unit-Detector and Amplifier, by Frederick J. Rumford.
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Radio World's Revised Dictionary, by Fred. Chas. Ehlert.
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Assembling a Detector and Two-Stage Amplifier, by H. S. Stanford.
Combined Radio and Audio Frequency Amplification, by C. White.
The Beginner's Catechism, by Edward Linwood.
Locating Your Aerial, by Harold Day.
Facts for Beginners, by Fred. Chas. Ehlert.

JULY 22.

When Your "Movies" Come by Radio, by Stanley Bryant.
Underlying Principles of the Vacuum Tube, by George W. May.
Practical V-T Detector Panel, by Frederick J. Rumford.
Revised Radio Dictionary, by Fred Chas. Ehlert.
The Beginner's Catechism, by Edward Linwood.
Importance of Aerials to Radiation, by C. White.

JULY 29.

The Vacuum Tube as a Transmitter, by Charles H. Plath.
My 20-Kilowatt Tube and its Uses, by Irving Langmuir.
Importance of the Capacity Switch, by E. L. Bragdon.
The Truth about Lamp-Socket Aerials, by Harold R. Hart.
The Beginner's Catechism, by Edward Linwood.

AUGUST 5.

How to Construct and Operate the Armstrong Superregenerative Circuit, by John Kent.
Using Radio Frequency to Extend Range, by George W. May.
Things Every Radio Fan Must Know, by E. E. Hawley.
Revised Radio Dictionary, by Fred Charles Ehlert.
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Human Voice Is Reproduced on a Moving-Picture Screen

SUMMER-SCHOOL students of Columbia University were shown motion pictures of the human voice in the Horace Mann Auditorium yesterday afternoon, says "The Times," New York. For three hours the students, most of them teachers from other States, witnessed demonstrations of recent advances in wireless telephony by leading engineers, including Dr. F. B. Jewett, President of the American Institute of Electrical Engineers and vice-president of the Western Electric Company, and John Mills, also of the Western Electric.

A projecting machine, the stereopticon-oscillograph, was used and the demonstration accomplished by transferring the voice waves as they were transmitted by Mr. Mills electrically over a telephone circuit to the light by means of delicately balanced mirrors. These light beams were then projected upon a motion picture screen, appearing in the forms of waves and varying in intensity, amplitude and character as the voice of the speaker varied in vowel and consonant sounds.

Mr. Mills explained that by photographing and analyzing the voice waves projected upon the screen experts were able to contrive new designs and to improve upon the transmission qualities of telephone circuits, especially in long distance cable circuits, line balances and electrical features, which must be extremely exact if the human voice is to be heard intelligently.

By means of the oscillograph it is possible to determine the relative audibility of various words and expressions. The vowel "o," it was pointed out, is the easiest human sound to understand, as illustrated by the word Chicago, the final vowel of which produced on the screen a marked broadening of the light in contrast with the weaker effects of the other letters.

A feature of the demonstration was the use of college yells, "Harvard," with its broad vowel sounds, leading in magnitude of light impressions. Yale, Columbia, Chicago and other university yells were shown on the screen, where the sound impressions made by Yale was noticeably weak.

Naval Radiophone Sets for Sale

APPROXIMATELY 295 unused radiophone sets of short range are being offered for sale by the Navy Department by sealed bids. Bids should be mailed to United States Naval Central Sales Office, Washington, D. C.

All the sets include sending and receiving equipment known as Type CW-936, originally supplied for submarine chasers and other craft during the World War, but are believed to be good for small land broadcasting-stations as well as yachts and seagoing craft. The apparatus includes transmitter and receiver, amplifier, switchboard, dynamometer system, head set and loud speaker, but not storage batteries or vacuum tubes. The transmitting tubes, however, may be purchased for marine use according to a recent decision of the Radio Corporation of America, although they will not be sold for land commercial stations without payment of a license fee.

The bulk of the sets for sale are located at the Navy Yards at Boston, Philadelphia, Norfolk, Charleston, and Puget Sound.

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Radio, Rhythm, and Sanity

CHARLES D. ISAACSON, who, for some years, has been giving concerts in the hospital for the insane at Central Islip, Long Island, has recently substituted a radio program, and has broadcast the opera "Cavalleria Rusticana." It was so successful that radio concerts promise to be a regular feature in entertainments for the insane.

Rhythm is a state the opposite of insanity. The Greeks, who had such a perfect ideal of balance of mind, body and artistic form, made rhythmical exercises the basis of their education. Many modern teachers now realize that dancing is often a cure for neurotic patients. A due sense of proportion is what constitutes the highest sanity. It is also a necessary factor in all the arts, and without it political and social reform is sadly handicapped. It is the life of humor, and without it understanding is not understanding.

So here is to Mr. Isaacson's endeavors. —"The American," New York.

