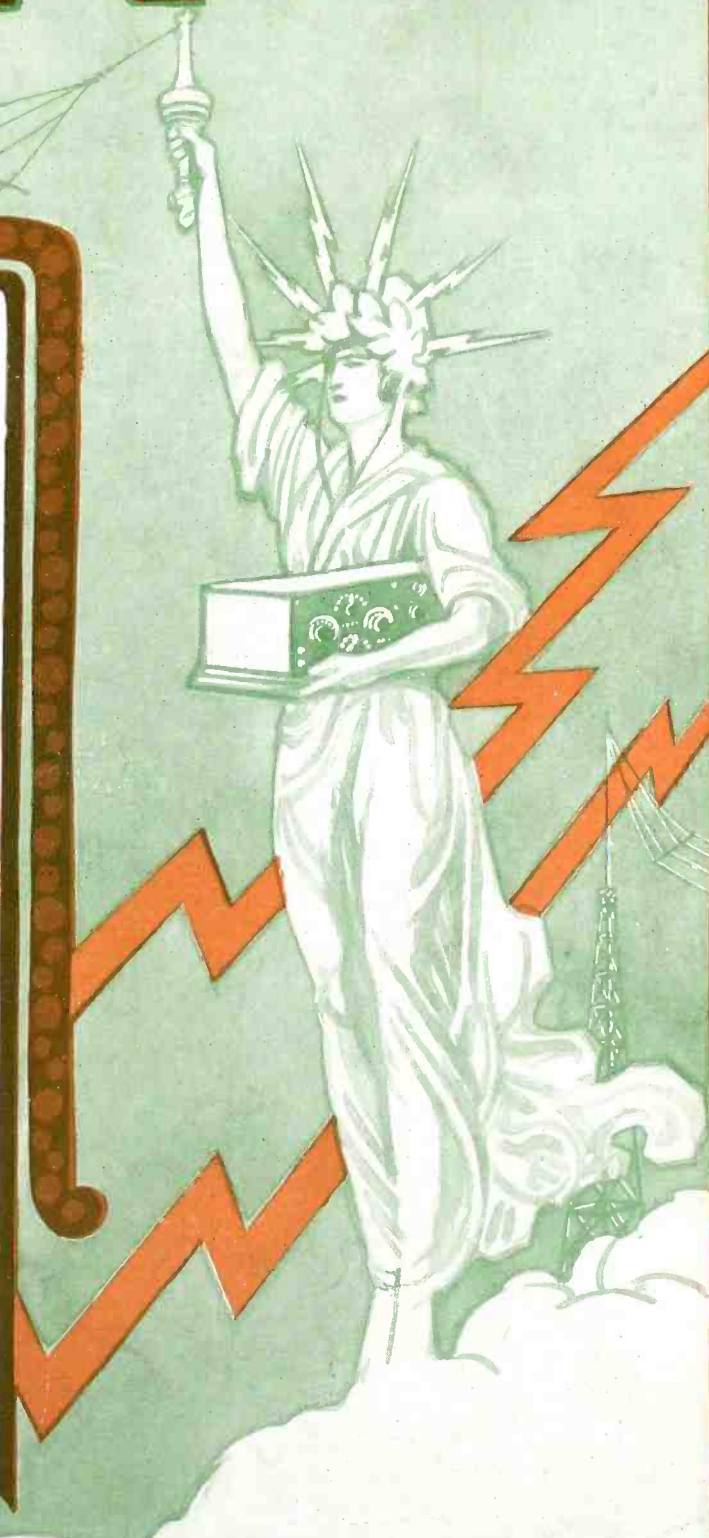
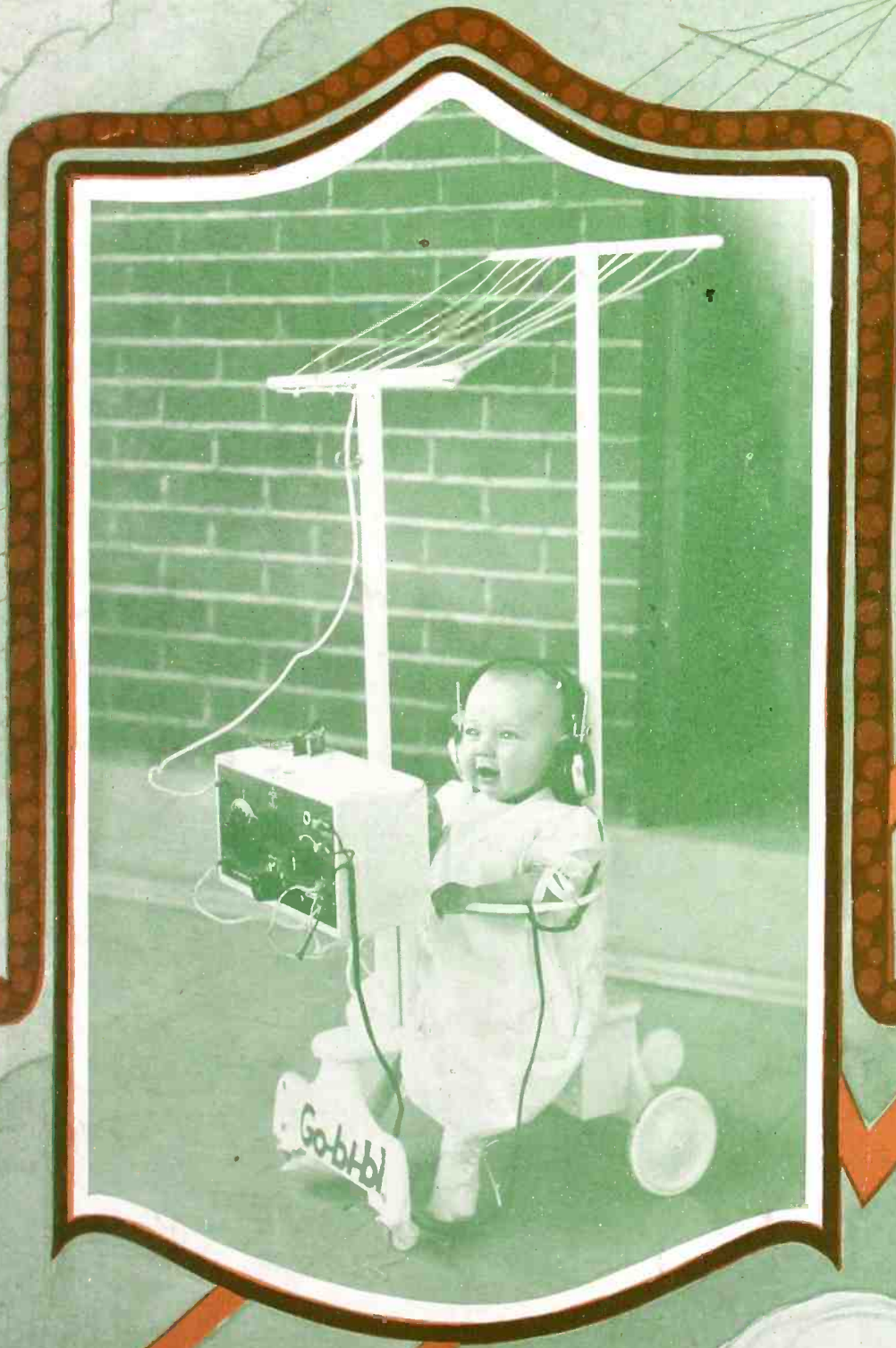


# Radio Topics

August, 1923



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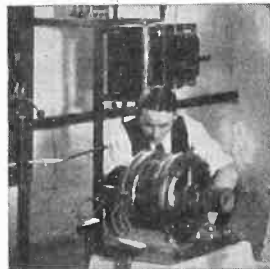
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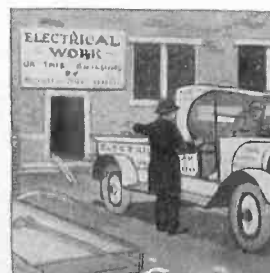
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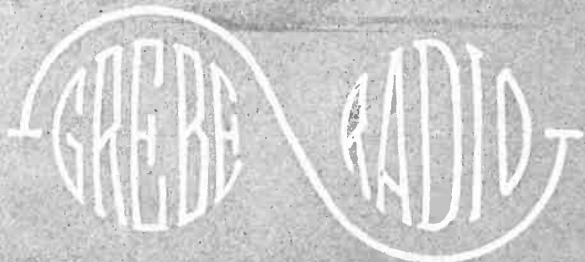
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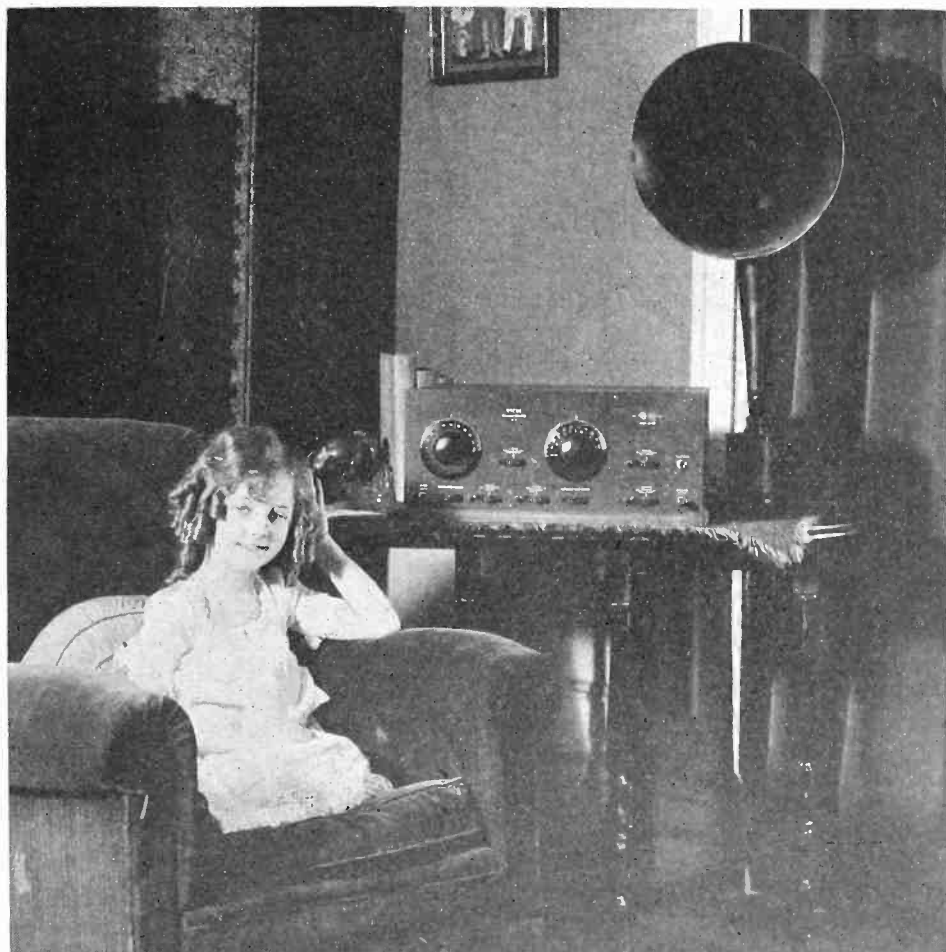
# Radio Topics

An Illustrated Monthly Devoted to Radio

Volume III

August, 1923

Number 7



## ALL SET FOR THE EVENING

This little miss finds the evening all too short when listening to Dad's big Grebe broadcasting receiver, be it stories about "the big brown bear" or music from the nearest broadcasting studio.

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# RADIO TOPICS

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Vol. III

August, 1923

No. 7

## Static

**A**MATEUR radio fans are gradually realizing that static, the summer pest, is really not as great a bugbear as it was at first regarded. Various methods are being devised by which it can be almost totally overcome. One of these is shorter aeri-als, or indoor aeri-als.

It is a good deal like summer heat—it comes in periodic waves and is experienced almost continually in the tropics. However, there are days when there is no static in the air and other days when it will be most severe.

The adjustment of the rheostat which controls the amount of filament current in your detector tube can be adjusted as to obviate much of the interference by keeping it as low as possible. Proper adjustment of tuning elements will also help considerably in wiping out static and giving satisfactory signals.

## Need of New Radio Alphabet

**W**E have ship lanes in the Northern Atlantic, traffic regulations for automobiles in the crowded cities and established lanes for aviators, and the time has come for allotting lanes in the ether, according to a statement recently issued by the Engineering Foundation.

It is absolutely necessary, the radio engineers maintain, to have a new alphabet for the electrical transmission of messages—one that will simplify

and expedite the sending of information via radio.

It is proposed by General Squirer, who commenced investigations for improving telegraphic transmission of messages in 1913, to introduce a new system of dots, dashes and spaces to reduce to the minimum the labor of sending. It is said the new continuous wave system evolved by General Squirer can be applied to radio telegraphy.

It is a comparative simple matter to devise instruments that will differentiate between modulating frequencies now employed, which are of low order, and the higher frequencies of "static" or other natural disturbances in the air.

The Foundation declares national legislation and international conferences are now in order to put into use the proposed universal alphabet and furnish relief. The radio public needs a common language and this is one method of getting it.

## Some Mail

**H**OW would you like to get 65,000 letters in a little over a year, all from unseen and unknown persons? That is the record of station WGY, Schenectady, N. Y. In a little over sixteen months WGY received this number of communications from all parts of the world. Some were typewritten and others scrawled on scraps of paper such as is used by butchers and woodsmen.

The listeners feel that the voice out of the air is their friend, hence the flood of letters from Chili, Hilo, Hawaii, London, Paris, Florence, and every hamlet, town and city of the broad U. S. A.

Fortunately the General Electric Company does not have to acknowledge receipt of all of them. If they did there would be a force of stenographers that wouldn't get any vacations this summer up at Lake George.

## Awarding the Prize

**T**HE awarding of the \$200 receiving set for the highest average in answer to the questions propounded by Harvey Mitchell Anthony in his interesting series of questions on Elementary Electrical Principles, will be announced in the next issue of RADIO TOPICS. The delay was caused by the late arrival of many papers in answer to the questions in the June issue. All are now in and the papers are being carefully examined and marked.

## Off to the North Pole

**E**VERY radio enthusiast will be interested in the MacMillan expedition to the North Pole, not only because of its historical value, but because of the part played in it by radio. Dr. Donald B. MacMillan, who accompanied Peary on his expedition that reached the Pole and who has been back to that region seven times since, at a dinner given him by U. J. Herrmann, owner of the Chicago Radio Show, said one of the greatest hardships of such a trip was not the cold, but the awful solitude. Radio now is going to rob the perilous jaunt of one of its biggest bugaboos.

# Radio to the North Pole

Dr. Donald B. MacMillan and his Crew of Seven Men Will Be Entertained and in Constant Communication With U. S. A. on His Fourteen Months' Trip.

**D**R. DONALD B. MacMILLAN, Dr. Sc., F. R. G. S., former professor of Bowdoin College, is now on his way to the north pole and expects to be in touch with friends and relatives at all times by radio.

Dr. MacMillan accompanied Peary to the arctic on his expedition which reached the pole and has been back seven times since. At a dinner given him by U. J. (Sport) Herrmann, who promoted the Chicago Radio Show and one of the owners of the Boston Red Sox baseball team at the Hotel Sherman, Chicago, recently he was induced to take along a transmitting and receiving outfit.

## Solitude Greatest Hardship

During his talk at the dinner Dr. MacMillan told of the hardships of the Arctic. He had said the greatest hardship is not, as is commonly supposed, the intense cold—which sends the mercury sometimes as low as 60 degrees below zero—that it is not the privations (for on one expedition which Captain MacMillan commanded he demonstrated that he and his crew could live for a year on nothing but the food which sustains the Eskimo)—but that the greatest hardship is the awful solitude—everything going out and nothing coming in.

Mr. Herrmann, who from the start has been intensely interested in radio, inquired why MacMillan did not take along a radio set. Dr. MacMillan replied that it would take up too much space. There developed a considerable discussion of just what radio would do, in which discussion Dr. MacMillan became greatly interested.

As an outcome, he arranged to install both sending and receiving sets aboard his ship, the Bowdoin, and converted the entire forward end of the forecabin into a radio room.

MacMillan takes with him, installed in the fore part of the ship, a Zenith "Long Distance" standard broadcast receiving set with a wave length of from 150 to 900 meters, and equipped with three-stage amplifier and loud speaking apparatus, as well as a Zenith long wave receiving set with a maximum wave length of 20,000 meters. With these two sets reception will be possible of not only amateur telegraph and phone

stations and radiophone broadcasting stations, but also naval and commercial transoceanic stations from which press reports, time signals, weather forecasts, etc., can be secured.

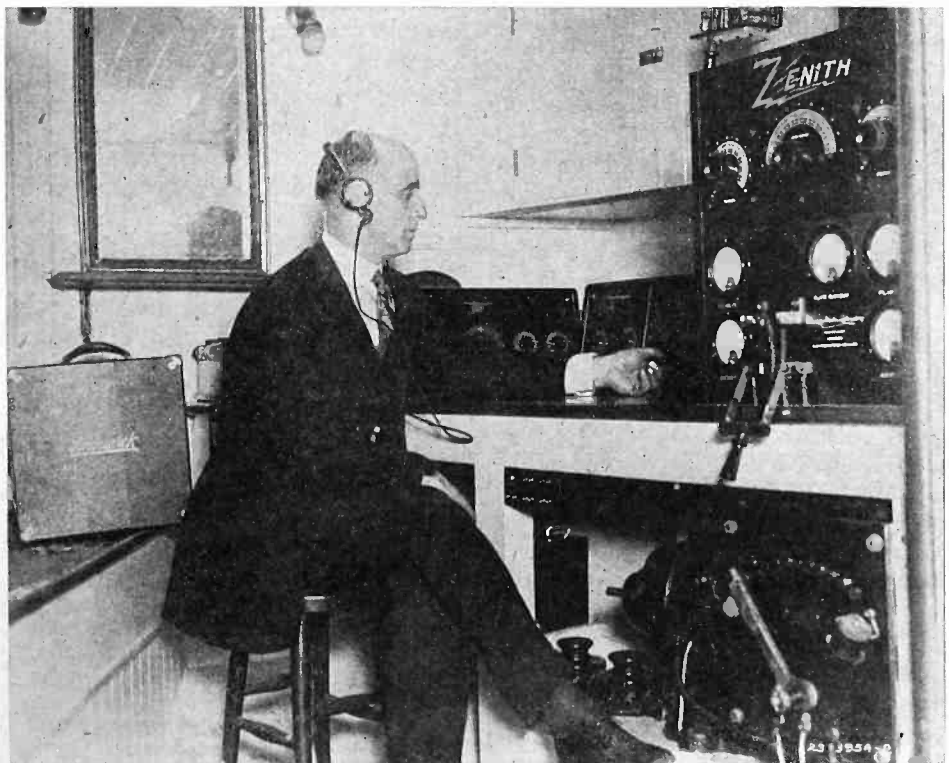
## Has Powerful CW Transmitter

The transmitting equipment consists of a Zenith 500-cycle interrupted continuous wave set, using two 250-watt transmitter tubes and the Armstrong regenerative circuit. This apparatus is mounted very compactly in semi-panel form with all necessary meters, and is supplied with current by two gas engine driven

Delco generator units entirely separate from the regular power plant of the ship.

The ship's antenna is of peculiar construction, due to the fact that the Bowdoin depends for part of its motive power on sails and is of comparatively short length. A stem to stern antenna is used, passing over the mainmast and foremast, the lead-in dropping through the foredeck to the radio quarters. In order to insure good ground, steel and copper plates have been riveted to the hull, and in addition, connections have been made to the propeller shaft through the engine and to the supply of coal which is carried partly as ballast and for emergency use.

Dr. MacMillan took with him as wireless operator Donald H. Mix of Bristol, Conn. Mix was selected by Captain MacMillan from five men who were chosen by Mr. Hiram Percy Maxim,



## OFF FOR THE NORTH POLE

Donald B. MacMillan, the Arctic explorer, aboard his ship, the Bowdoin, which sailed from Wiscasset, Maine. Mr. MacMillan's 89-foot schooner is bound for the northern limits of Eskimo land, 300 miles from the North Pole.

president of the American Radio Relay League.

Realizing the tremendous interest which the use of radio on an expedition of this character would arouse in the public mind, Maxim sent out a request for volunteers to all the members of the American Radio Relay League. Hundreds responded. Not only technical ability as an operator and the ability to withstand hardships were requisites, but in particular the faculty for making oneself congenial among a small crew of men on an ice-bound ship.

Dr. MacMillan's crew consists of only seven men. Mix represents Captain MacMillan's choice from among some of the best wireless operators in the country.

#### Daily Reports from Ship

Once a week Mix will transmit from the Bowdoin a 500-word story of arctic adventure and will transmit also diagrams of all new lands and harbors and lands found and charted.

At such times as it has been prearranged for Mix to attempt to get his wireless message through Hiram Percy Maxim will issue a request for all amateurs who are members of the league to stand by and tune in for station WNP.

The sending station on the Bowdoin has been assigned by the government the call letters WNP, "Wireless North Pole." The government has assigned wavelengths of 200, 300 and 400 meters and has also given permission for station WNP to use whatever wavelength it may find necessary for experimental purposes.

It might be interesting to figure out just how Uncle Sam would move against an ice-bound ship in the Arctic, hundreds of miles from civilization, if its wavelength were found to interfere with that of other sending stations.

The American Broadcasting Station, which will be used to send messages to Dr. MacMillan, is the new Zenith-Edgewater Beach Hotel Broadcasting Station WJAZ, Chicago, which incidentally is the most powerful broadcasting station in the country, having 4,000 volts and 10 kilowatt output.

This station will not only be used to give Dr. MacMillan and his crew of seven entertainments

and news of the day, but it will also be used by the families of Dr. MacMillan and his crew when they desire to send messages to those aboard the Bowdoin in the frozen north.

#### An Interesting Experiment

There is a period of 141 days in the Arctic during which a message sent at midnight must pass through hundreds of miles of sunlight before it reaches darkness. It will be interesting to see what effect these peculiar conditions of the Arctic have on radio communication. Up to the present time it has been thought that the so-called auroral band would act as a powerful deterrent in transmitting radio messages. At all events, there is no record of a message ever having been transmitted from the north through it.

It will be interesting to learn to what extent the auroral band will interfere, and it is quite possible that scientific data of great importance will be gathered about the Aurora Borealis, which has always been a mystery. Never before have all the amateurs of the country focused their receiving sets upon a single isolated station in the frozen north. It will be interesting to learn what portions of the country receive these messages clearly and what portions do not receive them at all.

