

Novel Spider-Web Tuner. See Inside

15c. a Copy

February 10

\$6.00 a Year

52 Numbers

# RADIO

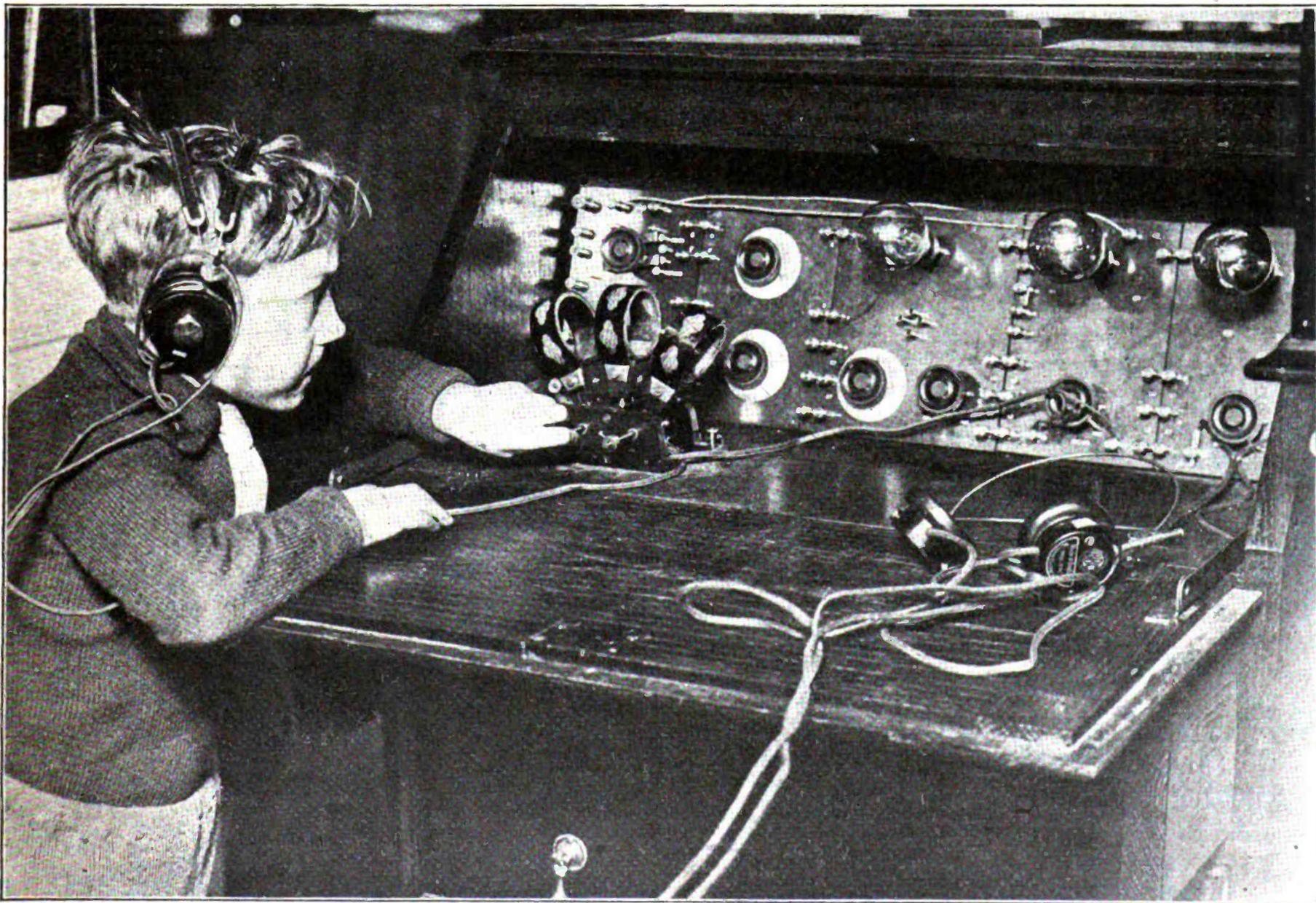
(Title Reg. U. S. Pat. Off.)

# WORLD

ILLUSTRATED

WEEKLY

## 5-Year-Old Boy Tunes and Connects Radio Set Unaided



(C. Underwood & Underwood.)