Voices Broadcast Farthest

LIKE the different instruments, different types of human voices have different carrying qualities on the radio-phonograph. The voice carries, it is generally believed, better than the other musical instruments and a baritone has somewhat better chances of registering successfully with his invisible audience than a tenor, soprano, or even a bass. Contraltos also go over somewhat better than tenors and sopranos, who have the greatest difficulty in retaining the quality of their voices when singing through the ether. The latter, however, carry the greatest distance.—"The Globe," New York.

Subscribe direct or through your news dealer. \$6.00 a year, \$3.00 six months, \$1.50 three months. Radio World, 1493 Broadway, N. Y. C.

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THAT ARMSTRONG AMPLIFIER
So much interest has been displayed in the special article, "TESTED INVENTION OF MAJOR ARMSTRONG AMPLIFIES SET 100,000 TIMES," by John Kent, that appeared in RADIO WORLD No. 13, dated June 24, 1922, the publisher decided to put aside a number of copies for those who were not able to get this issue when published. Copies will be sent, postpaid, on receipt of 15c. or send in your subscription, \$6.00, for one year (52 issues), \$3.00 six months, or \$1.50 three months, and subscription will be started with the issue containing the article about Major Armstrong's Amplifier.—RADIO WORLD, 1493 Broadway, New York.

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CRYSTAL DETECTOR SET, from aerial to phones, complete. Big bargain. Send for circular. Salkey Radio Co., 2378 Eighth Ave., New York City.

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RADIOISTS—Send for literature describing Vosco Tunette. Compact, simple, efficient tuner for radiophone reception. Broadcasts heard hundreds of miles. Panel or table mounting. Price, \$5.00. VOSCO RADIO LABORATORIES, Troy, Penna.

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AMATEURS, ATTENTION! USED APPARATUS!—Audion, complete with bulb and battery, \$10.00; Adams Morgan Variable Condenser, wood case, \$2.50; Murdock Variable Condenser, .001 mfd., \$3.00; Arnold Loose-Coupler, \$10.00; Short Wave Receiver, 200 to 800 meters, fitted for audion bulb, etc., \$15.00; Klitzken Rotary Gap, \$15.00; Half K. W. Packard Transformer, unmounted, \$10.00; Holtzer-Cabot Headset, 2,200 ohm. (new), \$6.00; Swedish-American Headset, 2,200 ohm. (new), \$6.00; 2-inch Spark Coil, \$5.00; Stationary Gap, 50c.; Regenerative Tuner, consisting of two variometers and vario-coupler, mounted on handsome brown hard rubber panel in walnut finished case, hand rubbed. This tuner is a beauty in appearance and performance. \$25.00. First money order takes them. Do not delay! L. M. SMITH, Box 66, Salem, Wis.

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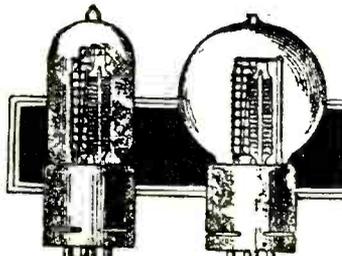
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A BROADCASTING MAP of the leading broadcasting stations of the country was published on the center page of RADIO WORLD dated May 20. Mailed on receipt of 15c., or send \$3.00 for six months, or \$6.00 for a year, and start your subscription with May 20 issue. RADIO WORLD, 1493 Broadway, New York City.

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Colleges Are Helping Radio

ONE guarantee of the permanency of broadcasting appears to lie in the fact that many of the larger universities have erected their own stations at great expense, and for definite purposes aside from entertainment alone, says "The Globe," New York.

It would take a page to enumerate the various institutions that have followed the lead of the University of Wisconsin and several other western State universities who were early in the field, but apparently they have been extremely satisfied with their experiments and plan to continue their scope.

Furthermore new recruits are being added continually. At Ohio State a campaign was begun recently to raise the necessary funds for a broadcasting station from among the alumni, and at latest reports was progressing successfully. The committee reported great interest on the part of the graduates, due largely to the fact that eighty per cent. of those solicited had already acquired an interest in wireless.

Ohio State has appointed a committee from among its engineering faculty to supervise the erection of the station; they plan to use it for entertainment extensively, though its chief purpose will be educational. Being situated in the center of Ohio it is anticipated that it will serve the state in public emergencies.



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TUEX SUPPLY CO. 1425 State St. Bridgeport, Conn.

Radio Patents

RECENTLY ISSUED

Alexanderson Invention to Amplify Electric Currents

No. 1,419,797. Patented June 13, 1922.
 Patentee: Ernst F. W. Alexanderson, Schenectady, New York.