Dr. MacMillan on his expedition primarily intends to study terrestrial magnetism. He will also co-operate with the weather bureau and Professor V. B. Ekerold, the distinguished Norwegian Meteorologist who helped establish the wireless weather station at Jan Mayen Island off the coast of Greenland. Dr. MacMillan is also conducting some investigations for the Carnegie Institute of Washington.

#### Yes, We Have No Static

ACCORDING to the Wilmington Morning Star there is no static in North Carolina. What an ideal state that must be. Beats California, where they are supposed to have a special brand of weather the year 'round. It is said even heavy electric storms down in N. C. have little appreciable effect on radio. Let's all move to North Carolina for the Summer and take our receiving sets with us.

#### Broadcast Music in 1874

RADIO broadcasting is a development of the past three years but the broadcasting of music goes back a great many years.

George S. Pierson, a consulting engineer of Kalamazoo, Mich., writing to WGY, the Schenectady, N. Y., station of the General Electric Company, acknowledging his enjoyment of many programs, tells of a broadcasting stunt enacted by the students of Union College on a frosty March night in 1874.

The generator, he explains, was what is commonly known as a horse fiddle, a great wooden box on the main floor of a circular building, now the library, then in course of construction and roofless. The top boards of the box were well resined and a plank 38 feet long used as the fiddle bow was also resined. With six men standing on the plank, the bow was drawn back and forth across the edges of the box. No one in Schenectady slept that night and the terrifying notes of the mammoth fiddle were heard five miles away.

Mr. Pearson also describes, as a parallel to the progress of radio, a demonstration of the telephone which was made in 1874 in a Schenectady church. An admission fee was charged. A telephone line was strung from pulpit to gallery. The audience was invited to listen in to the wonderful invention, but, according to Mr. Pierson, no two people were able to agree on what was said over the wire.

For lovers of the field and stream WGY, the Schenectady radio broadcasting station of the General Electric Company inaugurated a series of "outdoor" talks, on Thursday night, June 21, Jud Landon, nationally known devotee of the rod and gun, gave red-blooded talks for red-blooded men about the ways and the haunts of game fish in the language of the sportsman. Such important things as bait, flies, tackle, rod and reel were discussed, his first talk being on "Eastern Bass Fishing." On June 28, he spoke on "Outdoor Vacations—Where to Go and What to Do."



# Practical Hints on Designing of Regenerative Receivers

## PART 3—THE DOUBLE CIRCUIT REGENERATIVE

By PAUL A. PERRY

ONE of the first, as well as the best, all-around regenerative circuits, is that known as the double or tuned plate regenerative circuit. This hook-up has long been, and still is, the one most frequently found in the amateur's station. Its combination of regeneration with that of selectivity places it in a position enjoyed by few other circuits. Without doubt, even with all the new "freak" circuits still coming into use, the double circuit regenerative will still be the stand-by.

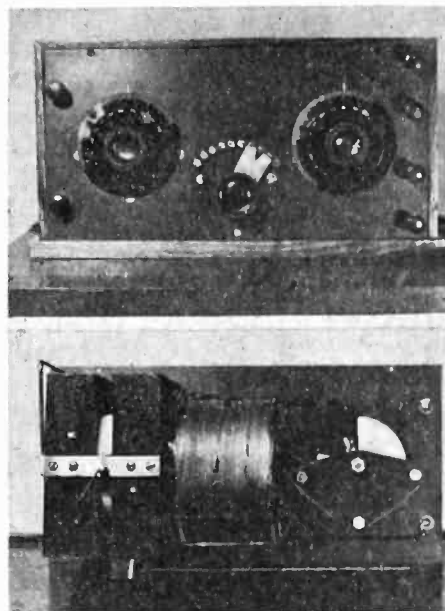
The writer has often been in radio experimenters' "labs" where they have been "tinkering" around with new circuits that never seemed to stay in use very long. When asked why, the original double regenerative set would be pointed out with the remark, "'Tis nothing like that set." Its sharp tuning gives it universal first choice with the experimenter, while, for some reason, our new friends in radio choose it last.

\* \* \*

This circuit is a modification and an improvement on Armstrong's original "grid-coil" regenerative hook-up—the one on which the patent was obtained. The vacuum tube, when its grid and plate are tuned, or balanced, has the peculiar characteristic of oscillating very freely. A tube may also be made to oscillate by adjusting the grid and filament circuits, with a feed-back from the plate circuit, as in the single circuit regenerative. This procedure, however, tends to give much less sharp tuning than when the grid and plate circuits are tuned. It is this sharp tuning which every experimenter needs in order to enable him to separate stations

that are mostly transmitting on one wavelength and not varying more than 10-25 meters from each other. The only objection to this type of instrument is its limited wavelength range. Unlike the single circuit regenerative, the double circuit regenerative has only a range of from 150-600 meters. Often receiving sets are built especially for some special wave lengths. These sets are usually the double circuit regenerative.

All capacity, excepting that contained in the variometer windings, is avoided in this circuit. According to many authorities, this is the underlying reason for its great efficiency, especially on short wavelengths. The primary,



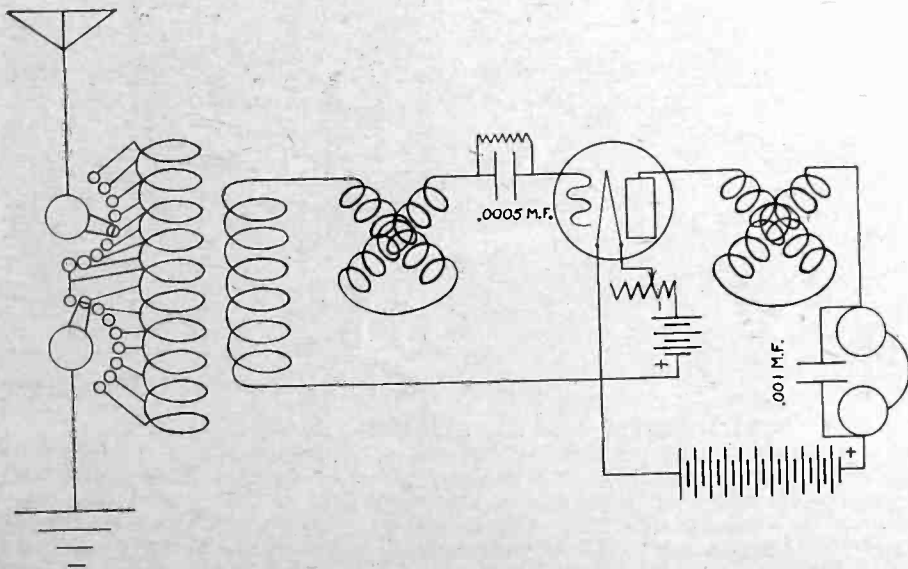
### SINGLE CIRCUIT SET

This is the receiver described by Paul Perry in the July issue of Radio Topics. (Top) is front view and (bottom) back view showing coil, condenser, etc. This set will respond to wave lengths of 150-300 meters and one in use in Chicago receives Arlington, Va., and Denver, Colo.

or antenna and ground circuit, is tuned by means of a switch. The secondary, or grid-filament circuit, is tuned to resonance with the primary circuit by use of a "grid" variometer. This variometer is connected in the grid leak between the secondary of the vario-coupler and the grid condenser. As it rotates from minimum to maximum, it builds up the inductance in the secondary circuit, thereby placing it in resonance with the primary circuit. In this way no taps whatever are required in the secondary circuit.

\* \* \*

All of the coils, excepting the primary, are used all the time during reception. The variometers, by reversing the directions of the coils within them by rotation, change their inductance values. When the rotor winding is in opposition with that of the stator, the inductance value of the variometer may be considered at zero, but when both windings are in the same direction the inductance



Hook-up employing two variometers and variocouplers as described in accompanying article.

value is at its maximum. It is this method of tuning that is used throughout this circuit.

As all the secondary tuning is by building up its inductance, the winding of the secondary coil is necessarily very small. In fact, the secondary rotor is only used for varying the coupling between it and the primary coil. This adjustment is necessary in separating stations which otherwise cannot be separated by the primary and grid circuits. The variometer in the plate circuit is used to bring the plate into resonance with the grid and thereby force the tube to oscillate and regenerate. It is the tuning of the plate circuit that makes the whole circuit sharp. The signal to be received must be in resonance with primary, grid, and plate circuits. Each circuit must be in resonance with its predecessor in order that a signal be received. It is for these reasons that the experimenter always chooses the double circuit regenerative set first.

The construction of such an instrument may be made at a comparatively small cost. One vario-coupler and two variometers are needed besides the tube control equipment. The vario-coupler primary should be composed of about 60 turns of No. 22 double cotton covered wire while the secondary should have about 28 turns of the same sized wire. The primary should be tapped closely in order to give sharp tuning.

A good method is to take off a tap every turn for eight turns, and from then on, a tap every eighth turn. This system will enable one, through the use of two switches, to increase or decrease the primary inductance one turn at a time.

\* \* \*

In obtaining the variometers, be sure that they are well made with either positive brush or "pig tail" connections for the wires leading from the rotors and that the rotors revolve closely within but do not touch the stator windings. In this circuit, variometers with very low distributed capacity in the windings should be chosen. The "plate" variometer differs greatly from that used in the grid circuit. The rotor of the "grid" variometer should be wound with about 60 turns of No. 20 D. C. C. wire with a similar

number in the stator coils. The rotor of the "plate" variometer is wound with but 50 turns of No. 18 D. C. C. wire with a similar number in the stator coils. If finer wire is used, the tuning will become very critical in the "grid" circuit while the current in the "plate" circuit, together with the signal strength, will be cut down considerably.

\* \* \*

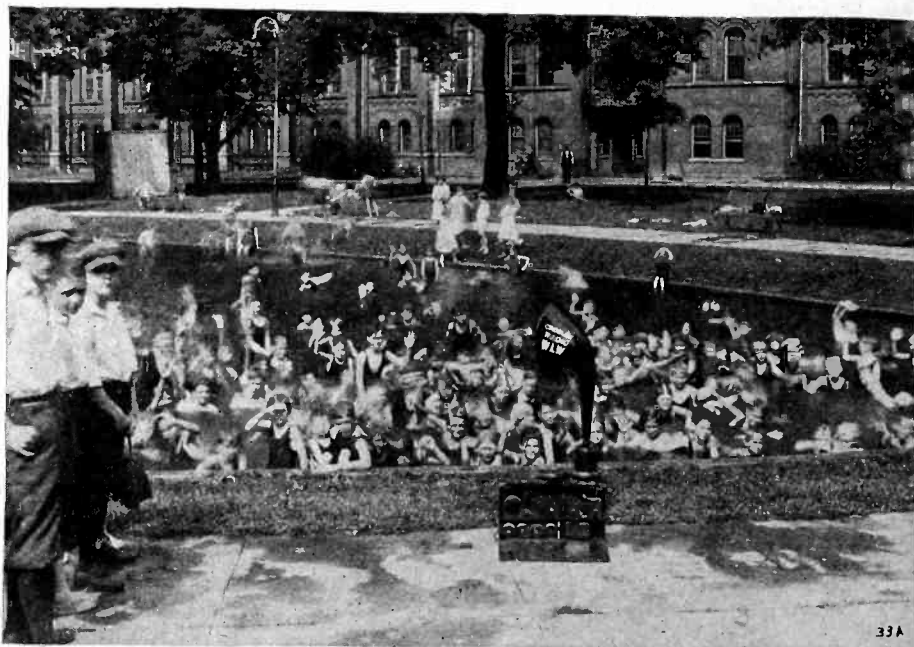
When adjusting this set for a station, set the coupling at maximum, that is, the secondary rotor parallel with the primary, turn the rheostat until a steady hiss is heard in the 'phones, and begin tuning simultaneously with the "grid" variometer and primary switch. After the signal has been picked up, increase the regeneration with the "plate" variometer until the desired volume is attained. If the regeneration tends to "mush up" or distort the signal, it can be easily "cleared" by slowly reducing the coupling between the primary and secondary coils until a suitable position has been found.

As has been hinted before, this circuit is not easily tuned. However, after one "gets used to it" and learns the functions of the controls in "picking up" and "bringing in" signals, you will

agree that it is a difficult set to improve upon.

One of the most important parts in building this set is the location of the different units in the case. Many may think this to be a very small item in construction. However, it was several years before the manufacturers of this type of set realized and corrected one of their greatest mistakes. The first sets of the double circuit regenerative type put on the market were built with the variometers placed side by side. In this construction the field about the "grid" variometer caused an interference in the field about the "plate" variometer. Each time the position of the rotor of the "grid" variometer was changed, the tuning of the plate circuit automatically changed with it. In other words, the regeneration could not be fixed for a series of wavelengths. Each change of wavelength in the grid circuit required a similar critical change in the regeneration.

Therefore, for the best operation the "grid" and "plate" variometers must not be placed side by side. The best construction is to place the vario-coupler between the variometers in order to keep them at least eight inches apart and at the same time save room. This construction will also cut howling in the grid and plate circuits to the minimum.



#### CHILDREN LEARN SWIMMING BY RADIO

A practical demonstration of the use of radio in teaching children how to enjoy the natatorial art was recently given by Stanley Brauninger, who broadcast a series of lessons from station WLW of the Crosley Manufacturing Co., Cincinnati. The children were in the pool at the work house and Prof. Brauninger, who is swimming director at the Y. M. C. A., had the children lined up in the pool and by means of a loud speaker he told them just what to do. The test, which was the first ever attempted to give swimming lessons by radio, was entirely successful.

# Music Publishers File First Suit

M. WITMARK & SON BRING ACTION AGAINST L. BAMBERGER & CO. OF STATION WOR FOR BROADCASTING "MOTHER MACHREE"

**T**HE first suit of the music publishers against a radio broadcasting station for an alleged infringement of the copyright law on a musical composition controlled by them was filed recently in the United States District Court of New Jersey at Trenton.

M. Witmark & Son have sued L. Bamberger & Co., who operate station WOR from their large department store, Newark, N. J. The Witmarks are music publishers in New York City and members of the American Society of Composers, Authors and Publishers.

The complaint alleges that the Bamberger firm broadcast a song called "Mother Machree" and thus infringed the copyright, which is owned by M. Witmark & Son.

## An Old Olcott Song

Chauncey Olcott and Ernest K. Ball wrote the music of "Mother Machree" and Rita Johnson, Young the lyrics, but they are not concerned in the suit, it is said, except indirectly and in like manner with every author or composer who belongs to the A. S. C. A. P., which is making a determined fight to enforce the payment of royalties or fees from all broadcasting stations before they will be permitted to use any of their music.

The damages sought in the Witmark vs. Bamberger case are discretionary with the court, the plaintiff moving for a temporary injunction. Nathan Burkan, representing the music publishers, states that in broadcasting "Mother Machree" Bamberger & Co. violated the copyright law, because it was for profit. The department store contends it was not for profit and they are not liable under the copyright act.

The A. S. C. A. P. before beginning action asked Bamberger & Co. to pay royalties for any of the numbers controlled by the society. The society asked \$1,000 a year.

## Publishers Issue Statement

RADIO TOPICS is in receipt of the following communication which refers to editorial mention in the June issue. The letter is signed by J. C. Rosenthal, general manager of the American Society of Composers, Authors and Publishers:

In the first place, the music publishers have not "backed down" in any particular, nor do they intend doing so. The members of this society are the only publishers that have ever asserted their rights in copyright

as to the public performance of their works by radio broadcasting stations, and they are still asserting those rights just as vigorously as they have in the past.

The publishers which do not assert such rights now, and never did in the past, simply adopted a resolution informing their members that each was at liberty to proceed in the matter as he individually saw fit, and some of them advised the broadcasters that their works were available for the present, without consideration.

There has, as yet, been no indication to us of any hostility upon the part of the public, as indicated in your article, based upon the demand of the men who make music and who contribute so much to the success of broadcasting, and the entertainment of radio audiences, that they shall be reasonably paid for their work, which is used for the profit of others. Nor has there been the slightest indication

## Since We've Got Our Radio

By C. M. BUCHANAN

**T**IME was when staying home at night seemed to me awful slow, but now we're burning midnight light since we've got our radio. The wife's face is lit with smiles, for I have ceased to roam; where once her life was full of trials, she now hums "Home, Sweet Home." When I come in from work each eve she shouts a glad "Hello"; the change in us you'd scarce believe since we've got our radio. Friend Wife has learned a lot of things while she listens in each day; with joyful heart she gayly sings a glorious roundelay. It's taught her how to pickle beets and make a sunshine cake; she's learned to mix up candy treats and home-made bread to bake. And while the wife has gone ahead with much punctilio, my foolish habits all have fled since we've got our radio. So listen to me, one and all—if you have wandered far—don't try your wife dear to stall with tales spectacular. Instead, just buy a little set, and then you soon will know precisely why I do not fret, since we've got our radio.

HIRAM JONES.

of a "buyer's strike"—on the contrary, the three outstanding song successes of the day are songs that have generally been restricted as to broadcasting.

In your article at page 9 you state that "the publishers of popular music, after making a survey of the situation, adopted the recommendations of a special committee on radio broadcasting." This, again, is untrue, and it is to be regretted that in reporting the remarks of Mr. M. E. Tompkins of G. Schirmer, Inc., which firm is not a member of this society, and not a "popular" publisher, you did not report them in full, as had you done so it would have been clearly noted that the "bars were down only temporarily," and only as to so-called "standard" music in the catalogs of certain firms.

Instead of withdrawing our demand for recognition of rights which have been already upheld by the Supreme Court of the United States in respect of public performance of copyrighted music, we are asserting those rights as vigorously as we know how, and are just now in process of filing a test suit with one of the broadcasting stations.

References to a "war" in connection with this particular matter are unfortunate and unfair. We are not at "war" with anyone. The substantial broadcasting interests of the country have recognized the legality and the merit of our contention. They do not feel that they can, under existing conditions, assume the expense that would be incident to securing license to publicly perform restricted copyrighted compositions, so they refrain from broadcasting such compositions, and be it said that in their conduct throughout they have been most honorable.

We have demanded that if our product be used for purposes of profit we be paid a reasonable fee for such use. The broadcasters, some of them, demand the right to use our property and refuse to pay us for it. That is the issue, in so far as there is an issue.

The crux of the situation is that the broadcasting stations receive no direct revenue from their audience—but they do receive millions of dollars through the sale of radio receiving apparatus, which would not be sold if music was not broadcasted. The radio audience is, in the meantime, content to receive its entertainment by the charity of the broadcaster, and, for the moment, no way can be found in which the broadcaster can collect from his audience, else he would be at it, double-quick.

We want only what is fair and right, and we will accept no less.

# Keeping in Tune the Year 'Round

DEPARTMENT OF COMMERCE GIVES VALUABLE HINTS ON  
SUMMER RADIO

**F**OR many reasons interest in radio is being maintained this summer to a far greater extent than last year, according to the radio experts of the Bureau of Standards. The maintenance of this interest and of good radio business during the summer depends very largely on the broadcasters and radio dealers.

Two elements of radio receiving sets which have been perfected during the last year or two have gone far to help in making it convenient and satisfactory to use radio receiving sets outdoors. The first of these is the dry battery tube, that is, electron-tube detectors and amplifiers which require only a small dry battery, rather than a heavy storage battery to light the filaments.

The second improvement is the development of more satisfactory loud speakers which furnish a considerable volume of sound without undesirable distortion. Thus it is possible now with small portable receiving sets which can be purchased or which can be fairly easily assembled, to receive satisfactory radio broadcasting while out camping or boating or making automobile tours. It is a noteworthy fact that exploring parties now take radio receiving sets with them for the dual purpose of furnishing amusement during the evening hours at camp and for receiving time signals with which to check their chronometers.

## Winter Conditions Better

It must be recognized that radio transmission conditions are not as good in the summer time as in the winter. Transmission range is decreased so that it is not possible to hear the distant stations which can be received in the winter. The presence of atmospheric disturbances or "static" often makes it difficult to hear weak signals, and reliance must be placed on stations which are near enough and powerful enough to produce loud sounds from the receiving set.

Fortunately it is not necessary to rely entirely on distant stations, since there are now over 500 licensed broadcasting stations in

the United States. In fact, about nine-tenths of the area of the country and probably 95 per cent of the population is within one hundred miles of a broadcasting station which furnishes quite satisfactory service. Therefore, while it has been possible during the winter to receive from any one of a large number of broadcasting stations, the summer decrease in transmission range will not mean an entire stopping of broadcast service for large numbers of people, but only a decrease in the number of stations between whose services they can choose.

## Reducing Interference

There are a number of ways to minimize the interfering noise which is caused by atmospheric and other stray disturbances. At important government and commercial stations, certain devices and methods are in use by means of which strays are appreciably reduced and it is made possible to obtain fairly reliable reception during the summer. The apparatus and methods employed at such sta-

tions are usually too elaborate to be used at the ordinary broadcast receiving or amateur station. One method which is easily employed and which will be found helpful in reducing certain types of strays, is the use of a small antenna.

If the ordinary open type of antenna is used, its height and length may be reduced and the loss in signal strength recovered by employing a more sensitive receiving set. A coil antenna may be constructed by winding a suitable number of turns of wire with proper spacing on a wooden form about four feet square. In case a coil antenna is used there is some loss in signal intensity, but there is an added gain in freedom from interference on account of the directional characteristics of the coil. Thus, by rotating a coil antenna to the proper position, the directional types of strays may be greatly reduced and a better ratio of signals to strays will be obtained.

Some relief can also be obtained by persons having good amplifiers

(Continued on page 26)



## A RADIO BUG AND HIS WIDOW

This is the first stage. After he gets the set assembled he'll sit up all night listening to WJAZ, WOOC or XYZ, eat his meals in a hurry and end up by mortgaging the family Morris chair to buy more equipment. (Kellogg S. & S. photo.)

# Learning Geology by Radio

By S. R. WINTERS



PHILIP S. SMITH

Acting Director of U. S. Geological Survey, at his desk, Washington, D. C.

"THE American people are the greatest poisoners in the world," was the alarming, if not fatalistic, introductory sentence of a radio-telephone communication recently broadcast from NAA, the wireless transmitting station of the United States Navy Department at Radio, Va. If the radio novice or amateur permitted that seemingly startling statement to jar the head telephones from his ears without listening further to the contents of the message he probably concluded that it was a lecture on an anti-militaristic organization on the activities of the poison squad of the chemical warfare service of the War Department.