Master Russell Scott Worthington, age 5 years, who tunes and connects radio apparatus unaided. Master Worthington, who is an ardent radio fan, is so interested in radio that he knows how to operate his father's set, and frequently does so. The set shown in the picture was exhibited at the Model Beginners Exhibition, in which all the exhibits were made by the exhibitors themselves. The interest that is taken in making your own apparatus frequently is responsible for many model makers abandoning the regular model ideas and beginning on radio, where they have an unlimited scope for their idea. The plug on the panel of the tube is for use in connection with a crystal detector in case it is wanted.

Unit System Is Good

Eventually the experimenter will be weaned away from his too-often crudely made set and will have a desire to own an outfit which can be shown with pride to visitors, says the *New York Globe*. One course to follow is to purchase a cabinet set in one or two large sections. The other is the acquisition of units from which a complete receiver may be assembled. The unit system has certain advantages.

With the unit system the purchaser starts with the simple outfit which his purse will afford. It may be only a variocoupler and tube detector. On each unit there are but a few binding posts, usually four. The aerial and ground are connected with two of the posts on the coupler and then the detector is brought into the circuit by neat connectors looping between the two units. Later on, the set can be made regenerative by adding a third unit, comprising a variometer. Another set of "jumpers," or connecting wires, and the alteration is complete. If the units are selected from one make, the cabinets will agree in size, shape and finish, and no matter how many are added the effect is always an agreeable one.

The one objection to this system at first thought would be the space taken up by a string of individual cabinets. But fortunately the units may be piled one upon another to economize space. A very neat and efficient station may be put together by pyramiding the units.

Amateurs Enter Code Speed Contests at Fair

MANUFACTURERS of radio apparatus and amateur wireless fans are attending the Contests at the Permanent Radio Fair, Hotel Imperial, New York City, which are running from January 29 to February 17. These contests are open to amateurs and no entrance fee is charged. Leading manufacturers are giving radio sets and equipment for the prizes in the various classes. There will be first, second and third prizes and additional ones for those receiving honorable mention. The main feature of the competition is the code-speed contest which is held daily from 4:45 to 5 P. M. Radio engineers and experts have been selected as judges of all classes.

An "Ad" Plan That Hit Radio Distributing and Auto Supply Co.

TEL. COLUMBUS 8584  
64 West 66th Street

RADIO WORLD, 1403 Broadway  
New York City.

New York, December 29th, 1922.

Gentlemen:—In starting our business as a retail distributor of radio goods, the writer had placed some advertisements in RADIO WORLD, while connected with another company, and was so impressed with your pulling power as an advertising medium that the suggestion was made that we advertise only in RADIO WORLD.

Our plan has been, as you know, to take a column one week, giving an itemized list of our offerings with prices, and on the following week to take but three- or four-inch space, mentioning but one or possibly two special items.

Although our store has not a particularly good location, our advertising has not only proved highly profitable but has resulted in sufficient mail order business alone to give us a handsome profit from our advertising in RADIO WORLD. Therefore, we take pleasure in telling you that we have found RADIO WORLD to be a most profitable advertising medium.

Very truly yours,

RADIO DISTRIBUTING & AUTO SUPPLY CO.  
B. K. OWEN.

THE GENUINE AND GUARANTEED  
"All Wave" Coupler  
TRADE MARK  
Wave Length, 150 to 3,000 Meters

DO NOT BE CONFINED to listening in on the nearby stations when the "ALL WAVE" COUPLER in your set will enable you to listen in on broadcasting stations

THOUSANDS OF MILES DISTANT

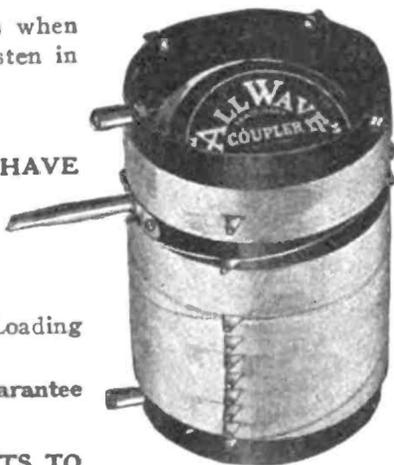
BE PREPARED FOR THE HIGHER WAVELENGTHS THAT HAVE BEEN AND WILL be allotted to broadcasting stations because of their ever-increasing number.