THIS latest invention, by one of the leading radiotricians of the United States, relates to the amplification of electric currents of small intensity and particularly to currents such as are used for transmitting signals. In describing his invention, Mr. Alexanderson says:

In carrying my invention into effect, I employ a plurality of electron discharge

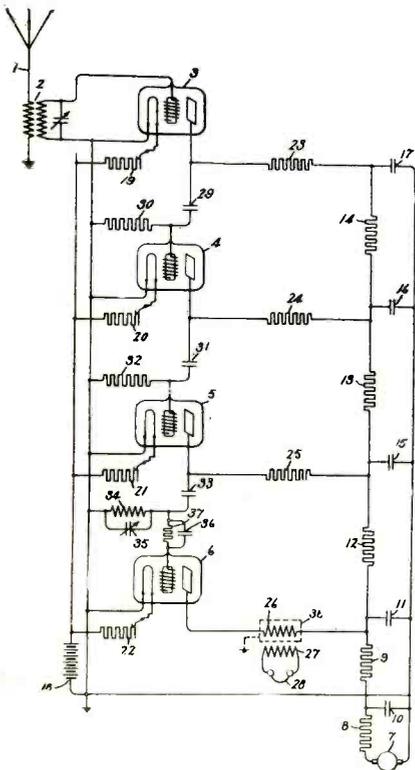
variation in the potential different between the cathode and anode of the amplifier and this variable potential is applied to the grid circuit of the second amplifier.

The variable potential between the cathode and anode of the second amplifier is in turn applied to the grid circuit of the third amplifier, and so on throughout the series. The last amplifier of the series is organized to give an intelligible indication of the signals which are transmitted by means of the current which is amplified.

One of the objects of my invention is to provide means for supplying the operating current to the plate circuits of the amplifiers in such a way that a source of current of somewhat variable potential may be employed without injuriously affecting the operation of the amplifiers. Another object of my invention is to provide a connection which will prevent the transmission from one amplifier to another of potential variations of undesired frequency, which may be set up in any of the circuits.

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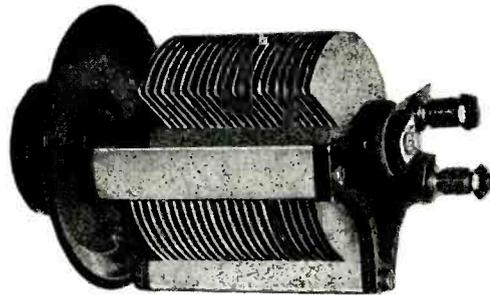
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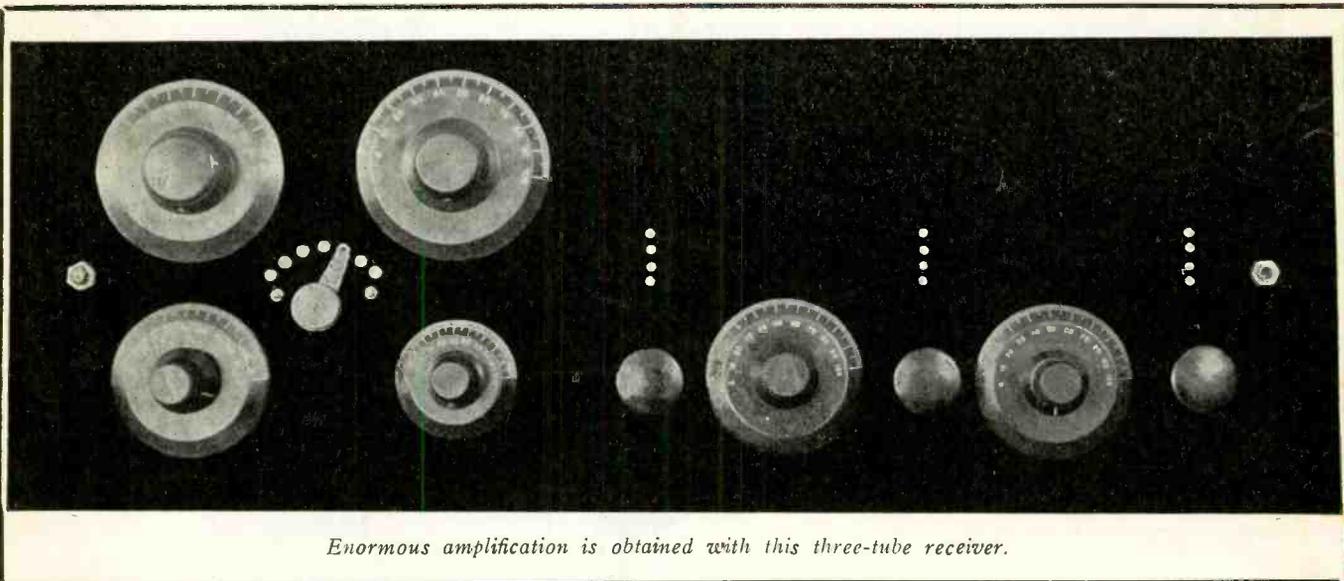
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