However, if the opening sentence of this wireless message intrigued you, and doubtless it did, before the speaker concluded his fifteen-minute talk you had formed the opinion that an interesting and informative discourse was radiating through the ether.

It was Guy Elliott Mitchell of the Geological Survey, United States Department of Interior, telling that vast, invisible radio

**T**HE Geological Survey in order to bring a knowledge of its activities and purposes closer to the people of the country whom it serves has recognized the value of radio as a proper vehicle by which it can clarify the public's general impression that this bureau is purely a scientific one and that its work is far removed from our public life."—Philip Smith, Acting Director of the Geological Survey, United States Department of Interior.

audience about arsenic, not as a means of poisoning humans, but as an agency in combatting harmful insects and weeds that are injurious to crops. Arsenic is employed in producing insecticides, and specifically at this time white arsenic is in great demand as a weapon for destroying the boll weevil, a pest that is so injurious to the cotton crop of the South. Approximately 12,000 tons of calcium arsenate will be needed in 1923 as an instrument of warfare against the cotton boll weevil.

#### Once a Week Talks

The Geological Survey of the United States Department of the Interior is the first geological branch of any government in the world to employ the radio telephone as a medium for spreading information about its service. This departure was taken recently, and regularly each Monday evening for a fifteen-minute period—from 8:25 to 8:40 o'clock—there will be broadcast from NAA, the wireless telephone and telegraph station at Radio, Virginia, talks prepared by the Geological Survey.

The present wavelength upon which these messages will be borne, as well as communications originating with other government departments, is 710 meters. It is understood, however, that the abandonment of the use of this specific wavelength is being contemplated, the difficulty experienced by novices and amateurs in adjusting their wireless receiving sets in resonance with this frequency being responsible for the change. Be that as it may, if you are interested in learning about the useful minerals, numbering more than one hundred, clamp your head telephones on your ears each Monday evening at 8:25 o'clock. Not only will one be informed about minerals, but the diverse activities of the Geological Sur-



GUY E. MITCHELL

U. S. Geological Survey Engineer broadcasting a paper on arsenic at Washington.

vey suggest the periodical treatment of a variety of subjects—ranging from harnessing the waterfalls to drilling for gushers of oil.

Figuratively, one may go prospecting for oil by means of the radio telephone—that is, provided you are seeking the counsel and expert advice of this government bureau; otherwise, if you are in the stock swindling and bogus oil prospecting game, you will doubtless advocate a "silent night" when the Geological Survey plans broadcasting reliable information on the subject of exploring into the bowels of the earth for hidden wealth. However, the reports of the Geological Survey on drilling for oil is not always adverse, by any means. Listen to this optimistic note recently circulated within a radius of hundreds of miles of the national capital by the use of electro-magnetic waves:

"The old, dead, abandoned oil fields are not yet exhausted of their oil. Some of the oil fields of the United States whose dwindling output seems to indicate that they must soon be abandoned may, as a matter of fact, yield more oil in the future than in the past, and others that seem dead are likely to be resurrected."

Cheerful forecast—is this! If you were engaged in exploring below the surface of the earth for our future gasoline supply and had contemplated the abandonment of a once resourceful oil field, this radio-telephone message doubtless renewed your hope of tapping another gusher on the ap-

parently exhausted field. Moreover, this geologist did not base his conclusions on generalities, for, if you live in Pennsylvania and own a radio-telephone receiving outfit, your interest was keyed to a high pitch when informed by wireless telephone that the Tidioute oil field, in Warren County, Pennsylvania, once considered barren, had been resurrected to the extent of yielding 500 barrels of oil a day.

#### Paper on Magnesite

On another Monday evening, the Geological Survey may, by use of the magic of the wireless telephone, tell the story of magnesite, which is considered a remarkable mineral.

For instance, how many operators of radio telephones are conversant with the fact that Epsom salts is made from magnesite, as well as fireworks and fine brick tiles. Moreover, magnesite contains more gas than any other useful mineral, and when this gas has been extracted it is light as a feather. If this mineral, however, has no appeal to you, a radio broadcast entitled "Aluminum, the Most Abundant Metal," is likely to arrest your attention.

The Geological Survey has surveillance over more than one hundred useful minerals, and retains a list in excess of 100,000 producers of these products of the earth. Its investigations into mineralogy range from iron, selling for only a few cents a pound, to platinum, commanding \$100 an ounce.

However, the radio broadcasts of this branch of our Federal Government are not to be restricted to a description of minerals, as vast a field as this may be. Did you know that the Geological Survey is the most extensive map making and printing establishment in the world? It has already published 3,000 engraved topographic maps, embracing every state in the Union and Alaska. The romance of map production is a fitting subject for broadcasting over the radio telephone. For example, the Geological Survey now has in the process of publication

a new map of Alaska, the surveyors of our Federal Government traversing more than 200,000 square miles for the purpose of determining the "lay of the land." This topographic figure is 50 by 33 inches in dimensions.

#### Issue Valuable Maps

An appealing cartoon entitled, "In Tune With the Infinite," appeared in a radio magazine some time ago. It represented the use of the radio telephone in a lonely, dreary desert. The sketch vies with the conditions recently described in a lecture given by the Geological Survey, bearing the title, "The American Desert." It describes one of the hottest and most inhospitable portions of the United States, namely, the Papago country of southwestern Arizona. By means of radio the Geological Survey recently pictured this area as being a paradox. That is, contrary to the common description of a desert, this area is green, it is covered with trees, and contains ponds and cultivated fields. The verdure is deceptive, however, since the trees cast little shade, the ponds are well-nigh exhausted of water, and the fields produce crops at irregular intervals.

The Papago Indians have inhabited this inhospitable, tree-covered desert since the coming of early Spanish explorers. The Geological Survey has published a guidebook of this territory where only the hardihood of a race can exist. The story of this desert, broadcast from NAA, must have been intensely fascinating to an invisible audience of thousands within a radius of hundreds of miles of Washington.

So, whether you want to know how much tin, lead, and zinc are produced; learn about the explorations for potash, oil, coal and ore deposits; become informed about how 11,000 measurements of stream flow are made in 31 states; take a surveying expedition to Mount Whitney—"the top of the United States"—or delve into the bowels of the earth for a hundred useful minerals, it is well to follow the progress of the latest Government bureau to participate in the features of radio broadcasting.

## Go to Church, but Stay Home

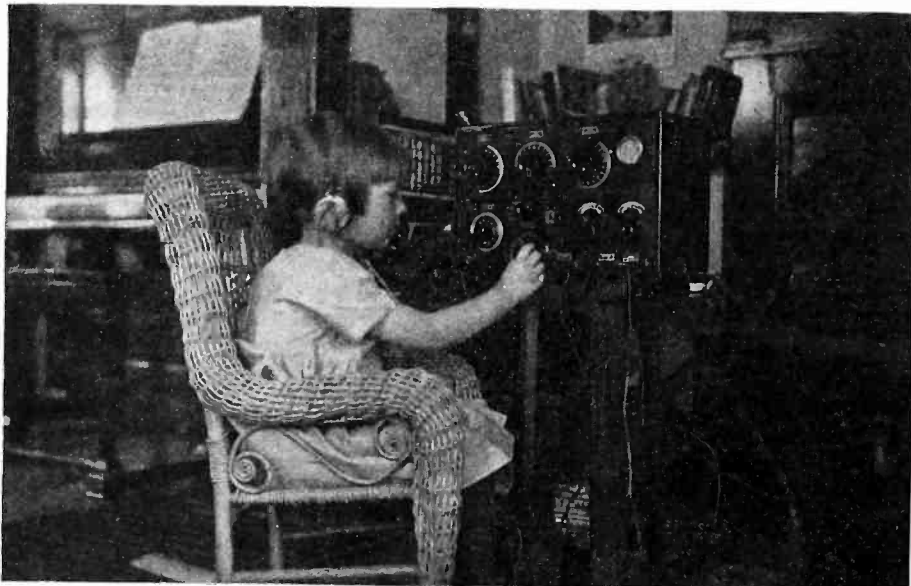
**S**CHENECTADY clergymen whose services have been broadcast now look upon the radio station as a powerful gospel missionary. Words spoken in a church in the presence of a small group of people are given wings and travel to thousands of homes reaching the aged and the infirm and many who, but for the radio, would not hear a church service. Village churches, locked because of a shortage of ministers or inability to provide for a pastor regularly, now open their doors and the congregations worship with the Schenectady church membership via radio.

After every service letters reach the pastor from all parts of the country. Our clergyman was recently told of two elderly women, too feeble to go to church, who dress each Sunday in their best finery and sit at their radio set, hats and gloves on, and devoutly listen to the service. During the scripture reading they follow the pastor in their Bibles and at the offertory they solemnly place a modest offering in a plate at their side. At the end of the service the money is sent to the pastor who has been speaking to them.

A lumberjack recently wrote one of the Schenectady ministers that he had heard a church service for the first time in eleven years, and that it had taken him back to his "Sunday School days." He was so impressed that he is getting a loud speaker so that the gospel message may be appreciated by others in the camp.

## Commissioner Carson Has Crosley Set

**J.** L. WOODS, Jr., representative of the Crosley Manufacturing Company, Cincinnati, installed a Crosley Model XV radio receiving set in the home of Commissioner Carson of the Department of Commerce, Washington, D. C. The receiving set was placed in his Nashville, Tenn., home and one of the first stations heard was WLW. When it is realized that Mr. Carson is the head of the radio service in the United States and had an opportunity to experiment with many makes of apparatus, his selection of the Crosley Model XV shows the superior quality of this product.



**CHILDREN ENJOY RADIO**

"Snooky," who is just three and a half years old, listening to a bedtime story. She is the daughter of the associate professor of Psychology of a Massachusetts college.

# World-Wide Communication

The Progress That Has Been Made by World-Wide Wireless Communication Has Astonished Even Those Who Promoted It

By FRANK R. CARNEY

*Division Manager of Trans-Oceanic Dept. of the Radio Corp. of America*

**T**HE magic of radio—so far as the public is concerned—spread over civilization practically over night. The birth of no other industry has ever attracted more world-wide attention. As the sun appears suddenly from behind a dark cloud, so did radio make its appearance—casting its rays throughout the universe.

Great industries, however, are not born over night—men visualize.

Columbus knew in his heart that the earth was round before starting on his voyage westward.

The empire-builder, James J. Hill, saw our Northwest bloom as a rose long before the trend of immigration condescended to settle that wonderful country.

Radio did not come into existence over-night. Like in all other great achievements, men labored for years to perfect this new, giant industry.

## Labored Many Years

With strong convictions as to the future possibilities of radio, the men who guide the destiny of the Radio Corporation of America (the mother of everything radio) are the pioneers in this new enterprise. They are the same small band of men, who, as far back as thirteen years ago, saw the future glories and possibilities of this new industry. The names of Owen D. Young, Edward J. Nally, David Sarnoff, Lee Lemon, in fact all of the executives of this Great American Radio Corporation will be known to future generations as those who gave to the world "Commercial Radio" in all phases of its activity.

What the future trans-oceanic or world-wide wireless will be, no man today can foretell—the future can only be judged by the immediate past.

## Amazed Great Minds

The progress that has been made by world-wide wireless communication since its introduction has

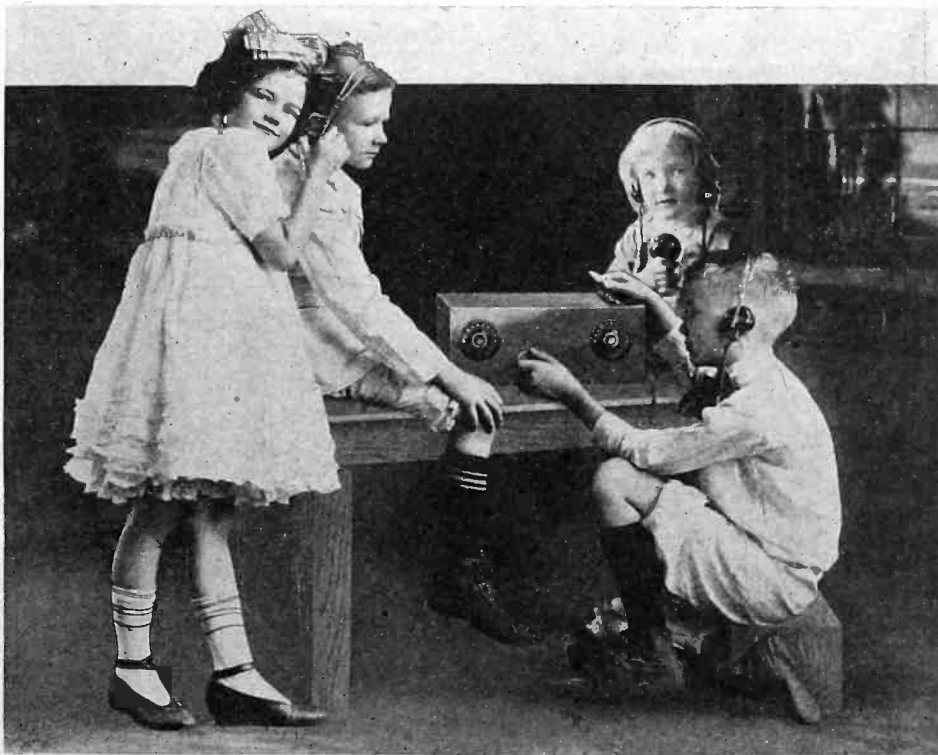
**T**HIS is the second of a series of interesting and instructive articles prepared especially for RADIO TOPICS by Frank R. Carney, division manager of the transoceanic department of the Radio Corporation of America. The practical application of world-wide wireless in business will be Mr. Carney's next paper.

amazed even those great minds which are behind the movement. Those who are steering the ship of state are laboring day and night in an effort to keep abreast of events. The progress made thus far and the hearty co-operation and good will of the people of the world has reached a point far beyond their fondest expectations.

While the world looks on in wonder at the marvelous performances of world-wide wireless, history is being made in the great scientific and research laboratories of the monstrous electrical organizations in this country. Such great strides have been made that this expensive luxury of yesterday has become one of the necessities of today.

Electrical technical publications have been pressed beyond measure in an effort to keep up with the new developments. The standards of yesterday have given way to the more efficient appliances of today.

There is no phase of electrical performance which requires greater ability than the science of radio. The minds thus engaged are the cream of the world in their profession, for the standard of knowledge required to cope with this new industry is to that required in the ordinary electrical activities as



## SATISFIED RADIO USERS

The mysteries of radio are not confined to the grown-ups. Children of all ages get a lot of pleasure out of tuning in the evening program of bed-time stories, singing and orchestra music. (Kellogg Switchboard & Supply Company photo.)

# Science Used in Selling Radio

ACOUSTICAL RESEARCH APPLIED AND EVERY SALESMAN CARRIES HIS OWN LABORATORY — A DEMONSTRATOR THAT WORKS



Benjamin F. Miessner, who devised a plan whereby loud speakers and head phones could be tested at a moment's notice.

**A** NEW way of selling loud speakers and telephones has been adopted by one radio manufacturing concern of Chicago. It is the result of years of study and provides a quick and simple method of testing apparatus which has proved very effective.

The chief engineer of this concern devised a plan whereby loud speakers or head phones can be tested at a moment's notice and without any question as to the reliability of the test. The plan was conceived by Benjamin F. Miessner, who has had years of experience in acoustical research in one of the foremost phonograph plants of the country and is also thoroughly familiar with requirements of loud speakers for radio work.

## Quick Comparison

Mr. Miessner's plan involved the use of phonograph music transformed into electric currents by a special type of microphone actuated by a reproducing needle. The most important feature of such a testing outfit was a quick

change switch by means of which musical currents could be switched in the fraction of a second from one loud speaker to another during the reproduction of musical tones or phrases having unchanging values. Or better still special types of selections, one of which could be reproduced on one loud speaker and the other on the second speaker for comparison.

In ordinary circumstances without this outfit, a salesman will call on a dealer and after introducing himself will show him his products, but of course the dealer in this case cannot be sold on the qualities which he can see in the product.

## Wants Proof

"The proof of the loud speaker," says Mr. Dealer, "lies in the hearing." And so it becomes necessary to arrange for some kind of test. The dealer is not ordinarily satisfied with merely a test showing that the speaker will function but he wants to compare it himself with other speakers of which he has some knowledge, or if he has no knowledge whatsoever of such himself, before making a selection he wants to be sure that he is getting the best obtainable within a given price range.

The dealer may not have a radio set in operation or if he has it

is more than likely that broadcasting is not going on at the time, or if it is, it is probable that the program is not of a type suitable for making such a test.

In many localities there is very little broadcasting done during the day, so that an evening engagement becomes necessary in making the demonstration. So we see that it is quite an involved matter under such conditions for a salesman to sell the dealer his product.

In comparison let us show how it may be done with the use of the Amplitone Demonstrator. The salesman asks for five minutes of Mr. Dealer's time and makes his demonstration on the spot, where clerks and customers may join in and express their individual opinions.

## How It Works

He sets his demonstrating outfit on the show case, connects his loud speaker and floods the room with music of volume even greater than an ordinary phonograph and of better quality. If the dealer has already been sold on a loud speaker that he regards from his limited knowledge or experience as the best obtainable, the salesman asks him to bring it out and

(Continued on page 33)



This is an Amplitone Demonstrator used to test loud speakers and telephones



# Department of RADIO ENGINEERING

## Radio Topics Institute

Nanko C. Bos, Chairman Advisory Board



### Look for the Approval Seal

Such as the one just above which are furnished manufacturers whose radio merchandise has been tested and approved by the Institute Laboratory. We urge you to purchase only such apparatus, for it carries the guarantee of our organization.

Send all inquiries and material for test, calibration, or reconstruction to RADIO TOPICS INSTITUTE, Oak Park, Ill.

# A Good Vacation Outfit

By C. E. BUTLER

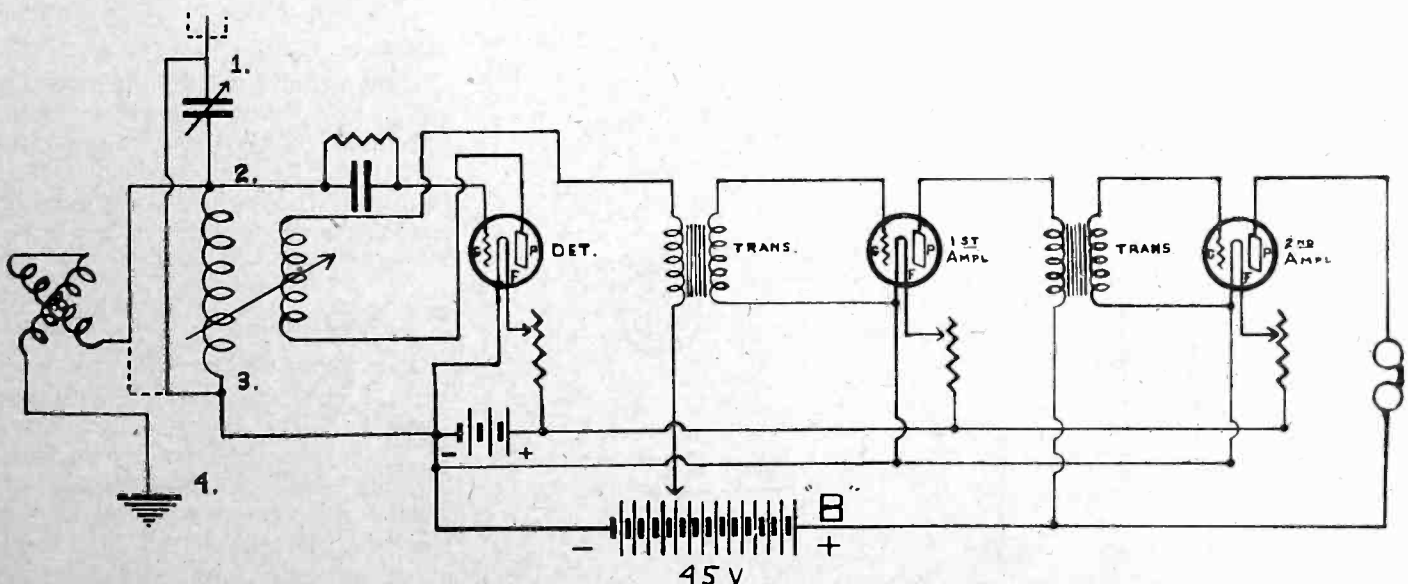
THE MONTH of August is usually the worst time of the year for static and atmospheric disturbances and a good many of our readers will welcome any escape from the continual roar of static in the phones or loudspeaker.

This hookup will be timely for a great number of fans who are making a portable set to take on

their vacation and do not always find it convenient to erect an aerial, or who wish to do away with the aerial with its lightning hazards and static collecting properties.

The results obtained from the hookup shown have been as good or better than any results obtained on a loop. The writer was using a regular variocoupler regenerative hookup (rotor for tickler) using

two five-watt tubes, detector and one stage of audio frequency amplification, on a loud speaker, when the changes shown on the diagram were tried out. Using a third five-watt tube as the second stage of audio frequency the volume was as good as when using the aerial, and considerably louder than a loop on the same set. The apparatus used consisted of a standard variocoupler



Circuit diagram of vacation outfit described by Mr. Butler in accompanying article using ground only.

ler, a variometer, and a twenty-three plate variable condenser.

\* \* \*

This hookup is, as we have mentioned, adapted from the standard variocoupler set using the rotor for the tickler and in making your set it is recommended that you first connect your set as follows:

Connect aerial to point 1.

Remove jumper from between points 1 and 3.

Remove connection from 2 and place it at 3.

This will give you the regular variocoupler hookup to start on. This is recommended as it may be the means of saving considerable work and valuable time, for often when a hookup is tried for the first time the operator may not hear signals due to unfamiliarness with the apparatus and its tuning peculiarities. If the regular hookup is tried first it will also show whether the remainder of the set is functioning properly, and if there is a station transmitting.

When the set is working properly with the aerial, disconnect and try the hookup using ground only. Still further experimentation may be tried with a very short indoor aerial as indicated in Figure 2 of from ten to fifteen feet in length.

For the fan who wishes to experiment further we advise him to try paralleling the variometer around the variable condenser, or to rewind the primary of his variocoupler putting more turns on to compensate for the loss of the aerial inductance and also to have sufficient inductance to reach the higher wavelength stations.

\* \* \*

In all cases the writer found that after becoming acquainted with tuning the static was reduced a

great deal and receiving was pleasanter due to the increased ratio of signal strength to static strength.

Due to a great number of requests that have come in from our readers for more information regarding the radio set as constructed by Mr. V. M. Moen of St. Paul, Minn., which was published on page 8 of the June issue of Radio Topics, next month's article in this department will completely describe the hookup as used by Mr. Moen including constructional data on winding the inductance unit.

## Resumes Programs

Chicago Daily News Moves Studio to La Salle Hotel

THE Chicago Daily News radio broadcasting station WMAQ resumed its regular programs July 10, after closing down for several weeks while the equipment was transferred from The Fair department store to the roof of the LaSalle Hotel.

The station in its new home is said to be second to none in America. The studio is located on the eighteenth floor of the Hotel LaSalle and is declared to be perfect from an acoustical standpoint, being ample in size to accommodate bands or orchestras. The walls are velour draped, tastefully decorated with lamps, Windsor chairs and other furnishings that harmonize. A Mason & Hamlin grand piano graces the studio.

## High Towers Provided

The towers are 135 feet high on the roof of the hotel and are spaced 100 feet apart, and they can be seen for a long distance.

The Daily News programs were broadcast by the Zenith Edgewater Beach station WJAZ for the forty days the loop station

was closed. The new wave length is 447 meters or a frequency of 670 kilocycles. The hours of broadcasting are as follows:

Monday—4:30 to 5 o'clock.

Tuesday—4:30 to 5, 7 to 8 and 9 to 10 o'clock.

Wednesday—4:30 to 5, 7 to 8 and 9 to 10 o'clock.

Thursday—4:30 to 5, 7 to 8 and 9 to 10 o'clock.

Friday—4:30 to 5, 7 to 8 and 9 to 10 o'clock.

Saturday—8 to 10 o'clock.

## Orchestra Will Play

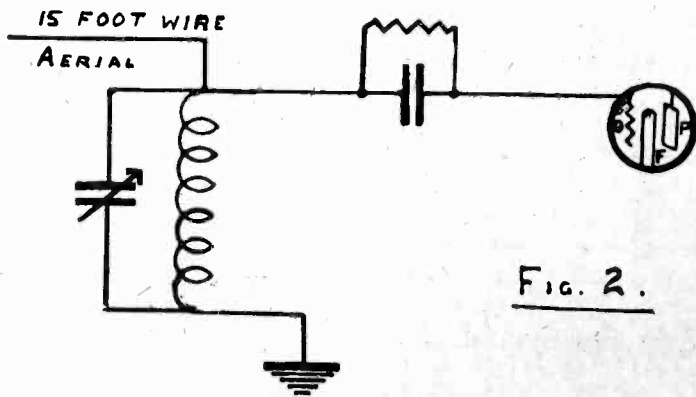
Several special treats are in store for Daily News radio family. Every evening except Sunday and Monday the Hotel LaSalle orchestra will broadcast a program for fifteen minutes. Popular numbers will be played, none of which, however, will be controlled by the American Society of Composers, Authors and Publishers. The Daily News, through its membership in the National Association of Broadcasters, is being supplied with a variety of carefully selected musical numbers, many of which are potential hits.

Another feature that it is expected will bring pleasure to many fans is the plan for broadcasting organ music, orchestral selections and a special show staged at the Chicago Theater. The show will have no spectators, it being given in a special studio room in the theater building for the sole benefit of the listeners to the entertainments of station WMAQ. The Chicago Theater program will be broadcast from 8:15 to 9 o'clock each Saturday night, according to present plans.

Other plans are in the making for giving to the thousands who listen to WMAQ a high-grade and versatile program of entertainment throughout the coming months.

## Broadcast Fight

The heavyweight bout between Luis Firpo and Jess Willard at Boyle's Thirty Acres, Jersey City, N. J., July 12, was broadcast through WEAJ by means of special microphones placed at the ringside. Details of the fight were given and other microphones transmitted the cheers of the crowd.



A short indoor aerial using 10 to 15 feet of wire

## CORRESPONDENCE WITH THE INSTITUTE

Conducted by Carlton E. Butler, Mgr. Radio Division, Service Department, Westinghouse Electric & Manufacturing Co., Chicago, Ill.

Mr. Butler will answer any questions puzzling Radio Fans. Make your letters as short as possible, write on one side of the paper only, and give your name and address plainly. In conjunction with questions and answers in this Department, an article will appear elsewhere in this magazine each month dealing with particular phases of trouble experienced in assembling and operating radio receiving sets by a great number of our readers. Save these articles, as they may answer many of your questions and prevent you from making costly mistakes in the future. This is your Department. Use it.

*Will you kindly mail me the wiring diagram giving resistance and ohm values for rheostats and condensers to be made up into the portable two-tube and crystal detector reflex circuit set which you describe in Mr. Graham's article, "Vacationing with Radio," in your June number of RADIO TOPICS? I should like to try the UV-199 and 201-A tubes if I could get them on the market.*

*I find your magazine to be a very instructive and readable periodical. Your articles are clear and concise. The only fault that I have to find is that they are sometimes too concise. If for example I should want to construct the set shown on pg. 27 I would not know the size and turns of wire to be used on the coil, the value of the condensers or the resistance. Another matter in which all radio journals seem to be misinformed is the upper limit of audio-frequency. The normal person can distinctly hear tones ranging in the neighborhood of 25,000 cycles. Any number of textbooks in psychology, physiology, and physics would indicate that the usual limit of 10,000 given by radio writers is much too low. The older books used to quote 40,000 to 45,000 cycles.*

*My regenerative two-circuit (variocoupler, two-variometer, with resistances potentiometer and rheostat) set gave me much fun last winter, but I want to build it over for vacation use.—C. A. RUCKMICK, Iowa City, Ia.*

**ANSWER:** The set you mention has not yet been published in this magazine, however, we are sending the hookup. UV-199 or 201-A tubes are readily obtainable on the market now.

The set as described on page 27 of our June issue can be constructed using a variometer in place of the inductance shown, or use a tuning coil of about 100 turns on a 3½ or 4 inch tube, size of wire immaterial except for mechanical strength and convenient size so as not to make the coil too bulky. A twenty-three plate condenser is satisfactory.

Thanks for the information on the limits of audio frequency. Why not use your present set on your vacation by changing the socket for the base of the UV-199 tube and use dry cells for the A battery supply?

*I have two variometers, a Kellogg variocoupler, Kellogg variable 43-plate vernier condenser, two WD-11's, and a*

*UV-712 amplifying transformer. Kindly give me a circuit which I could use to best advantage without buying much more apparatus. If I were to add another step of amplification would there be any way to use a UV-199? Would it be advisable to use another UV-712 amplifying transformer? Would such a two step amplifier work a loud-speaker?*

*If it is within the limits of your service kindly give me a diagram, in the usual symbols, of the "Symphony" No. 502-J receiver made of Kellogg parts by the Jones Radio Co., 14 E. Jackson Blvd., Chicago, Ill.—A. W. EATON, Bryan, Ohio.*

**ANSWER:** In response to yours we are enclosing one of the best hookups for your purpose. This is one which is used by a great number of the amateurs throughout the country, and is equally as good for broadcasting.

In addition we are showing you how to add another stage of amplification using UV-199 tube. At this point I would like to state that the UV-199 tube can be used throughout by changing sockets or using adapters, and by using a rheostat of about 29 ohms resistance. Detector and two stages of amplification using the transformers you have will be sufficient for loud speaker operation upon the more powerful stations providing your set is well constructed and operated. Due to our policy must refer you to the manufacturer for information asked in the last paragraph of your letter.

*Can you give me any information in regard to the circuit called the Neutrodyne as manufactured by the Freed-Diesmann Radio Corporation of New York City? If you know nothing about this circuit we would be glad to have your full opinion and particularly your opinion as to the merits of a tuned radio frequency circuit as compared with the ordinary coupled radio frequency circuit.*

*I would also be very glad to have you advise if there has been a new broadcasting station opened at Zion City, Ill., and if so who is operating it and when was it opened?—F. A. DICKERSON, KEWANEE, ILL.*

**ANSWER:** For complete details regarding the Hazeltine Neutrodyne receiver we refer you the paper presented before the Radio Club of America, March 2nd, 1923.

In our estimation tuned radio frequency is superior to transformer coupled radio frequency, especially so since the change in wavelengths by most of the broadcasting stations.

The Municipal broadcasting station located at Zion, Ill., were first heard by the writer on June 10th, giving a test program.

*Would you oblige me with the diagram for the construction of an efficient short wave radio receiver using one stage radio and two stage audio frequency, using the WD-12 tubes. Would prefer a regenerative tuner employing variocoupler and variometer or meters if you think I would get satisfaction with this type of tuner using radio frequency amplification. Please mark all values of condensers, grid, and potentiometer if employed, also connections to rotary plates of condensers. Also state to what extent tinfoil should be used on the inside of the set. I am using a Rheinartz set at present using Northern Electric Peanut tubes but am doing away with this set on account of the range during summer being poor and a number of these tubes being defective, the company saying if it is not a good detector it is a good amplifier which is a costly experiment as I have two of these tubes on hand which would neither detect nor amplify, one of which I burnt out trying to make amplify. Thanking you in advance, I remain.—H. E. MARQUIS, LEWIS, QUEBEC.*

**ANSWER:** In response to your request we sent diagram for one stage of tuned radio frequency, detector, and two stages radio frequency. You can paste tinfoil on the rear of your front panel, taking care to insulate well from your instruments, and connect this shield to ground.

*As a reader of RADIO TOPICS, would it be possible for you to give me the hookup of the set described in the June copy of the RADIO TOPICS on page 8, the V. M. Moen Set? Thanking you in advance, I am—J. A. URIDIL, BRUNO, NEB.*

**ANSWER:** In response to your request we are mailing you hookup of the set as described in our June issue on page 8.

*In reading your June issue of RADIO TOPICS, I took a particular interest in the mention given to a Mr. Moen from St. Paul, Minn. (Picture of self and set page 7 or 9.)*

*You state it has been considered impossible to reach coast to coast on one tube. There is nothing impossible about it, as it was done consistently all through the winter by listeners in many states that are not nearly so centrally located as St. Paul. Myself as an example, using a Reinartz circuit that was but slightly modified (using all single primary taps instead of regular) I copied the east and west coast stations regularly and south as far as Havana off of detector only, and twice I had Los Angeles Times loud enough in horn (not a Magnavox) on two steps to be heard on the second floor, which will give a fair idea of the value necessary on detector alone to accomplish this.*

*I might also state that the Tunit peo-*

ple have been making a two rotor affair of the type described in this article and I have used one of them in two different hookups, and without proper condenser (variable) control, the tuning qualities are helplessly broad, while the range in distance was also less than either of the other sets I have.

For instance on a single tube I still think that the chap down in New Hampshire who won the first prize in the contest of Radio News or Broad Cast in February last, still has the edge on a lot of us for distance covered with one tube and a simple circuit.

If this St. Paul party has something new in a tuner of the type shown that will get the distance and at the same time possess highly selective tuning, I am sure that the circuit used would be very much appreciated by all fans, but as the article from St. Paul is only in the neighborhood of 1,800 miles which is far from an impossible thing these days to be done on one tube.—L. J. KAISE, 2476 PARK BLVD., DETROIT, MICH.

ANSWER: You are quite right as many of our readers have heard stations from coast to coast during the winter season, and ought to write Mr. Moen that several other people have succeeded in doing the so-called impossible stunt also.

I am familiar with the "Tunit" unit but it differs slightly from the inductance set Mr. Moen uses in that I do not believe that provision is made for the fixed plate feedback in addition to the usual variometer feedback to secure regeneration. The set is broad only in the sense that most single circuit receivers are broad when used with an aerial which is a hopeless misfit on account of its overlarge natural period. With a short single wire antenna of fifty to seventy feet in length the tuning is quite sharp.

A description of this set will be published in an early issue.

## Appointed Crosley Agents

ANOTHER link in the large chain of Crosley distributors has been added with the appointment of the Southwestern Radio Sales Company, Fort Smith, Ark. This company will distribute Crosley apparatus exclusively. Stephen Brown is the head of the company with Messrs. Barry and Barton, as partners. Mr. Toland has been appointed sales manager of this new organization.

George Lewis, holding radio operator's license number one has been associated with radio work in all capacities and an engineer whose work advanced the science of wireless, is now assistant to Mr. Powel Crosley, Jr., president of the Crosley Manufacturing Company and the Precision Equipment Company. Mr. Lewis was in charge of wireless on the George Washington and handled all Ex-president Wilson's messages. He is arranging a special exhibit of radio apparatus at the Cincinnati Fall Festival to be held August 25 to September 8. The radio wedding will be broadcast through WLW of the Crosley Manufacturing Company whose remote control lines are being arranged by Mr. Lewis.

# Leviathan's Giant Radio

WHEN the steamship Leviathan of the United States Lines left Boston on her recent trip she carried the most powerful and versatile outfit aboard any merchant steamship in the world, thereby giving to America radio supremacy upon the seas, according to an announcement just made by the Radio Corporation of America.

With her principal transmitting set six times as powerful as any of its kind ever installed on a merchant vessel and with three additional complete radio stations in the spacious radio quarters capable of independent operation, the Leviathan's radio officers will be able to reach out their "arms" of communication in many directions over great distances.

This apparatus will be used chiefly for commercial and social communication between points in Europe and the United States as well as for relaying the messages of smaller vessels equipped with radio having a limited range of communication.

## Life Boats Equipped

Great attention has been given to emergency apparatus even in the case of the life boats, two of which are provided with sending and receiving equipment.

The remarkable design which has made possible the installation in such a comparatively small space of four independent transmitting and receiving outfits and three antennae capable of carrying on both telegraph and telephone communication on a wide band of wavelengths, is a tribute to the skill of American radio engineers. This system will enable one operator to engage in communication while at sea with France or England while the voice of another operator is hurled out westward to the shores of America or other vessels in the North or South Atlantic.

This installation is the outcome of plans laid by the Radio Corporation of America and the United States Shipping Board, the former company having been

awarded the contract to equip the huge vessel several months ago.

## Antenna 600 Feet Long

The main antenna, which is suspended between the topmasts of the vessel, is over 600 feet long and 200 feet above the water level. Connected to this aerial is a super-power vacuum tube set, the tubes of which are of a very recent design. By the simple manipulation of a wheel similar to that employed on a motor car, this transmitter can be operated on four predetermined wavelengths from 1,800 to 2,800 meters. The vacuum tubes are of the high power type and are operated at 16,000 volts.

The radio telephone employed aboard the Leviathan is the only one of its kind in use. In design it differs only slightly from the average broadcasting transmitting station. But in practical operation and in combination with associated receiving outfit, it performs in a manner identical with that of the conventional land wire telephone. The person operating the set can listen to the voice of his co-operator on shore and immediately break into the conversation without the manipulation of a single control.

While it is not expected that a commercial telephone service will be inaugurated immediately upon the Leviathan's going into commission it is quite possible that shore stations will in the no distant future be erected to handle wireless telephone traffic from ships at sea to points inland over the conventional land line system. When such arrangements have been made passengers and officers on vessels at sea may establish contact with those on shore at their homes or offices and speak with them with the same facility and ease that accompanies an ordinary telephone conversation.

The emergency apparatus is a part of the main installation. Should the power in the main generating room fail, storage batteries located far above the water line will provide sufficient power to run the apparatus two or three days.

# Advantage of Tube Over Crystal

By H. M. FREEMAN

*Research Engineer, Westinghouse Electric and Mfg. Company*

**M**OST radio amateurs know what a vacuum tube looks like. Most of them have already passed through the preliminary stages where anything that would receive the local station was good enough, and are taking advantage of the tremendously increased range of the tube set. Others are still satisfied with the cheap and convenient crystal set, and are content to hear only the local stations. It is the large and growing class of those who are just beginning to ask, "How can I get these distant stations that my friends are talking about?" for whom this article is written.

In the first place, what can we do with a tube set that makes it so much more desirable than a crystal set? A simple outfit like the Aeroila Junior crystal set furnishes perhaps the least complicated way of receiving local broadcast material. You can receive good, clear music and speech within a radius of 25 or 30 miles from one of the large broadcasting stations. Under exceptional conditions it may be possible to get dependable results over distances somewhat greater than this. There are no replacements of worn-out parts to make, and with reasonable care a set is always ready to pick up a concert with a minimum of preliminary adjustment.

## Crystal vs. Tube Set

By way of comparison, let us look at the ordinary tube set. We find that we have batteries to buy occasionally as old ones wear out; the tube itself is a fragile piece of apparatus and liable to breakage, and altogether there are a rather more complicated set of adjustments to make for reception than is the case with the crystal set. Wherein then lies the advantage? A tube set with a single tube, such as for example, the Aeriola Sr. set, will increase the reliable listening range three or four fold over the crystal set. In other words, you can live 100 to 150 miles from one of the big broadcasting stations and be perfectly sure of receiving their concerts and speeches at any time. In addition, with reasonably good conditions it will be possible to hear stations hundreds of miles away and to participate in the fascinating sport of "listening in" with the possibility of hearing concerts or lectures or news from a dozen widely separated sections of

the country. I shall try to describe very briefly the properties of the vacuum tube that makes it possible to obtain such wonderful results in receiving.

Much has been written about the mechanism by which the sound at the broadcasting station is converted into electrical energy and is sent out from the transmitting antenna in all directions in the form of ether waves. A receiving antenna lies in the path of these waves and therefore picks up a very minute fraction of the electrical energy sent out from the transmitting station. This energy exists in the form of an extremely small electric current in the receiving antenna and must be converted back into a form suitable for making the audible signal which is heard in the telephone receivers. It is the function of the receiving tube to perform this conversion process which is necessary before the energy collected from the transmitting station can be perceived by the ear.

## Elements of Tube

There are three elements in the vacuum tube—filament, grid and plate—which are the vital parts of the receiving tube and, when connected into the receiving circuit in the proper way, act together to produce from the incoming electrical disturbance a form of energy which can be connected into a reproduction of the original sound initiated at the broadcasting station.

The exact action by means of which this result is obtained is rather complicated and is exceedingly difficult to discuss without the aid of diagrams or some such way of visualizing the process. At

best, under the conditions imposed in a talk of this kind, it is possible to give only a very rough idea of the physical phenomena, which are concerned in the action of the tube.

To begin with, in order to receive with a tube, the filament must be heated by passing an electrical current through it. When a metallic substance is heated in a vacuum it shoots out from its surface millions of extremely minute particles which are called electrons. These electrons are small negative charges of electricity, the smallest known subdivisions of matter and upon them the whole action of the tube is dependent. The filament is there for the sole purpose of shooting these electrons out into the space in the bulb where they can be made use of.

## Operation of WD-11

Having heated the filament of the WD-11 tube to a very dull red, we have a condition where electrons are being evaporated out of the filament at a rate determined by the temperature of the metal, and if the electrons have no place in particular to go, an equilibrium condition is reached where the filament is surrounded by a cloud of electrons which are in a state of constant agitation and change, a number coming out of the filament and an equal number returning to it each second.

Now let the plate be connected through the telephone receivers to the positive pole of a 22½ volt battery called the "B" battery. The negative pole of this battery is connected to one end of the filament. The plate is therefore "positive" in potential and the negative particles of electricity coming out of the filament are attracted towards the plate just as unlike poles of a magnet are attracted to each other. A stream of negative particles of electricity is pulled from the filament into the plate, and an electrical circuit is thereby completed, so that the "B" battery is forcing a current through a circuit containing the telephones and the space between plate and filament.



#### "WHISKERS" IS A RADIO FAN, TOO

Charles Ray, the United Artists' star, is an ardent radio fan, and while he is not busy at the studio he spends his evenings tuning in various broadcasting stations. "Whiskers" is the dog you have seen with Mr. Ray in a number of his pictures.

But in the space between the plate and filament is the grid which normally allows the stream of electrons to flow freely through its mesh to the plate. If a voltage is applied to the grid, however, the stream of electrons will be deflected so that some of them go to the grid or are driven back to the filament, and the amount of current means a variation in the current through the telephone receivers and this of course means a sound. Therefore an electrical impulse impressed on the grid of the tube appears as sound in the telephone receivers.

It is this property of the structure of the tube which makes it possible to perceive with the ear the results of the electrical impulses intercepted by your antenna.

The antenna with its tuning system is connected in such a way that the variations of electrical energy which form the incoming signal are impressed on the grid of your tube. Because of the way in which the electron stream is controlled, a very small amount of energy impressed on the grid will make a relatively large variation in the energy in the plate circuit which is supplied by the "B" battery. The incoming signal on the grid is therefore able by the control of this local source of energy to actuate the telephones much more strongly than would be the case if this amplifying property

were not present, or the amplified energy in the plate circuit may be applied to the grid of a second tube and amplified again.

#### Its Regenerative Action

Because of this same amplifying property, the principle called "regeneration" may be employed. In this method of using the tube, the incoming energy is used to produce variations in the "B" battery energy in the plate circuit as described; and then part of this energy variation is taken out of the plate circuit and fed back onto the grid of the same tube where it again produces variations in the plate current which add to the variations previously obtained. In this way, a feeble incoming signal may be re-inforced and strengthened to produce a relatively large quantity of sound when it finally is converted into that form of energy. It is by the use of this regenerative action of the tube that stations operating at great distances can be heard with a single tube.

It will immediately appear that a further use of the amplifying property of the tube makes possible the building up of a signal which is barely audible in head telephones, until it is loud enough to furnish music for a large room.

To accomplish this result, the energy variation which actuates the telephone in the ordinary detector set is made to pass through the primary winding of a transformer or through a high resistance. The

variations of voltage across the high resistance or across the secondary terminals of the transformer are impressed on the grid of a second tube. These voltage variations produce variations in the energy in the plate circuit of the second tube which are much greater than the variations in the plate circuit of the first tube, and which can be converted into sound by means of telephone receivers or can be used to actuate still another tube with corresponding amplification in the plate circuit of the last tube. In this way a signal can be built up without distortion to produce a volume of sound immensely greater than the feeble note you hear in the telephone receivers of your detector set.

The development of the WD-11 bulb with its dry cell filament, by doing away with the necessity of the bulky and inconvenient storage battery for filament lighting, has placed the tube set upon such a footing that its use is entirely practicable for all home receiving stations.

#### Ribbed Surface Dial

One of the latest innovations in the radio field is a new Radion dial with a ribbed surface. This ribbed surface gives the dial a distinctive appearance and renders it far more attractive than the ordinary dial with the plain face.

Radio fans who have had sore fingers from constant tuning with the ordinary dial will welcome the ribbed surface feature. The ribbed surface enables tuning not only with the hand on the knob but with the tips of the fingers as well, thus preventing fingers from becoming sore. It is possible with this dial to tune almost as fine as with a vernier, for the ribbed surface gives you a knob almost as large as the face of the dial itself.

This dial comes in three inch diameter and 4 inch diameter. Both sizes are graduated from 0 to 100 over 180 degrees of the circumference, with graduations reading clockwise. A strong metal insert is moulded in the center, allowing  $3\frac{1}{2}$  full turns of the set siren through the metal.

Another strong point in favor of this dial is a reducing sleeve which permits the use of the dial for either a  $\frac{1}{4}$  inch or 3-16 inch shaft hole.

# Combined Rheostat for All Tubes

By DORMAN D. ISRAEL

*Engineer Crosley Radio Manufacturing Company*

**W**ITH the development and sale of the many new, and improved types of vacuum tubes, the radio manufacturer has been faced with a problem regarding rheostats for these tubes.

The old style tubes operated from a six-volt storage battery, using one ampere at five volts. The new 201-A and 301-A tubes operate on from three to five volts, and use only one quarter of an ampere. For these tubes a special high resistance rheostat would be necessary. A twenty ohm rheostat has been placed on the market, but is usable only for the 201-A and 301-A tubes.

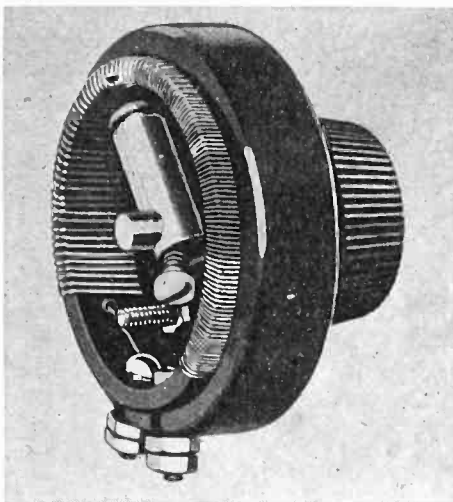
The WD 12-tube operates at  $1\frac{1}{2}$  volts and takes a quarter of an ampere. It should operate on one of the old style five ohm rheostats.

The new 199 and 299 tubes operate at three volts (two dry cells), and consume .06 ampere. When they are used it is customary to connect all in parallel, and use a twenty ohm rheostat of the same type developed for the "A" tubes. In addition to these tubes there are the DeForest, DV-6, and DV-6-A tubes taking eight-tenths and one-quarter of an ampere respectively. They each require separate rheostats, also.

\* \* \*

During the present change-over period there are, of course, a great number of the old style one-ampere five-volt tubes still being sold, so that the problem, as faced by the manufacturer, was complex.

The Crosley Manufacturing Company has just placed on the market a combined rheostat which will take care of any of the above tubes mentioned. Its name is the "Crosley Multistat." The resistance elements themselves consist of separate sections connected in series. Part of the fibre form is wound with the old style low resistance wire. This is on the side nearest the minimum resistance. When controlling the



Crosley Rheostat fits all tubes

one ampere, or WD 12 tubes, this is the section of rheostat which is automatically used by the operator. It has a resistance of about  $2\frac{1}{2}$  ohms, which is sufficient to control any of the tubes mentioned, excepting the low filament current tubes. The low voltage section of the form is wound with a finer and higher resistance wire than previously used, so that the combined winding in series gives a resistance it is possible to use the same "Multistat" to control the 201-A and 301-A tubes.

\* \* \*

When using the Multistat the operator does not know that he is using any piece of apparatus other than the old style of rheostat to use with a certain type of tubes is entirely eliminated. In other words, the Multistat is a graded resistance unit which will control and operate satisfactorily any of the tubes which are on the market at present. It can be used with the 199 or 299 tubes for any number arranged either individually or collectively. It is advisable to use a three-volt battery on these tubes.

## Radio Service Station

**W**ITH radio rapidly becoming a household necessity, comes a cry for better service and repair facilities.

All radio fans will be glad to hear that the Radio Corporation of America has announced the in-

auguration of a plan whereby their service and repair program will be greatly expanded.

Major repair shops are to be located in Chicago, New York and San Francisco, with sub-service stations at Cleveland, Boston, Philadelphia, Baltimore, Washington, New Orleans, Los Angeles and Seattle.

These service and repair stations will not only render service on their own products, but also will undertake radio repair work of all kinds.

## Got "Dixie" From Two Stations

**W**ITH nearly 600 radio broadcasting stations in the air, many of them at the same time, it is not unusual for an operator to pick up two or three stations at the same time. Then begins the delicate task of tuning out all but the desired station.

It is most unusual, however, for a fan to discover that two stations are playing the same tune in the same key and tempo.

This occurred recently according to a Providence, R. I., radio fan who wrote WGY, the Schenectady station of the General Electric Company that he had heard the Radio Four sing "Dixie" from WGY at the same time that WEAN, the station of the Shepard Company in Providence, was sending out a phonograph record of "Dixie," a banjo solo with piano accompaniment. Part of the letter follows:

"Just once you faded out and WEAN was playing a banjo solo with piano accompaniment, 'Way Down South in Dixie.' What was our surprise to hear your minstrels come in on the same song, in the same key and same tempo and altogether, the two companies so many miles apart, finished the verse and chorus."

The log of WGY showed that the Radio Four had sung "Dixie" on the night and at the time given by the correspondent and R. F. Shepard, vice-president of the Shepard Company has reported that his station broadcast the same number at that time.

(Continued from page 12)

by using a "ground antenna." This is a long insulated wire run in a shallow trench or on the surface of the ground. The ground wire should be run in the direction of the station from which the most signals are to be received and should preferably be several hundred feet long.

#### Shielding Necessary

It is also worth while to use various means to improve the sharpness of tuning of the receiving set. Then such interference as is picked up by the antenna will to some extent be filtered out before it reaches the telephone receivers. The receiving set itself should be thoroughly shielded to prevent the tuning coils and transformer windings from direct induction from the source of trouble.

Inductively coupled receiving sets should be preferable to single-circuit sets under these conditions.

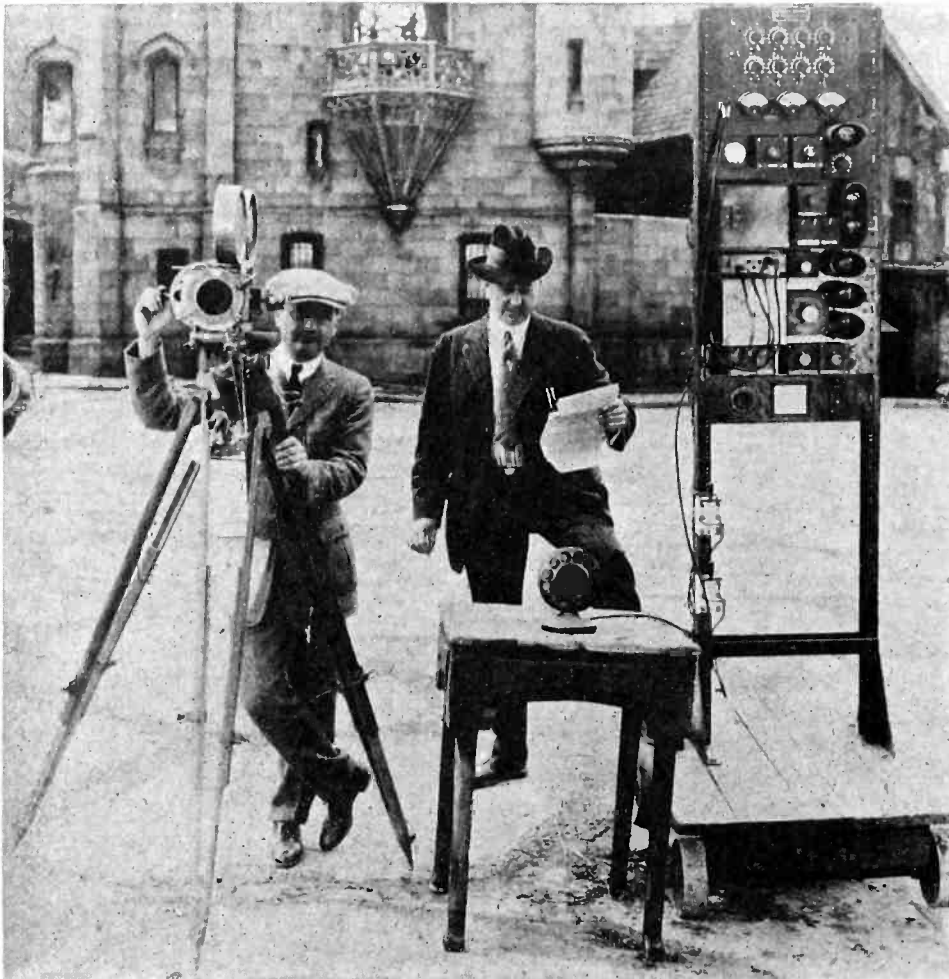
Radio-frequency amplification with sharply tuned inter-stage transformers is also helpful. A well-designed regenerative receiving set is also very selective. If the receiving set is one which has a series condenser in the antenna circuit, it is sometimes helpful to shunt the set with a high resistance (several thousand ohms) connected between the antenna and ground terminals. This may provide a shunt path for some of the interfering currents and avoid their entrance into the receiving set.

While the increase in the number of broadcasting stations in operation is an important factor in the radio situation this year, a still more valuable feature from the viewpoint of the listener is a very notable improvement in the quality of programs, and other features of operation of broadcast stations.

There are now about thirty Class B broadcasting stations operating

on individually-assigned frequencies between 1,000 and 550 kilocycles (300 and 545 meters). These stations furnish programs of high quality and employ transmitting sets of 500 to 1,000 watts power in order to secure the privilege of frequency assignment in this band.

The large number of Class A broadcasting stations are also distributed over a range of frequencies from 1,350 to 1,050 kilocycles (222 to 286 meters). A number of these stations as well as some of the Class C stations operating on 833 kilocycles (360 meters) have well-designed transmitting sets and carefully selected programs. The assignment of broadcasting stations to frequencies differing by at least 10 kilocycles, in accordance with the recommendations of the Second National Radio Conference, has resulted in a decrease in interference and an improvement in the quality of broadcast service which is obtainable by the average listener.



#### DIRECTING A MOVIE CROWD

The Universal Pictures Corporation, out at Universal City, California, has found a solution to one of the most vexing problems that confronts directors of mammoth motion picture productions. Wallace Worsely, while making scenes for "The Hunchback of Notre Dame," used a microphone and with loud speakers placed at convenient intervals around the "lot" thus was able to direct 2,500 persons taking part in the picture. The loud speakers were also used during halts in the making of the picture and music was picked up from a Los Angeles broadcasting station and amplified throughout the ten-acre lot where the Universal screen play is being produced.

#### Columbia Experiments With Radio

The radio broadcasting department of the American Telephone and Telegraph Company and the home study division of Columbia University announces a series of experiments to determine the educational value of radio broadcasting and the most acceptable way to present educational matter. Lectures on English literature have been prepared especially for radio delivery by Professor Hoxie N. Fairchild, supervisor of English of the home study division of Columbia University. The first three of these talks were given on July 17, 20 and 24 at 7:30 p. m. Each was broadcasted simultaneously through station WEAJ in New York City, WMAF at New Bedford, Mass., and WCAP in Washington, D. C., the stations being connected by long distance telephone lines.

Officials of the company state that they are convinced anything presented by radio must be highly interesting and that broadcasting of educational material is limited to such subjects as can be presented in an inspiring way. For this reason the Columbia University authorities who are co-operating with WEAJ have determined upon a series of lectures on English literature to begin with.





The WGY Instrumental Quartette, whose music forms a popular part of the concerts broadcast by WGY, the General Electric station of Schenectady, N. Y. Edward Rice is violinist and leader of the orchestra.



Schenectady Boy Scouts' orchestra recently heard from WGY station, Schenectady, N. Y., in connection with a Boy Scout program. Deputy Scout Commissioner C. E. Gregg is director of the boys' orchestra.

# Have Weekly Dramas Now

Station WGY Has Actors Trained for Radio—Wait Days for Applause

**A** TURN of the dial gains you admission to the radio drama. Tune your radio set to station WGY and at least one evening a week you will hear an entire play, sometimes a comedy-drama, a farce or melodrama.

For nearly a year now the General Electric Company station at Schenectady, N. Y., has been offering dramas by radio one night a week, and during that period the little group of actors making up the WGY players has had the largest audiences ever before accorded dramatic offerings. Just how large that audience is, is difficult to estimate. There are at least 2,000,000 radio sets in the country, and of that number 1,500,000 are almost nightly within range of WGY. Many of these sets have loud speakers or extra phones, enabling groups to listen in. The number of people who have heard the WGY players in the continuous run of 43 weeks, is anybody's guess.

## Gave "The Wolf"

Edward H. Smith and a half dozen actors were engaged about a year ago to produce Eugene Walter's play "The Wolf," at WGY. It was something entirely new; it was contended by many that the radio audience would be unable to follow the play with any

degree of interest because of the absence of scenery and because they could not see the players. Voice alone, it was contended, would not be sufficient to put over dramatic climaxes.

From the very first, the radio drama was a success. Letters veritably poured into the station, asking for more. Mr. Smith, formerly an actor and director on the professional stage, was engaged to produce one show a week.

This work was undertaken in a serious and thorough manner, and for months many of the greatest successes of the stage have been going into the air, reaching untold thousands who, but for radio, would never have had an opportunity of hearing the plays. During the past winter when farmers in many parts of the country were snowed in, cut off from the mails, the village, and in many cases their nearest neighbors, radio programs went out to relieve their loneliness. The farmer, the woodsman, the keeper of the lighthouse along the Atlantic Coast, were enthusiastic in expressing their appreciation of the dramas.

## Pioneers in the Art

Mr. Smith and his players have pioneered in the art of the radio drama; they have had to develop

a new technique. It was found necessary to make occasional changes in play manuscripts, especially where a climax depended upon sight for its appreciation. The entrance to or departure from a room by one of the characters had to be indicated by sound, as a closing door. A bell helps somewhat in announcing a newcomer to the invisible stage. Various sound devices were created to produce atmosphere. A telegraph key and an imitation of an engine whistle helped in a railway station scene; storms were stimulated by devices similar to those used on the stage.

The performer was greatly handicapped at first because he had depended a great deal upon the presence of his audience. Facial expressions were no help in interpretation; strong emotion could be conveyed only by vocal tone. To help the performer to a realization that his work was heard and appreciated, WGY requested the radio audience to write their "applause" and this they have done by the thousands. The actor now sees his audience but an audience made up of all conditions of men, and finds inspiration for his work in applause, not of hands clapping, but words written.

# WGY Gets 65,000 Fans' Letters

**S**INCE the inauguration of broadcasting by WGY, sixteen months ago, the General Electric Company has received 65,000 letters from listeners scattered over the United States and from points as widely apart as Hilo, Hawaii, and London, England, Vancouver, Canada and Valparaiso, Chile.

Some of these letters are typewritten and from the offices of business and professional men and some are penciled on scraps of paper from woodsmen and from forest rangers. All the letters acknowledge appreciation of the broadcasting service the General Electric Company is giving and, by the very fact that they are written, prove that the writer feels that the company addressed has a heart, is interested in the letters and receives them sympathetically and appreciatively.

## Warm Personal Missives

Until WGY began broadcasting, the mail of the General Electric Company was made up of the usual type of business and technical letters. Broadcasting began a veritable flood of warm, personal missives in many of which intimate facts relating to the family were unbosomed. The listener feels that the voice coming out of the air is that of a friend. It enters his home and provides pleasure and entertainment for all the members of the family circle and in acknowledging appreciation the writer addresses the station as a friend.

An elderly woman wrote WGY in part as follows:

"Accept my thanks for the two sermons yesterday. I am a poor, hopeless invalid and they were most comforting. I shall be waiting for the coming Sabbath for you have brought something into my life I had never expected to enjoy again."

Another, also an invalid, wrote: "I have been an invalid for over twelve years, confined to my wheelchair or couch nearly all that time and it is indeed a great privilege to hear the dear old hymns which I love so well and the word of God so faithfully proclaimed. It helps me forget my

suffering for I am a great sufferer . . . It is little I can do to help carry the burdens of the world but at least I can keep sweet and WGY helps me do it."

## Whole Family Enjoys It

A mother told how each of her children enjoy the WGY concerts, even an eighteen months' old infant, she said, was comforted when the phones were placed over its head. A blind girl related how she had grown melancholy and depressed and then radio came along and she now has a daily joy to anticipate.

WGY requested letters from listeners when the station was started because those in charge of the technical operation wanted to know the quality of the transmission and the range of the station. When these facts became known the announcers continued to ask for letters because these letters constitute the only applause which the radio performer gets, and a large number of complimentary letters is an inspiration. So far as the performer in radio station is concerned he has only the word of engineers that his solo is being radiated many miles. When the letters come he knows that the words sung in the radio station in the presence of only his accompanist and an announcer, have taken flight over many states and brought pleasure to countless homes.

These letters are also useful to the program manager for from them he learns what type of program appeals to the majority of listeners and the letters strongly influence his decisions in building up future programs.

## Liked Minstrel Show

After a recent minstrel show broadcast by WGY 1,400 letters were received by the station within 24 hours. Over 2,000 letters were received within a week referring to this particular entertainment. All letters are acknowledged in one way or another, sometimes by printed form and sometimes by special letter. In addition to the letters ad-

dressed to the station, many thousands are sent direct to the performer. Schnectady clergymen whose services have been broadcast get many messages from the radio audiences and frequently small sums of money are sent in by those who feel that they should be included when the contribution plate is passed.

## Summer Receiving Conditions

**A** GOODLY number of our readers are passing through their first radio summer and are experiencing the joys of static for the first time. Quite a few have written us asking what was wrong with their set that they couldn't hear from coast to coast as they had been accustomed to during the winter season.

The reason for all of this is due to weather conditions. Due to some cause or another, the real cause of which is still a matter of theory, radio transmitting and receiving ranges in the summer time are considerably reduced and interrupted by static discharges. Static appears on all wave lengths, seeming to increase on higher wavelengths and for this reason we cannot tune it out as we would an interfering transmitting station.

Since static and signals are amplified alike, the use of the loudspeaker should be discontinued in favor of the headphones during heavy static discharges. Vacuum tube amplification, especially audio, should be reduced to a minimum consistent with signal strength.

At any rate, during the summer season it is well to give up long distance or DX reception and confine one's activities to the reception of nearby broadcasting stations, using as small an aerial as possible, and without amplification. Amplification generally serves to increase the troublesome static in greater proportion.

# Frequency Trap for Novice

By M. WOLF

THE radio novice has read of many panaceas for the elimination of much of the interference which spoils his reception of broadcast entertainment, but his relief has been very small. Most of the methods are not practical for small receiving stations, though some of them may be for large stations. However, one particular method advocated shows some promise and should therefore be tried out by radio fans. This is the "frequency trap" which the novice has read so much about and which he has seen largely advertised.

First the novice should know the how and why of it. The frequency trap is nothing more than a simple coil and a condenser across it. Any coil and a variable condenser in parallel with it will act like a frequency trap if it is properly placed in the circuit.

Now the object of the frequency trap is to eliminate some of the interference in the receiver. It does this by trapping the undesirable signals which are causing the interference and preventing them from getting into the receiver. This may be accomplished if the frequency trap is placed in the antenna circuit in the position shown. All the signals which are traveling through the air strike the receiving antenna and flow down it into the receiver. All of these signals are not wanted because they create the interference, and only one of these signals is desired, as for example the signal from KDKA.

\* \* \*

Now as these signals flow down the antenna toward the receiver they have to pass the frequency trap. If this can be adjusted so that it traps all the undesired signals and only lets the signal from KDKA pass through it to the receiver the interference will be eliminated. This is exactly what the frequency trap is supposed to do. It does this because of a certain reason. When the trap condenser C is set at a certain value

the wavelength of the trap circuit will also have a certain value. Now, because of particular manner in which this trap circuit is connected it has a certain resistance to all currents which pass through it. To some of these currents it has a low resistance and so lets the currents pass through it to the receiver, while to other currents it has a very high resistance, and these currents have a hard time passing through it. But to one particular current it offers a tremendously great resistance and prevents it from passing through it. This current has the same wavelength as the trap circuit.

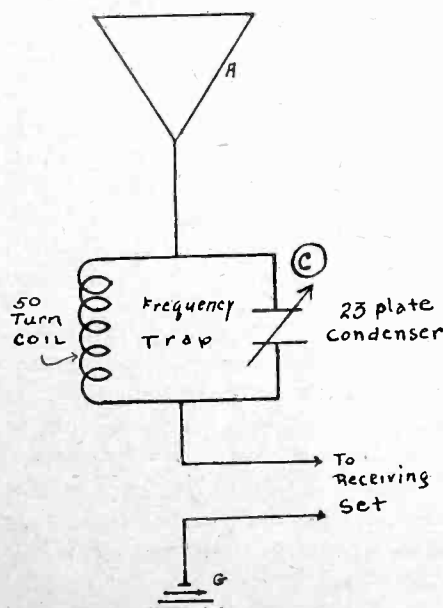
Now suppose the trap circuit is set so that its wavelength is 360 meters. Then if any signal having the wavelength of 360 meters comes down the antenna it will not pass through the wave trap, because the wave trap is set at 360 meters and has a tremendously high resistance at this wavelength, so that it will not permit this current to pass. It will permit other wavelengths to pass through it, therefore the wave trap eliminates any interference due to the 360-meter signal. Thus we see that because the frequency trap has such a high resistance at its own wavelength it will not let currents of this wavelength pass

through it, and in this way eliminates all interference at this wavelength.

\* \* \*

The novice will appreciate that the frequency trap circuit can only be adjusted to one particular wavelength at one time. Thus when he is receiving he can set the condenser C at a certain value, then the wave trap will eliminate the interference created by signals having the same wavelength as its own. But it is possible for there to be interference created by more than one wavelength. If the novice is receiving at 400 meters there may be interference created by a signal at 360 meters and also at 450 meters. If the frequency trap is set so that its wavelength is 360 meters it will eliminate the interference created by the 360 meter wave, but it will let the signal of 450 meters get by it as well as the 400 meter wave, thus there is still some interference at 450 meters, though not at 360 meters. In order to get rid of the 450 meter interference the same scheme is employed as for the 360 meter interference. A second frequency trap is placed in the antenna circuit, and this one is set at such a condenser value that the wavelength of the frequency trap is 450 meters. Now this circuit will have a tremendously high resistance at 450 meters and therefore it will not let the 450 meter signal pass through it to the receiving set. Thus we see that by the use of these two traps we have eliminated the 360 meters and 450 with the 400 meter signal, but have permitted the 400 meter signal to pass through the receiver.

Ordinarily it is not necessary to use more than two such traps because generally there is just one, or perhaps two strong interference signals. Such a scheme will therefore help the broadcast listener materially in reducing the interference. These devices are sold now on the market, but they are quite easily made. All the novice needs is a coil and a variable condenser, which he connects together as in Fig. 1. The coil may



Frequency Trap and Method of connecting same in Antenna

be a 35 or 50 turn honeycomb coil, or he may make a coil by winding about fifty turns on a 3-inch or 4-inch diameter tube of fibre or varnished cardboard. The wire may be No. 22 or No. 20 double cotton covered. His condenser need only be the standard 23-plate condensers, which are sold on the market quite cheaply. By connecting his coil and condenser in parallel as in Fig. 1 and inserting the combination which makes up his wave or frequency trap in the lead-in of the antenna he will be ready to operate. The second trap is connected up in the same way and inserted right after the first trap.

\* \* \*

In order to operate this now the novice should proceed as follows:

He should provide some means of short-circuiting the trap circuits so that they are out of the circuit without opening the antenna circuit. The best way is simply to use a simple single pole switch. When the switch is open the frequency trap is in circuit. When the switch is closed the trap is short-circuited—that is, it is not in the circuit, but the antenna circuit and receiving circuit are working anyhow. Now, with the switch closed so that the trap is not in circuit, the novice tunes his set so that he is receiving signals. If there is no interference there is no need of working the frequency trap. If there is interference he opens the switch and begins to turn the condenser handle of the frequency trap. As he turns he will notice that one or more of the interfering signals begins to get lower and lower and at a certain setting these signals disappear, without eliminating the desired signal.

What has happened is that as the condenser was tuned its frequency was varied and when it reached the same frequency as those of the interfering signals its resistance became so high that it prevented these interfering signals from passing through it to the receiver. When it prevents the interfering signals from passing through it it does not prevent the desired signal from passing through it to the receiver, because the desired signal has a different wavelength. In the same way the second frequency trap is worked.

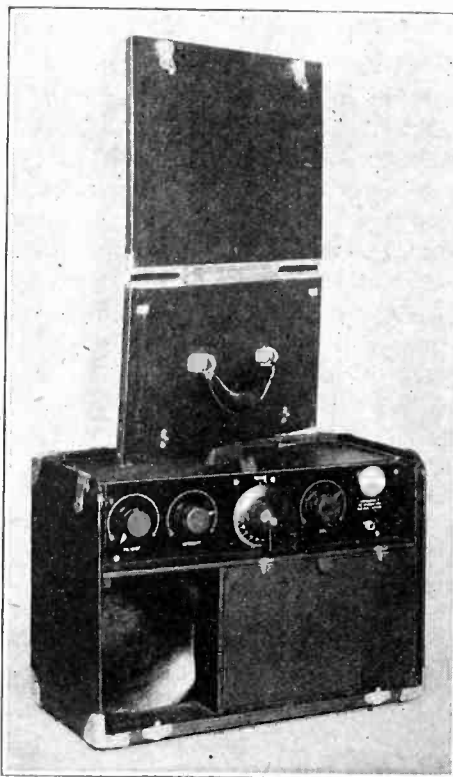
By the use of these devices it is possible to eliminate almost all of the very disturbing interference and really enjoy the broadcasting.

## The Portable Operadio-2 Embodies Many Novel Features

Many radio enthusiasts have looked for a truly portable receiver which may be operated any place without the necessity of stretching wires and using head phones.

It is complete in its entirety and is probably the most compact, really efficient receiver yet built which contains a scientific loud speaker.

The Operadio-2 is enclosed in a leather carrying case, dimensions,



17 inches long, 12 inches high, and 9 inches deep. It employs a radio frequency circuit and uses a wave bridge or "loop" for wave interception. This wave-bridge is built into the removable top and side and is plugged into the instrument when the set is in operation. It is free to rotate and being very directional makes the set most selective. It actually takes less than a minute to have this instrument in operation.

It uses either C-299 or UV-199 tubes, throughout, there being three steps of radio frequency and two of audio frequency.

Both the "A" and "B" dry batteries which are enclosed in a compartment are balanced in such a

manner that their actual life are the same. Under normal operating time there is one hundred fifty hours use of the set in the batteries, or about three months. Six No. 6 batteries supply the filament current and four 22½ volt batteries the plate current. A color code on the connecting wires to these batteries makes battery connections self explanatory.

All tuning is accomplished by capacity through one condenser and grid potential through a potentiometer. Both of these controls are in the center of the panel.

The "on" and "off" switch is really a rheostat in series with the filament or "A" battery. A voltmeter mounted on the panel allows the user to burn the filaments at the proper point, namely, 3 to 3½ volts. This feature is most practical as the life of both tubes and batteries is greatly extended.

The only other control knob is also a constant being set at the critical point of the particular detector tube used.

There are no radio or audio frequency controls of any sort. These usual controls have been eliminated by virtue of the circuit and in no way impairs the selectivity or range.

A phone jack is also on the panel which when used cuts out the loud speaker.

The instrument is very quiet and its range has in no way been cut down by its compactness. Each instrument is tested on loud speaker reception, on a station at least 700 miles distant in the summer time.

The Operadio Corporation of Chicago is placing on the market just such a portable. It may be used at home, indoors, in an automobile, on the water, or any place in the great outdoors. When not in use, at home, it may be put under cover out of the way, but is always ready to receive in less than a minute's time. It weighs, complete, about thirty-one pounds.

Everyone interested in the controversy between the copyrighted music publishers and the radio broadcasters is watching the progress of the newly formed National Association of Broadcasters, which is solidly behind every independent music publisher who contributes his music tax free for broadcasting. These independent music publishers realize the value of the publicity they are gaining and are glad to get the additional advertising.



# New and Novel Radio Patents



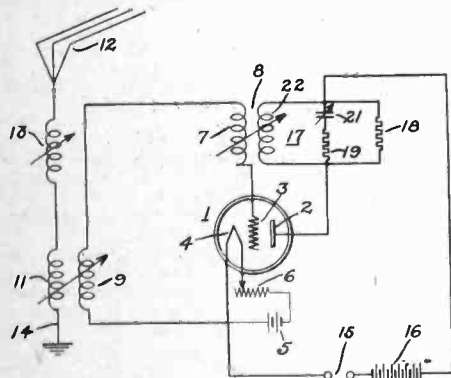
## AMPLIFYING DEVICE

(Patent No. 1,455,767, issued to Joseph Slepian, Swissvale, Pa., under date of May 15, 1923).

The principal object of this invention is to provide an improved wireless receiving system, wherein received signal impulses are enormously amplified.

Another object of this invention is to provide a wireless receiving system wherein undamped, continuous-wave signal impulses may be readily received without the customary heterodyning step heretofore employed.

According to this invention, it impresses the signal impulses to be detected upon a regenerative feed-back system adjusted to what, heretofore, has been considered an undesirable state, that is to say, one in which an increase in the amplitude of the oscillations causes a more than proportional increase in the feed-back power, tending to maintain the oscillations continuously.



Slepian Receiving System

The unbalanced condition of the system, which is effective following the application of the signal impulses, is made stable a predetermined time interval thereafter by means of thermally responsive elements having a time lag in their response.

With these and other objects and applications in view, this invention further consists in the details of construction and circuit arrangements hereinafter described and claimed and illustrated in the accompanying drawing wherein:

The single figure is a diagrammatic view of a wireless receiving system embodying this invention.

In the drawing, a regenerative feed-back system having an extremely large negative damping effect is shown as comprising a three-electrode tube 1 of well known design and input and output circuits therefore. The three-electrode tube 1 comprises an anode 2, a controlling grid member 3 and a hot cathode 4, the latter being energized from a source of direct-current energy 5 through a resistor 6.

The input or grid-filament circuit includes a coupling coil 7 of a feed-back transformer 8 and a coupling coil 9. The coupling coil 9 is inductively associated with a coupling coil 11 which is serially included in an antenna circuit that includes, in addition, an antenna 12, a tuning inductance coil 13 and a ground conductor 14.

An output or plate-filament circuit includes a translating device shown as a telephone receiver 15, a direct-current source of energy 16, a tuned circuit 17 and a thermally-responsive element 18 connected in shunt relation to the latter. The tuned circuit 17 comprises a series-connected, thermally-responsive resistor element 19 and a condenser 21 and a coupling coil 22 of the feed-back transformer 8 connected in shunt relation thereto. The feed-back coupling between the coupling coils 7 and 22 is so adjusted as to provide a regenerative system having an extremely large negative damping effect.

The thermally-responsive resistor element 18 is preferably one having an extremely large negative-temperature coefficient and a definite time lag in its response to changes in the amplitude of the alternating potential drop

across the tuned circuit 17, said time lag being of the order of the shortest essential period in the signal to be received, that is, about .015 of a second for telephony signals and a few hundredths of a second for telegraphy signals.

One such device having the above characteristics may be constructed of a fine-wire point resting on the surface of a relatively high-resistance material, such, for example, as fine porous porcelain which has been soaked in an electrolyte. In such device, when small voltages are applied, a high resistance appears, nearly all of which resides in the immediate neighborhood of the point. If, however, the voltage across the point is raised, the neighborhood thereof becomes heated and the resistance of the device falls rapidly.

## A NEW ELECTRIC CONDENSER

(Patent No. 15,642—re-issued July 3, 1923, to Charles F. Smith and Wm. H. Smith of Brooklyn, N. Y.)

This invention relates to electric condensers and has for its object to provide an improved simple and efficient condenser of this character, and also an improved method for the easy and expeditious making of such condensers. Condensers of improved type are intended primarily for use in wireless telegraphy or telephony but they are also adapted for other uses.

The condenser here illustrated comprises units any number of which may be assembled readily to form a condenser of the desired capacity. Each of the units shown comprises a base or body portion which gives the unit the requisite strength or stiffness; a flexible dielectric, preferably paper impregnated with insulating material, such as wax; and sheets of metal foil preferably non-resilient metal, such as lead or "tin-foil," though other metal foils may be used; such dielectric and metal foils being folded or wrapped together.

Fig. 1 is a detail view of the base or body portion of a condenser unit.

Fig. 2 is a perspective view showing the manner of assembling the metal foil and flexible insulating sheets of the unit.

Fig. 3 is a perspective view of a completed unit.

Figs. 4 and 5 are longitudinal and transverse sections, respectively, of the improved condenser unit.

Fig. 6 is an elevation showing a number of condenser units suitably mounted.

Referring to the drawing, in which some of the thin parts are necessarily somewhat exaggerated for clearness of illustration, 12 denotes the base or body portion of the improved condenser unit. This base or body is made of any material which has sufficient strength or stiffness and also the electrical characteristics required to act as a proper support. Make the body portion 12 of thin vulcanized fiber board, which has the requisite stiffness and also offers the advantage that it is not softened or affected by moisture, as ordinary pasteboard would be. Adjacent to its ends, the body portion 12 is provided with holes 13, adapted to receive eyelets 14. To make the improved condenser

shown in the drawing, then take a strip of flexible dielectric 15, for instance waxed paper, and fold it upon itself at the center, as indicated in Fig. 2; a sheet of metal foil 16, with a lead 17 projecting therefrom at one side, is placed between the two layers of the folded or doubled sheet of dielectric 15, so that the same surface of said sheet 15 (the inner surface) will be adapted to engage both surfaces (the upper and the lower surface) of said sheet of metal foil 16. On top of the folded dielectric sheet 15, so as to be in contact with its upper or outer surface, is placed a second sheet of metal foil 18, similar to the sheet 16, except that the lead 19 of the sheet 18 and the lead 17 of the sheet 16 project from the folded dielectric sheet 15 at opposite sides thereof. The sheets 16 and 18 of metal foil are smaller in size than each of the halves or plies of the folded dielectric, so that the edges of the latter extend beyond the sheets of metal foil to prevent short-circuiting. Preferably as shown in Fig. 2, the leads 17, 19 are placed adjacent to the fold connecting the two plies of the dielectric sheet 15; this gives them a more protected position during the wrapping of the dielectric and of the metal foil. While we have shown these 17, 19 as integral with the respective metal foil sheets 16 and 18, this is not essential.

FIGURE 1

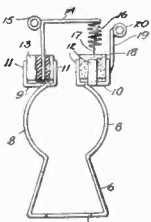


FIGURE 2

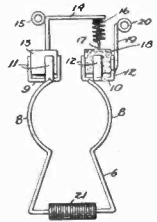


FIGURE 4

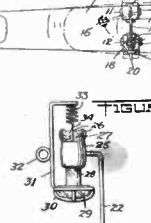


FIGURE 3

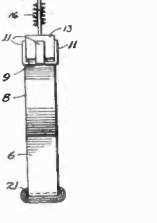
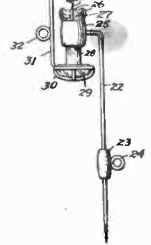


FIGURE 5



Wireless Detector

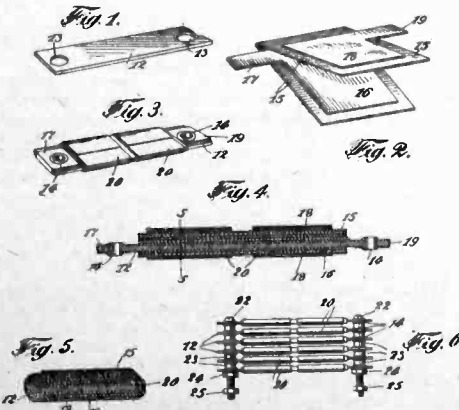
## ANOTHER WIRELESS DETECTOR

(Patent No. 1,460,734, issued to William Harry Ruf, Roselle Park, N. J., under date of July 3, 1923.)

This invention relates to wireless detectors, more particular purpose being to give the detector such form that during its active use it may be readily carried around upon the person without causing inconvenience to the individual carrying it, and also to confer upon the detector a high degree of sensitiveness and to give the operator a special and immediate control over its sensitiveness, not generally attained in the use of a wireless detector.

Figure 1 is a side view showing a form of device to be carried like a finger ring; the figure being mainly an elevation, one of the parts being shown partly in section.

Figure 2 is a side elevation of the mechanism appearing in Figure 1, and shows the addition of an inductance winding for adapting the detector for use with electromagnetic waves of great length.



A New Fixed Condenser

Figure 3 is an edge view of the mechanism shown in Figure 2.

Figure 4 is a plan view of the detector shown in Figures 1 to 3 inclusive, and illustrates how the detector is mounted upon and carried by the operator's finger.

Figure 5 is a side elevation of another form of the invention adapted in this instance for use as a scarf pin.

A clip frame 6, made of metal and having the form of a yoke, is provided with slots one of which is shown at 7, and is further provided with a pair of oppositely disposed portions 8, 8, each of arcuate form. These portions carry crown settings 9 and 10, the crown setting 9 being provided with upwardly extending fingers 11 integral with it, and the crown setting 10 being similarly provided with fingers 12.

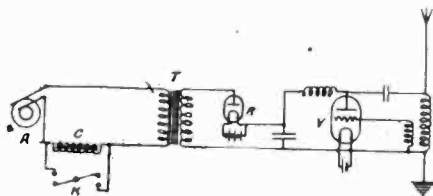
Fitted neatly into the crown setting 9 and held firmly by the fingers 11 thereof is a block 13, having a substantially cubical form and made of insulating material, such as hard rubber or bakelite. The block 13 carries a metallic stem 14, having substantially the form of an inverted L, and provided with an eye 15, adapted for use as a binding post. The stem 14 supports a whisker 16, having the form of a helical winding of wire provided with a point 17. The whisker stem 14 is by means of the block 13 insulated from the crown setting 9 and metallic parts immediately connected therewith.

The crown setting 10 carries a crystal of galena, silicon or the like, in the form of a block 18, upon which the point 17 rests lightly.

The crown setting 10 carries a stem 19 extending upwardly from it and terminating in an eye 20, serving the purpose of a binding post.

As inductance winding 21 may be added, if desired, as indicated in Figure 2. This winding, when used, is located within the slots one which appears at 7, in Figure 1. The winding 21 is for the purpose of adding inductance, in order to adapt the detector for use in connection with waves of great length. It does not show the electric connections for the winding 21, or for the other parts, as they constitute no part of this invention.

The detector as a whole is fitted upon the operator's finger 22, and is worn somewhat after the manner of a finger ring.



Wireless Transmitter

**WIRELESS TRANSMITTER**

(Patent No. 1,454,598, issued to Wm. Theodore Ditcham, Twickenham, England, assignor to Radio Corp. of America, under date of May 8, 1923.)

The object of this invention is to provide an improved valve transmitter in which the transmission of the interfering noises known as key clicks may be obviated and the valve or valves may be relieved of the full load during the spacing periods of the Morse characters.

According to this invention I connect in the primary power circuit of a valve transmitter a choke coil if the primary current is alternating, or a resistance if the primary current is direct, and I provide a key or switch by means of which this choke coil or resistance may be shortcircuited for the purpose of signaling. The choke or resistance should be of such a value that when it is not shortcircuited the valve will continue to oscillate but will only generate a small current compared to its normal working current. Thus signals can be transmitted by varying the strength of the oscillations without stopping their production or sensibly varying their frequency.

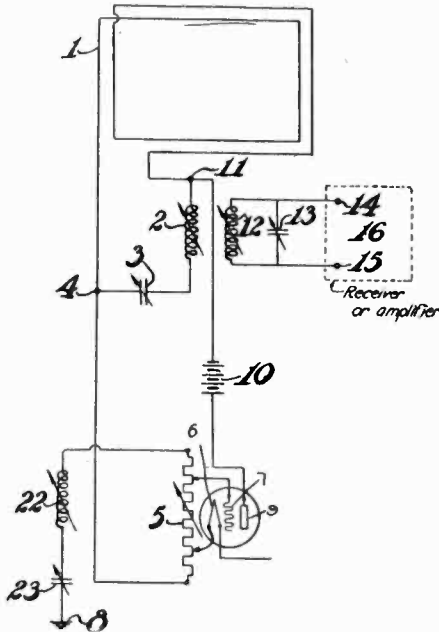
As illustrated by the accompanying diagram, C is an iron cored choke coil inserted in the circuit of an alternator A and K is a key by which it can be shortcircuited. T is a transformer, R a rectifier and V the oscillating valve.

**DIRECTIONAL RADIO RECEIVING SYSTEM**

(Patent No. 1,460,801, issued to Robert H. Marriott, Bremerton, Wash., under date of July 3, 1923.)

This invention relates to radio systems having for its object the unidirectional control of the receipt of signals. To get a unidirectional receiving arrangement combine two-directional characteristics of a periodic loop antenna with the four-direction characteristics of the loop to ground, in the loop circuit via a two-directional repeater, to neutralize one of the two-directional characteristics of the loop.

This arrangement eliminates the separate open antenna which have been used with periodic loops for unidirectional effects and is less critical for adjustment.



Directional Radio Receiving System

In the accompanying diagram shown the type of apparatus and the manner of assembling and connecting it to secure the desired result.

In the diagram; antenna 1, inductance 2, and condenser 3, comprises a loop antenna circuit. The loop circuit is connected to ground 8 through a path 4, 5, 22, 23 which is coupled across a portion of resistance 5 to the filament 6 and grid 7 of a thermionic repeater. 22 represents an inductance and 23 a capacity. The plate circuit coupling to the loop circuit is completed by the connection of plate 9 and battery 10 to a point 11 in the loop circuit. The loop circuit is coupled by inductance 2 to inductance 12 of the circuit containing 12 and condenser 13. The circuit 12, 13 is connected at 14 and 15 to a radio detector 16.

Radio waves from one direction in the plate of the loop set up currents in the loop circuit, 1, 2, 3 and in the loop to ground circuit, 1, 4, 5, 22, 23, 8. By a coupling as shown in this figure across a portion of resistance 5, the effects in 1, 4, 5, 22, 23, 8 are impressed on the repeater 6, 7, 9, 10 and repeated in the loop circuit through connections 4 and 11 to neutralize the loop circuit currents. Radio waves from the opposite direction set up loop circuit currents and currents to ground which when repeated do not neutralize the loop circuit currents and the combined current effects are transferred to the detector 16 via the coupling 2 to 12 and circuit 12, 13.

**ELECTRICAL CONDENSER**

(Patent No. 1,452,610, issued to Morris Klossner of New York City, under date of April 24, 1923.)

This invention relates to electrical condensers, and has for an object the provision of an apparatus of this character which is of continuously variable capacity whereby the tension may be varied to meet numerous

requirements; a further object being to provide an apparatus which is of such air-tight construction as to be capable of containing either compressed air or any adaptable gas capable of being used in electrical condensers.

In the accompanying drawings Figure 1 is an end view. Figure 2 is a vertical sectional view taken on the line 2-2 of Fig. 1, and Fig. 3 is a cross sectional view taken on the line 3-3 of Fig. 2.

In the example of invention shown by drawings, 1 indicates a metal cylinder having fixed at each end a head 2, by means of any suitable air-tight joint.

Leading horizontally and centrally through each head 2, and fixed thereto by an air-tight joint, is a plug 3 composed of insulating material of any suitable variety. These plugs respectively have fixed thereto an outwardly extended shaft-section 4, having on its inner end a hearing-cup 5, for loosely supporting a longitudinal shaft 6 which carries a set of fixed depending sheet metal segments of leaves 7 which, by their own weight, are maintained in suspended position as indicated by Fig. 3 of the drawings.

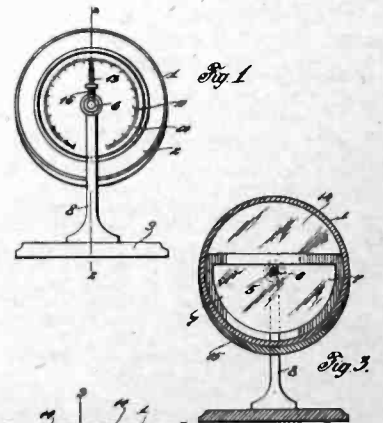
The shaft-sections 4 are rotatably mounted in standards 8 and 8a, which are fixed to a wooden base 9. Fixed to the outer end of one of the shaft-sections 4 is a knob 10 composed of insulating material, whereby the cylinder 1 may be rotated.

Fastened to the plug 3 which is adjacent to the knob 10 is a dial 11, having a scale 12, which registers with a fixed pointer 13 extended upwardly from the standard 8.

Secured across the inner wall of the cylinder 1, and having their straight-line edges normally over and parallel with the straight-line edges of the leaves 7, is a set of segmental plates or leaves 14, these are adapted to inter-leave with said leaves 7 when the cylinder is turned by means of a knob 10. The leaves 14 are maintained in their normal position, shown by Fig. 3 of the drawings, by means of a balance weight 15 located on the cylinder 1 at a point diametrically opposite said leaves, and said cylinder may be turned to any arbitrarily selected position by means of the knob 10, and it may be maintained in set position by means of a set-screw 16, which is threaded through the head of the standard 8 and bears on the shaft-section 4.

One head 2, of the cylinder is provided with an adaptable check-valve 17, through which compressed air or gas may be injected into the device, said valve being maintained normally closed by means of a spring 18, thus maintaining the cylinder air and gas-tight when the apparatus is in use.

ELECTRICAL CONDENSER  
Filed Sept. 2 1920



Electrical Condenser

## Science of Selling

(Continued from page 18)

invites a comparative test. The new loud speaker is connected to the extra set of binding posts on the instrument and while the reproduction is in progress, he switches instantly from one to the other. If there is the slightest difference in quality or in volume between the two, it will show up immediately to an unbiased listener, and should the listener be prejudiced in favor of the product he has already adopted, an absolutely convincing test is to ask him with others, if possible, to stand a few feet away with their backs to the instruments; then while the reproduction is in progress he switches from one to the other, identifying each by calling out No. 1 and No. 2, when switching, and after this test, asking the individual listeners to assert their preference. In five minutes with such a plan it is possible to convey to the dealer all the information that he needs to know about the qualities of the product.

He can see it, examine it, and most important of all, listen to it in comparison with others. Of course, a salesman with an inferior product would hardly dare to make or invite such a test, but with a superior product and where the sale is to be made on merits, such a testing outfit is absolutely invaluable for this purpose.

Should the dealer bring up the point that he is not sure that such a test is absolutely identical to a radio reception test, the salesman can show him several letters from responsible testing laboratories and dealers who have had the opportunity to make a comparison between the two methods of testing and have found that a comparison of two instruments made with the demonstrator shows up in precisely the same way as when made with a radio receiver under correct conditions. If he still is not satisfied the test can be repeated for him with a radio receiver.

### Small Portable Outfit

The Atlas Amplitone Demonstrator consists of a small portable phonograph with an electric

reproducing apparatus substituted for the sound box, tone arm and tone chamber as ordinarily used. All of the apparatus, wiring and batteries are concealed in the compartment with the spring motor, only those parts such as the electrical tone arm, output binding posts, control switch lever and volume control rheostat being visible.

Standard dry batteries such as may be purchased at any good retail electric store are used for furnishing the current in this outfit. They are so arranged that when they are pushed into the special compartment provided for them behind the hinged door, the connections are automatically made as in portable flash lights.

The whole outfit is extremely compact and is said to be very ruggedly constructed. The records are carried on an extension of the turn-table shaft of the phonograph motor, where they are always available.

The case is leather covered and presents a very neat appearance. The weight of the outfit is only twenty-three pounds, so that it can be easily carried. The demonstrator is fully protected by patents. The sales forces of the Multiple Electric Products Co., Inc., are being equipped as rapidly as possible with these demonstrators for use in demonstrating the Atlas Amplitone Loud Speaker and Atlas Head Phones, and their reports from the field indicate phenomenal results wherever the demonstrator is used.

## WMH Resumes Program

**R**ADIO broadcasting station WMH of the Precision Equipment Company, Cincinnati, has resumed its radio programs. This station was one of the first in America to broadcast reproduced music and Powell Crossley, Jr., the new president of the company, has arranged with W. W. Boes, the manager to give daily programs at noon and at four in the afternoon on Tuesday and Friday.

There will be no broadcasting from this station, however, on Saturday and Sunday. Mr. Boes holds a commercial operator's license and has been interested in radio for a number of years.

The radio broadcasting equipment at WMH has a fifty watt oscillator and a fifty watt modulator with one thousand volts on the plate.

WMH has been heard in twenty states and the reports from the listeners tell of their appreciation of this noonday service when so many of the people are resting at lunch time. Some of the letters come from factories where hundreds of workers are enjoying their lunches while the loud speaker amplifies the concert.



Talk  
Number  
6

**SIGNAL**

*Facts from the Factory*

Don't let exaggerated stories of summer "static" dampen your enthusiasm for Radio at this season. On most summer nights—especially in dry weather—receiving is as good as at any other time of the year. But you must have quality apparatus—like SIGNAL, for instance.

Most of the interference attributed to static and other air disturbances is due to apparatus incorrectly, ignorantly, or carelessly manufactured. You never—at any season of the year—can get satisfaction with such apparatus.

But with SIGNAL Radio Sets, or parts, it's different. Every SIGNAL item is made in a factory that has grown up with "wireless." Utmost precision marks even the smallest detail of manufacture. With SIGNAL, service is inbuilt. SIGNAL has stood the test of time.

Say SIGNAL, when you're buying radio equipment, and you'll "listen in" with satisfaction the whole year through.

**SIGNAL** Electric Mfg. Co.

Factory and General Offices  
1901 Broadway, Menominee, Mich.

Atlanta	Cleveland	Pittsburgh
Boston	Minneapolis	St. Louis
Chicago	New York	San Francisco
Montreal	Philadelphia	Toronto

(2423)

### INFORMATION COUPON

Signal Electric Mfg. Co.,  
1901 Broadway,  
Menominee, Mich.

Please send catalog and bulletins, giving complete information about SIGNAL Radio equipment to name and address written in margin—without obligation.

**25<sup>c</sup> Trouble With Your Set?**  
 Ever think how important the Grid Circuit is?  
 Mica insulation, wax treated Grid Condenser. Can be used as bi-pass condenser on amplifying transformers, etc.  
 POSTPAID  
 DEALERS—ATTRACTIVE PROPOSITION

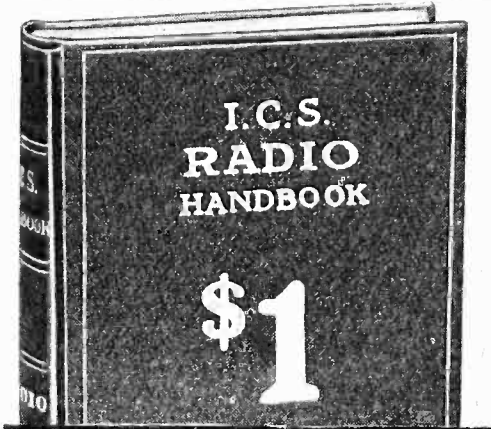
**DX RADIO CO**  
NOT INC.

DEPT. S OF ILLINOIS SUMMIT, ILL.

**Radio Set for Baby's Go-Bi-Bi**

**A**N "Ace V" receiving set made by the Precision Equipment Company, Cincinnati, was installed on Edward Snyder's "Go-Bi-Bi" and the child now hears radio music as he learns to walk. The mother sets the dials for the program she wants the child to hear and it is said the baby listens to it with great interest.

Many children in Cincinnati now have their go-bi-bi's equipped with radio and the parents do not have to give them much attention when WLW and WMH are broadcasting. Out of town stations are also heard although the little aerial makes it a little harder to tune-in the distant stations. Our cover shows Master Snyder and his outfit.



*This*  
**RADIO BOOK**  
*will save you money!*

Compiled by HARRY F. DART, B.S.E.E.  
 Formerly with the Western Electric Co.,  
 and U. S. Army Instructor of Radio  
 Technically edited by F. H. DOANE

**JUST** off the press! The greatest book on radio ever written. Price only \$1. Filled with sound, practical, tested information for every radio fan, from beginner to hard-boiled owl. Written, compiled and edited by radio experts of national reputation.

Every page tells you something useful. And there are 562 pages! More than 150 illustrations and diagrams!

You may dip into this I. C. S. Radio Handbook at random, or hunt up special information you want, or read it right through. Different types of receiving and sending hook-ups are explained; proposed insurance regulations; lists of broadcasting stations; radio compass stations; interesting experiments; definitions; codes and symbols; technical data and thousands of suggestions for getting more pleasure out of radio. Will save you from wasting money on things that won't work.

Send \$1 to-day and get this 562-page I.C.S. Radio Handbook before you spend another cent on parts. Money back if not satisfied.

TEAR OUT HERE

INTERNATIONAL CORRESPONDENCE SCHOOLS  
 Box 8290, Scranton, Penna.

I enclose One Dollar. Please send me —postpaid—the 562-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....  
 Address.....

*a Chi-Rad Special!*  
**for W.D. 11 tubes—**

Standard, threaded rubber, Willard's specially adapted for use with W. D. 11 tubes. Supply current at 2 volts to one W. D. 11 tube for 210 hours on a single charge. Rechargeable. Brand new, size 4x5½x7 inches—Chi-Rad guaranteed.

2-Volt Willard Charged.....\$7.50  
 2-Volt Willard Dry..... 6.50

These same Willards can be adapted to deliver 8 volts for pure D. C. for C. W. Transmitters. Better than a generator because no filter is necessary. Much less expensive.

In lots of 40 (320 volts), \$160.00

(Better prices on larger quantities.)

Specify dry or charged when ordering.

**Chicago Radio Apparatus Co.**  
 415 S Dearborn St., Chicago, Ill.

**"THE BETTER RADIO"**  
**PIERAGGIO**

The Perasco Kewpie



Ideal for vacation or home use. Its special circuit makes possible the reception of stations without an aerial of any description. Any tube may be used with equal efficiency. Range 1,000 miles.

Perasco Kewpie .....\$25

(Descriptive folder sent on request)  
 Special Discount to Dealers

**PERRY RADIO SUPPLY CO.**  
 218 WASHINGTON BLVD.,  
 RIVER FOREST, ILL.

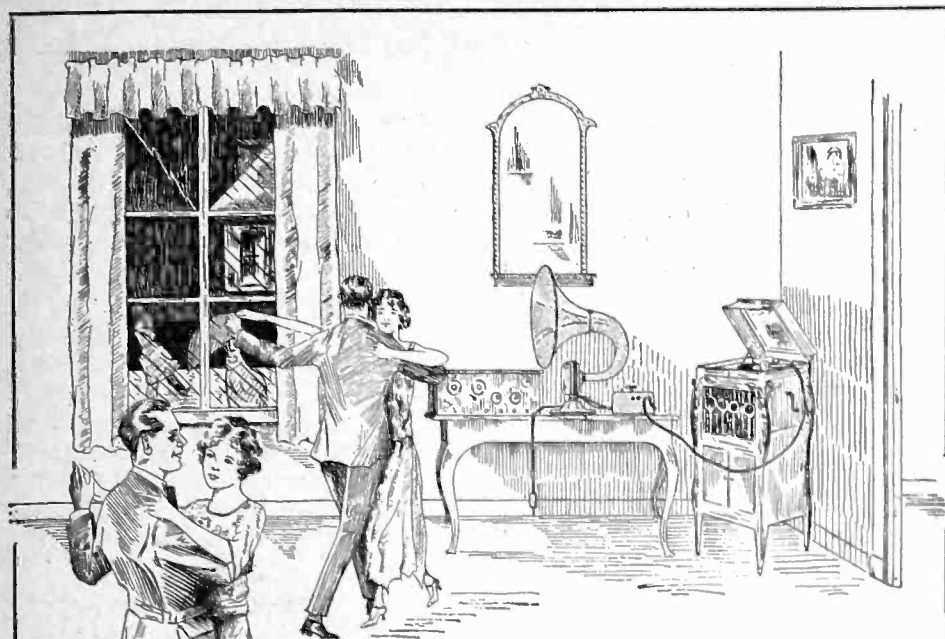
**New York Theatre's WEA F Concert**

"In Our Broadcasting Studio," one of the musical features of the Capitol Theatre program, New York, has been so well received that S. L. Rothafel has decided to offer a second edition of this number, introducing some of the Capitol Theatre artists who broadcast through Station WEA F of the New York Telephone and Telegraph Company direct from the Capitol Theatre studio every Sunday evening.

William Axt (Dr. Billy) presided at the piano; the Capitol Mixed Quartette, Betsy Ayres, Louise Scheerer, Patrick Keller and Ray Coffy, sang "Allah's Holiday," from "Katinka," and "Swinging Down the Lane," by Isham Jones and Gus Kahn; Evelyn Herbert sang "My Hero," from "The Chocolate Soldier"; "I'm Falling In Love With Someone," from "Naughty Marietta," was sung by William Robyn; "Comin' Through the Rye," by Betsy Ayres, and "Duna," by Douglas Stanbury. Yasha Bunchuk, solo cellist; Eugen Ormandy, concertmaster of the Capitol Grand Orchestra, and Carl Scheutze, harpist, also appeared in this number.

A correspondent of WGY who has a beautiful faith in the efficacy of radio in the capture of criminals recently requested the General Electric Company station to announce that a reward of \$50 would be paid for the arrest of the "parties" guilty of chipping words off the family grave stone.





## Another Use for Loud Speaker

When the static is too great for radio reception, your AUDIOPHONE Loud Speaker can be used with the Bristol Phonograph Record Reproducer on your phonograph. Then you may have concert or dance program without interruption.

Attached instantly without mutilating the instrument in any way—the Bristol Phonograph Record Reproducer can be used with any make of phonograph.

Equipped with such an outfit, there are no disappointments—it is always ready—never fails. For dance music you have the equivalent of an orchestra, but without the expense.

The tone of the phonograph thus amplified through the AUDIOPHONE has volume enough to fill large rooms and the quality is round—smooth—and beautiful—entirely free from mechanical noises.

Remember that the same AUDIOPHONE Loud Speaker is used in common for both radio reception and phonograph record reproduction.

Write for Bulletin 3007-P and we will advise where you may hear a demonstration.



TRADE MARK  
**AUDIOPHONE**  
REG. U. S. PAT. OFFICE

## The Bristol Company

WATERBURY, CONN.

BRANCH OFFICES:

Boston                      New York                      Pittsburgh                      Philadelphia  
Detroit                      Chicago                      St. Louis                      San Francisco

## General Has Radio With Meals

The installation of a radio outfit in the private car Berwick, in which General Henri J. E. Gouraud, the "Lion of the Argonne," and his party are making a tour of the United States, marks the first time a radio has been installed in a train coach making a transcontinental trip. The radio will enable the famous French general, who is the guest for six weeks of the Rainbow

Division Veterans, to get greetings from cities as his train approaches them.

Pittsburgh was the first city picked up by the general's party. The private car Berwick was then in the Union Station in Washington. Donald Stevens, engineer for the Radio Corporation of America, who has placed the radio in the private car, installing a unique aerial from one ventilator to another on the roof of the coach performed something absolutely new in radio engineering.



## Announcing— "Burgess 'A' Dry Battery" "A Laboratory Product"

**T**HIS new dry battery for the "A" or filament circuits of dry cell vacuum tubes is a Burgess achievement which will not soon be forgotten.

Burgess has perfected a dry "A" battery which will give over twice the life, on vacuum tube service, of any ordinary No. 6 Ignition dry cell. It has a rapid recovery to high voltage after short periods of rest and practically no voltage lost when not in use.

This Burgess "A" dry battery will lead the "A" battery field just as the Burgess dry "B" battery has led in the field of "B" batteries. Ask any Radio Engineer about Burgess "B" Batteries.

Made only in single cell units. This makes it possible to wire up convenient combinations for all types of dry cell tubes, and eliminates the hazards and expense of multiple cell units.

**Ask for the Burgess "A" Battery** when you are equipping your new set or replacing your old dry batteries. Sold by all progressive radio dealers.

### BURGESS BATTERY COMPANY

Engineers—DRY BATTERIES—Manufacturers  
Flashlight—Radio—Ignition—Telephone

General Sales Office: Harris Trust Bldg., Chicago  
Laboratories and Works: Madison, Wisconsin

Branches:  
New York    Boston    Washington    St. Paul  
                  Kansas City                      New Orleans

In Canada: Gen'l Offices and Works: Niagara Falls, Ontario  
Branches: Toronto    Montreal    Winnipeg    St. John

"Ask any Radio Engineer"

# Railroad Fare



Student Winding a Stator

## To the Great Shops of **Coyne**

We pay your railroad fare to Chicago—the Electrical Center of the World—from any place in the United States. Grasp the opportunity to see the country at our expense. Come to Coyne—learn electricity in 3½ months. Get a complete training so you can make big money as Power Plant Operator, Superintendent, Telephone man, Construction worker, auto, truck or tractor electrician, battery man, radio expert, or you can go into business for yourself as electrical contractor, dealer, auto ignition or battery expert and make from \$3,000 to \$20,000 a year. Hundreds of our graduates today are making big money and you can do the same if you grasp this opportunity—act now.

## Learn Electricity In 3½ Months

No books or useless theory. You are trained on \$100,000 worth of electrical equipment. Everything from door bells to power plants. You work on motors, generators, house wiring, autos, batteries, radio, switch-boards, power plants—everything to make you an expert ready to step right into a position paying from \$45 to \$100 a week.

## Radio Course FREE

We include the following free with the regular course;

- (1) A complete course in auto, truck and tractor electricity and storage batteries. Greatest outlay of auto, electrical and battery equipment in the country.
- (2) Course in Radio—the marvel of the age. Constructing, installing and operating. You can build your own wireless telephone set.
- (3) A life scholarship in the Coyne school. You can stay as long as you wish and return for further training at any time in the future.

## Earn While You Learn

We help students to secure jobs to earn a good part of their expense while studying.

## Send Coupon Now

Don't delay a minute—send that coupon in right now for our big free catalog and full particulars of Free Railroad Fare offer. Act now!

B. W. COOKE, President

**Coyne Trade and Engineering School**  
Dept. 5993 1300-1310 W. Harrison St., CHICAGO

B. W. Cooke, Pres. Coyne Trade and Engineering School,  
Dept. 5993 1300-1310 W. Harrison St., Chicago, Ill.

Dear Sir: Please send me free your big catalog and full particulars of your special offer of Free Railroad Fare and two extra courses.

Name .....

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# Amateur Stations Get Restrictions

Department of Commerce Issues New Regulations for Operating in Evening and on Sundays

**A**PPARENTLY all radio disputes are to be settled by the Department of Commerce. At least it has issued a new decision with regard to the operation of amateur stations. Under the new regulations amateurs are forbidden to operate between 8 o'clock and 10:30 in the evening, local standard time, and during Sunday morning broadcast services.

Code interference has been a serious detriment to the enjoyment of music or lectures, ever since the advent of broadcasting. At first the "spark" boys outnumbered the owners of receiving sets, but now the balance is the other way. By inference the amateur can operate at all other times, so he is protected as well as the broadcast listener.

## Big Stations to Blame

Much of the code interference which was blamed upon amateurs was not rightfully chargeable to them, as it came from commercial stations engaged in sending communications to Washington, boats at sea and other points.

The new regulations contained in circular No. 252 read as follows:

"General and Restricted Amateur Radio Station Licenses will be issued permitting the use of any type of transmitter (CW, spark, AC-CW, ICW, unfiltered CW and phone) with the restriction that when using pure CW they are authorized to use wavelengths from 150 to 200 meters and when using spark, AC-CW, ICW, unfiltered CW and phone the wavelengths from 176 to 200 meters only can be used. The types of transmitters must be specified in the application and the license.

"Special Amateur Radio Station Licenses will be issued permitting the use of pure continuous wave transmitters only, authorizing the use of wavelengths from 150 to 200 meters.

"For the purpose of application to amateur stations pure CW is defined as follows:

## "CW" Defined

"A system of telegraphing by continuous oscillations, in which the power supply is substantially direct current, as obtained from (1) a generator, (2) a battery, or (3) a rectifier with an adequate filter. (A filter is not deemed adequate if the

supply modulation exceeds 5 per cent.)

"General Restricted and Special Amateur Stations are not permitted to use a transformer input exceeding one kilowatt, or equivalent of this power based upon watt input to plates if tubes are used. (Where input rating of tube is not specified by manufacturer this rating will be considered as double the manufacturers' output rating.)

"On licenses issued for amateur stations you will include the following:

"This station is not licensed to transmit between the hours of 8 and 10:30 p. m., local standard time, nor Sunday mornings during local church services."

"Special amateur stations must be operated by persons holding an extra first-grade amateur operator's license, or a commercial first-class operator's license, or a commercial extra first-class operator's license.

"Applicants must also meet the requirements of Regulation 63.

## Amateur Requirements

"A new class of amateur operator's license is hereby established to be known as 'Amateur Extra First Grade.'

"Licenses of this grade will be issued to persons passing the required special examination with a percentage of at least 75 and code speed in sending and receiving at least twenty words a minute, five characters to the word; who have had at least two years' experience as a licensed radio operator, and who have not been penalized for violations of the radio laws subsequent to the date of these regulations."

Regulation 63 referred to reads as follows: "Special amateur stations may be licensed by the Secretary of Commerce to use a longer wavelength and a higher power on special application. Applications for this class from amateurs with less than two years' experience in actual radio communication will not be approved. The application must state the experience and purpose of the applicant, the local conditions of radio communication, especially of maritime radio communication in the vicinity of the station, and a special license will be granted only if some substantial benefit to the art or to commerce apart from individual amusement seems probable."

## The Cat's Whiskers

By  
AUNT ENNA

A RADIO fan from Toronto  
Tried to cut into KYZ "pronto,"  
But the answer was "Nix"—  
They were next to his tricks,  
And the message read: "It's you  
we're onto."

\* \* \*  
"Talk about dumb-waiters," said  
John. "I ordered roundsteak for  
dinner today and the waiter brought  
me meat balls."

\* \* \*  
A busy guy is Henry Hurls—  
He's always picking up strange girls.  
But don't think he's a sporting gink—  
He just works at the skating rink.

\* \* \*  
Cat's Whiskers are the most sensi-  
tive things in the world. If you en-  
joy this column of cuteness tell us  
about it. We like to have our back  
stroked once in a while.

\* \* \*  
"Speaking of bathing in famous  
springs," said the tramp to the tour-  
ist, "I bathed in the spring of '94."

\* \* \*  
Ah, how well do I remember,  
It was on a hot September,  
When I heard a gentle tapping,  
Tapping at my little set.  
Some poor amateur, not doubting  
We would listen to his spouting,  
Some poor amateur was tapping  
And was trying me to get.

Then I listened for his message;  
What the dickens might it presage?  
And I tried my hand at guessage  
Till it made me pretty sore.  
And I still am wondering—wonder-  
ing—  
At his tappings and his blundering,  
And 'twill keep me guessing, guess-  
ing— Evermore.

\* \* \*  
Some of these days the Bolshevik  
government is going to turn loose its  
biggest barrage of propaganda via the  
radio. Then when you pick up your  
receiver you'll get something like  
this: "Moscow spevitchjky prslm  
zylksch proletarean bourgeoisie skis-  
kuy," or its equivalent. All of which  
should convert you into a Rooshian  
Red. But, seriously, what is there to  
prevent them from shooting their  
stuff into the air?

\* \* \*  
KYW, Chicago, is broadcasting a  
splendid "Column" every Friday  
night. They have adopted the catch  
phrase: "Long may the ether wave."  
The crooked brewers, however, beat  
them to the ether wave stuff some  
time ago, and those who know say  
the blame stuff has an awful under-  
tow.

\* \* \*  
"Don't condemn 'Yes, we have no  
bananas,' too much," remarked the  
Professor. "It is teaching a lot of  
our illiterates good English. Uncon-  
sciously they will learn that two  
negatives do not make an affirma-  
tive."

# HERE!



## Buy Only a Non-Selective Transformer

Good quality demands  
equal amplification for all  
frequencies within the voice  
range. The 3.7 to 1 ratio of  
the Type 231A amplifying  
Transformer gives maximum  
amplification without distor-  
tion, in multi-stage as well  
as in single stage amplifiers.

High ratio amplifying Transfor-  
mers are selective—and selective  
transformers have a resonant peak  
that causes serious distortion.

The General Radio Co.'s type 231A  
Transformer is suitable for use  
with UV-201A, 201, 199, WD-11, 12  
and tubes of similar plate im-  
pedance—\$5.00.

At your dealers, or direct  
from us: Two educational  
folders, "Quality Amplifica-  
tion" and "Quality Con-  
densers." Ask your dealer  
or write us. Send for free  
Radio Bulletin 914T.

## GENERAL RADIO CO.

Manufacturers of  
Radio and Electrical Laboratory  
Apparatus  
Cambridge, Mass.

Radio Fans—Write for Our Complete  
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## Standard Radio Corporation

MANUFACTURERS, DISTRIBUTORS  
AND JOBBERS

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**FROSTONES** Best for Your  
Radio Set  
Bring in  
programs clear and  
sweet; free from distor-  
tion. Highest quality—biggest val-  
ue. 2000 ohms, \$5; 3000 ohms, \$6.  
HERBERT W. FROST, Inc.  
154 W. Lake St. - Chicago

## More Reasons Why CROSLLEY Better—Cost Less Radio Products are so Much Better



By perfecting the new Crosley Duostat uni-  
versal filament control rheostat, the Crosley  
Manufacturing Company has made their in-  
struments more efficient because of the:

1. Efficient, smooth, uniform control of  
all tubes duo-wound to low and high  
resistance 10 to 20 ohms.
2. Plunger type contact actuated by a  
special spring, insuring uniform  
pressure at all times.
3. Spring washers producing uniform  
tension.
4. Positive rugged stop at zero resis-  
tance or "on" position.
5. Circuit interrupted at "off" position.
6. Resistance material having zero tem-  
perature co-efficient.
7. Windings protected by a black  
moulded shell of high heat insulat-  
ing material.
8. Electrical connections substantial in  
construction.
9. Design of parts to prevent warping.
10. Extremely low operating temperature  
with all tubes.

The outstanding performance of all Crosley  
Radio sets is due to the effective co-opera-  
tion of the new "Filament Control Rheostat"  
with other parts.

New Crosley Duostat above, price 85c.  
For Sale at Best Dealers Everywhere  
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CROSLLEY MANUFACTURING COMPANY  
823 Alfred St. Cincinnati, O.

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We Have Purchased

## 122,000 Pair

U. S. ARMY MUNSON LAST  
SHOES

Sizes 5½ to 12, which was the  
entire surplus stock of one of the  
largest U. S. Government shoe  
contractors.

This shoe is guaranteed one hundred per  
cent solid leather, color dark tan, bellows  
tongue, dirt and waterproof. The actual  
value of this shoe is \$6.00. Owing to this  
tremendous buy we can offer same to the  
public at \$2.95.

Send correct size. Pay postman on deli-  
very or send money order. If shoes are  
not as represented we will cheerfully re-  
fund your money promptly upon request.

## National Bay State Shoe Company

296 Broadway, New York, N. Y.

## SEND NO MONEY



A limited quantity of Standard Make,  
high grade, fully guaranteed type-  
writers at lowest price ever offered.

### FREE TRIAL

for five days in your own home. Easy  
monthly payments. No "red tape".  
Send Today for Free Booklet of Valu-  
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cial Sale Bulletin.

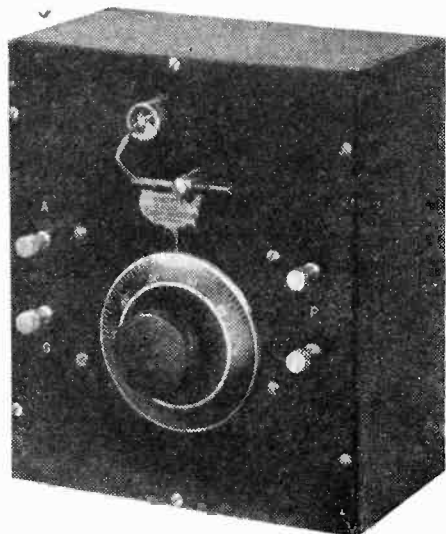
Smith Typewriter Sales Co.  
—360 E. Grand Ave., Chicago, Ill.

OTHERS MAY FOLLOW  
➔ NONE SHALL LEAD ➔

# Radio Topics

*The Greatest \$2.00 a Year Radio Publication  
in the Country*

THE MOST LIBERAL OFFER OF THEM ALL



A STATES RADIO CORPORATION  
CRYSTAL SET FREE

Your opportunity to get  
this Super Crystal Set

*With But Little Effort*

THREE one-year subscriptions or one three-year  
subscription \$6.00.

FOUR one-year subscriptions or one four-year  
subscription includes head phone \$8.00.

A CRYSTAL SET  
A CRYSTAL SET  
A CRYSTAL SET

# FREE

Radio Topics—1112 North Boulevard, Oak Park Ill.

Inclosed find six dollars in payment of the following three one-year subscriptions, for which I am to be sent one crystal set, or \$8.00 for four one-year subscriptions, which includes head phone.

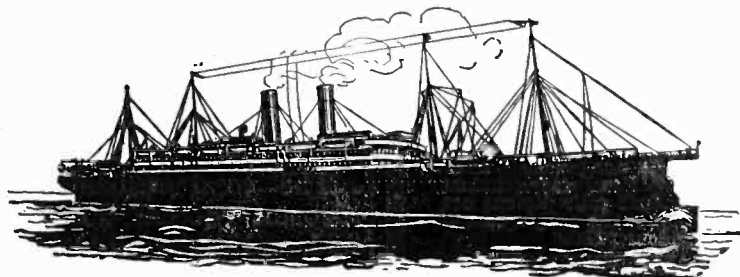
NAME .....	NAME .....	NAME .....
ADDRESS .....	ADDRESS .....	ADDRESS .....
CITY .....	CITY .....	CITY .....
STATE .....	STATE .....	STATE .....

ANNOUNCEMENT

THE  
**GREAT NORTHERN  
STEAMSHIP COMPANY**

(Incorporated)

**BOSTON, MASS.**



Announces that arrangements are now being made for monthly

**\$110 Round Trips to Europe**

Boston—Southampton

**\$110**

ONE WAY \$65

Connecting for

London, Liverpool, LeHavre

Boston—Gothenburg

**\$138**

ONE WAY \$75

Connecting for

Christiana, Stockholm, Helsingfors,  
Danzig, Riga, Copenhagen

THE ABOVE PRICES INCLUDE RAILROAD FARES TO POINTS  
AS FAR NORTH AS STOCKHOLM

The Company plans to carry approximately two thousand passengers  
monthly. Make your plans now for a trip during the coming season.

Lives of passengers will be protected by  
**EVER-WARM SAFETY-SUITS**  
which prevent drowning and protect from exposure

A round trip, with all expenses on ship-board included, at no more expense than a vacation right here at home! To meet the ever increasing demand in this country for an inexpensive and at the same time thoroughly comfortable and enjoyable trans-Atlantic voyage, is the prime object of the Great Northern Steamship Company. Organized by progressive business men who realize the exceptional opportunity offered now for inexpensive travel in Europe, the Company will cater to the thousands of

intelligent persons who wish to visit the battlefields of France, the Shakespeare country, Scandinavia, the Land of the Midnight Sun, etc. A chance of a lifetime! So it would seem; but it is more than that. The Company is building for permanent business, setting a new standard of high-class ocean travel on a one-class basis. That this can be done at a fair margin of profit has already been proved and is further outlined in our prospectus. You'll find it extremely interesting.

WE WILL ALSO SHOW YOU HOW YOU MAY BECOME A PART  
OWNER IN THE MOST TALKED-OF ENTERPRISE IN YEARS

Cut out and mail us with your name and address

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Information Dep't  
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Boston, Mass.

I am interested in securing full information regarding a trip to:

(Mark with a cross)	One way	Round trip
England	.....	.....
France	.....	.....
Germany	.....	.....
Sweden	.....	.....
Norway	.....	.....
Denmark	.....	.....
Baltic Provinces	.....	.....
Finland	.....	.....
Russia	.....	.....

Name .....

Street or R.f.d. ....

City or Town .....

State .....

A. Wikstrom  
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Edmunds Bldg., Suite 54  
Boston, Mass.

I am interested in becoming part owner in the Great Northern Steamship Company.

Please send me proposition and full particulars.

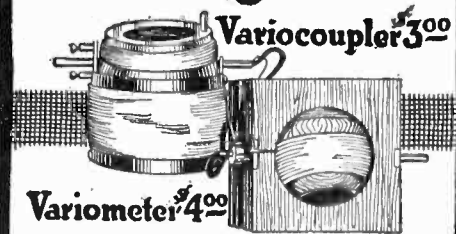
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**Both Selling Fast  
Because the Price  
is Right!**



Variometer \$4.00

Variocoupler \$3.00

Set of Three

2 Variometers \$8.00

1 Variocoupler \$3.00

**Special \$10.00**

Send Your Order in To-day

OUR NAME PROTECTS YOU

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Send sketch of model and description, for advice as to cost, search through prior United States patents, etc. Preliminary advice gladly furnished without charge.

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**Jones Fiddlestick Vernier**



Pat. Pend.

Price 10 Cents

Drill a 1/8 in. hole 3-16 in. from edge of each dial. No screws, no nuts, no washers or springs. Keep it in your hand and go from dial to dial. Eliminates all body capacity on fine tuning. Keeps your hand six inches from set. Mounted two dozen on a card for counter display.

Sample sent for twelve cents in stamps.

**Howard B. Jones**

612 S. Canal St., Chicago

Say you saw it in "Radio Topics" when writing to advertisers.

# The Receiver that Satisfies

## Telmaco

Type B-R Receiver



fully meets the requirements of the discriminating purchaser because of the following features:

**EFFICIENCY OF OPERATION:** Securing volume, distance (1500 miles with single tube is not unusual), selectivity. Broadcasting stations one-half mile distant are tuned out by a slight turn of condenser dial.

**EASE OF OPERATION** enabling the novice to secure satisfactory results.

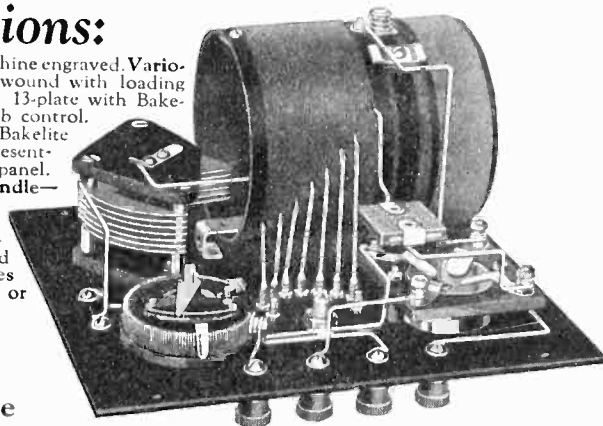
**HIGHEST QUALITY OF WORKMANSHIP AND MATERIALS.**

**PRICE** within the reach of everybody.

Manufactured exclusively for us by the Tri-City Radio Electric Supply Co., licensed under Armstrong U. S. Patent No. 1113149, October 6th, 1914.

### Specifications:

**Panel**—Formica, grained and machine engraved. **Vario-Coupler**—Telmaco special silk wound with loading inductance. **Condenser**—Special 13-plate with Bakelite ends. **Rheostat**—Single knob control. **Socket**—Highly nickeled shell, Bakelite base. **Dials**—are polished, presenting pleasing contrast with dull panel. **Telmaco Adjustable Vernier Handle**—secures extremely fine tuning and entirely eliminates body capacity effects. **Workmanship**—manufactured according to Telmaco's rigid specifications. **This Guarantees Your Satisfaction.** Either 6 volt or 1½ volt tube may be used.



TELMACO Type B-A Two Stage  
A. F. Amplifier

Matches the above in size and construction. The greatest Amplifier value on the market. Price \$20.00.

RADIO DIVISION

TELEPHONE MAINTENANCE CO.

20 S. Wells Street, Dept. C

Chicago, Illinois

Price \$25

The ultimate in value



Quality Radio Exclusively

Bona Fide Jobbers

If our salesmen have not reached you with our proposition, write or wire for it today

### Universal Rheostat

A RHEOSTAT designed by the Crosley Manufacturing Company for use with all known makes of vacuum tubes. The certain carefully graded part of the rheostat is wound, it is observed, with comparatively low resistance wire. It is on this portion of the rheostat that perfect control of the 200, 300, 201, 301, WD-11 and WD-12 tubes is found.

The balance of the rheostat is carefully wound with higher resistance wire for control of the 201-A, 301-A, DeForest DV-6, UV-199 and C-199 tubes.

The total resistance of this rheostat exceeds 20 ohms, it is said, and is the unique solution of the rheostat problem in connection with all makes of tubes. It enables the person building a receiving set to change from one kind of tube to another without need of worry about rheostat control.

### WLW Broadcasts Swimming Lessons

Stanley Brauninger completed his series of swimming lessons from station W L W of the Crosley Manufacturing Company, Cincinnati by giving a practical demonstration of the use of radio in teaching children how to enjoy the natatorial art. The children were in the pool at the Workhouse and Mr. Brauninger who is swimming director of the Y. M. C. A., got the children to line-up in the pool, and by means of a radio set and an amplifying horn, he told them from W L W studio just what to do. This is the first time that swimming lessons have been given by radio and the test was successful in every way.

Mrs. Maude Ballington Booth is attempting to have radio introduced in the prisons of the country. The leader of the Volunteers of America has introduced radio successfully into three prisons—Joliet, Ill.; Dannemora prison and Alleghany country prison, Pittsburgh, Pa., and she hopes to have it extended to the large penitentiaries throughout the country.

### FOR SALE A REAL TREAT FOR SALE

1-0 to 300 Jewell milliamperemeter, \$4.00; 1-0 to 500 Jewell milliamperemeter, \$4.00; 1-0 to 5 Jewell Radiation Ammeter, \$7.00; 1 Radio Corporation Inductance, \$7.50; 2 .0015 DeForest Variable Transmitting Condensers, \$8.00 each; 6 W. E. Sockets, 75c each; 2-5 watt transmitting tubes U V 202, \$4.00 each; 1 filament transformer 8-10-12 volt taps (home-made), \$2.50; 2 choke coils (home-made), \$5.00 for two; 1 Joy-Kelsey Microphone, \$3.00; 1 W. E. Modulation Transformer, \$3.00; 1 Boston Key \$4.00.

Above can be had all mounted on panel for \$85.00. The only thing necessary for immediate operation of set is motor-generator or C. W. transformer A. C. Or will sell individual parts.

Address Box X B, Radio Topics, Oak Park, Ill.

# May We Give You Any of These?—

It won't cost you a cent to get any of these things. Just secure a few subscriptions to Radio Topics and they are yours

*You, as a reader of RADIO TOPICS, know that you, as well as your friends, should be regular subscribers. Sign them up and get whatever you wish.*

*A well built variocoupler, complete with dial, which sells for \$6.50, will be mailed to you postpaid for 3 one-year subscriptions.*



*Manhattan 2,000 ohm phones sell for \$6.00. You may have a pair postpaid for 3 one-year subscriptions at \$2.00; total \$6.00.*

*A variometer, complete with dial, is also yours for 3 one-year subscriptions to RADIO TOPICS.*

You may also have a full set, consisting of a variocoupler and two variometers, with dials, whose value is about \$18.00, for only 8 one-year subscriptions.

Just send us subscriptions, either renewals, new ones or your own, whose total at our rate of \$2.00 per year equals the price of the item you want, and we'll send it immediately prepaid.

*All of the items listed on this page are fully guaranteed.*

*If there is something you want not listed, we'll arrange to get it.*

*A WorkRite splendid loudspeaker made of a composition and having a receiver in the base with extension cord. It costs \$12.00, and is yours for 6 one-year subscriptions.*

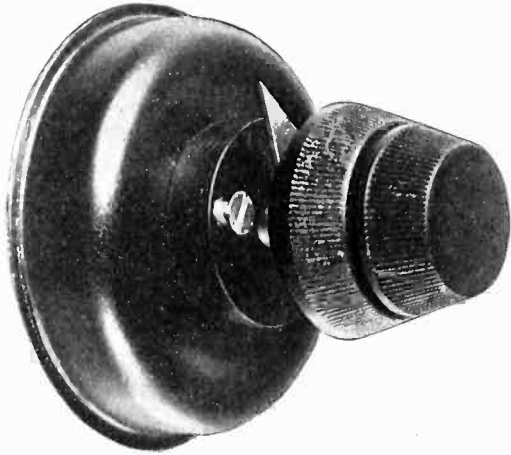
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*Address:* **RADIO TOPICS**

CIRCULATION MANAGER

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## As Noiseless and Smooth as a Bird Thru the Air

☐ Gone are the scratching and noises as you vary the current to your tubes.

☐ Can you imagine anything more perfect and smooth in operation than a resistance wire passing through a well of mercury?

☐ Then there is another wire which gives a vernier adjustment.

☐ No need to turn back the rheostat to shut off the tube; just a touch of the fingers and a bearing switch throws it in or out.

☐ There is also a Gollos Potentiometer on the same principle.

☐ They come ready for panel mounting and template furnished. A Gollos Mercury Rheostat sent postpaid for only.....\$2.00

*Dealers Desired*

# GOLLOS DEVICES, Not Inc.

*"Perfect Noiseless Rheostats"*

118 N. La Salle Street :: CHICAGO

Suite 704

## *The Gollos Mercury Rheostat*





of ILLINOIS  
SUMMIT, ILLINOIS

May 26, 1923.

Radio Topics,  
1112 No. Blvd.  
Oak Park, Ill.

Gentlemen:

Analyzing the quality of inquiries received ever since we have advertised in RADIO TOPICS, it has been proved conclusively that fifty-five per cent of the inquiries are from fruitful sources.

You will continue having our advertising, knowing well the value of a good "National Radio Monthly" and without fear of any "summer slump", with everybody striving to make this a RADIO SUMMER.

Sincerely yours,

DX RADIO COMPANY OF ILLINOIS

*Edward F. Spadoni*

EFS:FA

DEPENDABLE QUALITY

# "WORKRITE"

## TUNER TEAM



Here it is—The WorkRite Tuner Team—the most selective circuit possible. Two WorkRite Super Variometers made from polished mahogany and a WorkRite 180° Super Variocoupler made from molded Bakelite make up this wonderful team. Let the WorkRite Tuner Team get your station for you. Just look at these extremely low prices.

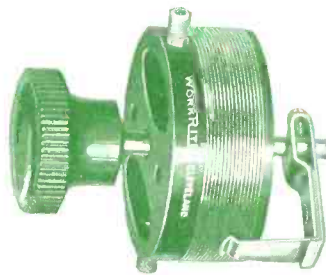


WorkRite Super Variometer..... Each \$3.50  
WorkRite 180° Super Variocoupler

## NEW WORKRITE SUPER VERNIER RHEOSTAT \$1.00

This instrument is the last word in Rheostats. 50,000 possible adjustments for \$1. The drum is molded and cannot shrink. No danger of the wires loosening.

Easy to mount on panel. Pushing the knob way in turns off filament. Turning the knob gives the very finest adjustment. Often a turn of 1/32 inch will clear up a station or separate two stations.



The WorkRite Super Vernier Rheostat is made with three different resistances so that there is a WorkRite Rheostat that will work with any Tube now on the market.

WorkRite Vernier Rheostat  
6 ohms .....\$1.00  
WorkRite Vernier Rheostat  
15 ohms .....\$1.10  
WorkRite Vernier Rheostat  
30 ohms .....\$1.25

## WORKRITE UV 199 TUBE ACCESSORIES ARE BEST

### WORKRITE RESISTANCE CARTRIDGE



No need to buy a new Rheostat to get the 30 ohms resistance required for the UV 199 Tubes, or the 15 ohms for the 201A and 301A Tubes. Just put a WorkRite Resistance Cartridge on the circuit with your old 5 or 25 ohm Rheostat. Price 15 or 25 ohm .....40c

### WORKRITE NON-MICROPHONIC SOCKET



Here is the right socket for your new UV 199 Tube. It is molded with a sponge rubber base in one piece, which is even better than the soft rubber recommended for use with this tube. Price.....60c

### WORKRITE Hydrometer



Double the life of your battery by giving it proper care. Fill and test it regularly with a WorkRite Hydrometer. Never let it get below 1150. Full instructions for testing and care of battery with each "WorkRite." Get one now. Price.....75c

## OTHER WORKRITE RADIO PRODUCTS

WorkRite E-Z-Tune Dial. Has a knurled flange on outer edge, giving firm grasp for fine tuning. Price .....75c

WorkRite Concertolas. Loud Speakers of Quality. Carefully made.

WorkRite Concertola, Jr. ....\$12.00

WorkRite Concertola, Sr. ....\$18.00

WorkRite Switch Set. Complete switch set in one unit. Parts made to work together. Use block for template in drilling panel. Price.....50c

WorkRite Head Set. Extremely sensitive and free from distortion. Compare it with any one the market. Price .....\$6.00

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