COMBINES SIMPLICITY OF ASSEMBLY  
with EFFICIENCY OF RESULT

inasmuch as it eliminates all Variometers, Variocouplers and Loading Coils.

Price \$9.00 Guaranteed with an absolute money back guarantee to operate as advertised.

6 EFFICIENT HOOKUPS SENT UPON RECEIPT OF 10 CENTS TO COVER COST OF MAILING.



Patents Granted

60 Lafayette Street  
New York City

Capitol Phonolier Corporation

SERVICE QUALITY STANDARD RADIO LOW PRICE RELIABILITY

All Goods New, in Original Packages  
RELIABLE MERCHANDISE FIRST, THEN PRICE  
SOME OF OUR BARGAINS

TUBES

W. D. 11—1½ Volt	\$6.50
U. V. 200 Radiotron	4.00
U. V. 201 Radlotron	5.25
Navy V. T1	6.50
Navy V. T2	7.50
201A	8.50
DeForest	5.75

PHONES

\$16.00 Baldwin Type C 4800 ohms	\$9.00
8.00 Holtzer Cabbott 2200 ohms	4.25
5.00 Murdock 2000 ohms	8.90
8.00 Federal 2200 ohms	4.50
6.00 Bannard 2200 ohms	3.75
8.00 Dictograph 3000 ohms	5.25

VARIOMETERS

\$6.00 Baldwin	\$4.50
9.00 "Capitol" All Wave	7.50
8.00 Emco Moulded	5.75
8.00 Helman Moulded	6.00
5.00 Pathe Moulded	3.75
Couplers to Match	

VARIABLE CONDENSERS

\$3.00 23-Plate Plain	\$1.25
5.00 48-Plate, A. B. C.	2.50
4.00 23-Plate, A. B. C.	2.00
6.60 24-Plate Vernier	4.75
7.70 46-Plate Vernier	5.25
.0005 DeForest Balanced	4.75
Others	

RHEOSTATS

\$1.00 Framingham	\$.50
1.25 Amsco	.75
1.50 With Dial	.75
3.00 Radio Corp.	2.25
1.00 Cutler Hammer	.80

LOUD SPEAKERS

\$20.00 Dictograph	\$13.50
25.00 Clearstone	9.59
45.00 Magnavox	\$4.00
22.50 Baldwin	14.00

Space will not permit us to list all our special values, therefore we will gladly quote special prices on any Radio Parts or sets you may want.

Reliable merchandise first, then price. We will refund, at any time, for Radio material purchased from us which is not up to standard and as represented. No Checks. No C. O. D. Add Parcel Post. Reference: Radio World.

SETS

\$130.00 Grebe CR. 9	\$100.00
112.00 M. R. 6 DeForest	90.00
175.00 Firth	72.00
150.00 Paragon	115.00
25.00 Polak Green Crystal	10.00

"B" BATTERIES

\$5.50 45-Volt Eveready	\$4.00
3.00 22½-Volt Eveready	2.20
5.00 45-Volt Franco	3.00
3.00 22½-Volt Franco	1.75

STORAGE

110 Hour Eveready	\$17.50
90 Hour Eveready	16.00

TRANSFORMERS

\$5.00 Acme	\$3.95
7.00 U. V. 712	5.75
5.50 Coto Coil	3.75
5.00 Pacent	3.50
4.50 Thordarson	3.00
3.75 Marle	3.00

RADIO FREQUENCY

\$3.00 Owl	\$1.10
5.00 Meyers	4.00
5.00 Acme	3.95
4.00 Erla	3.00

SOCKETS

\$.75 Turney	\$.40
1.00 DeForest	.60
3.00 Triple	1.25
.75 W. D. 11	.40
1.00 W. D. 11	.65
Others	

\$3.00 Brach Arrestor	\$2.10
2.50 Brach Arrestor	1.50
Magnet Wire, Jacks, Plugs, Atwater-Kent Honeycomb Coils, Switch Levers, Potentiometers, Attachments	

BROOKLYN RADIO SERVICE CO.

577 MYRTLE AVENUE. Phone Prospect 2952-8168. BROOKLYN, N. Y.

VOLUME TWO OF  
**RADIO WORLD**

[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879.]

A Weekly Journal, Published Every Wednesday and Dated Saturday, by Hennessy Radio Publications Corporation from Publication Office, 1493 Broadway, New York, N. Y. Telephone: Bryant 4796.

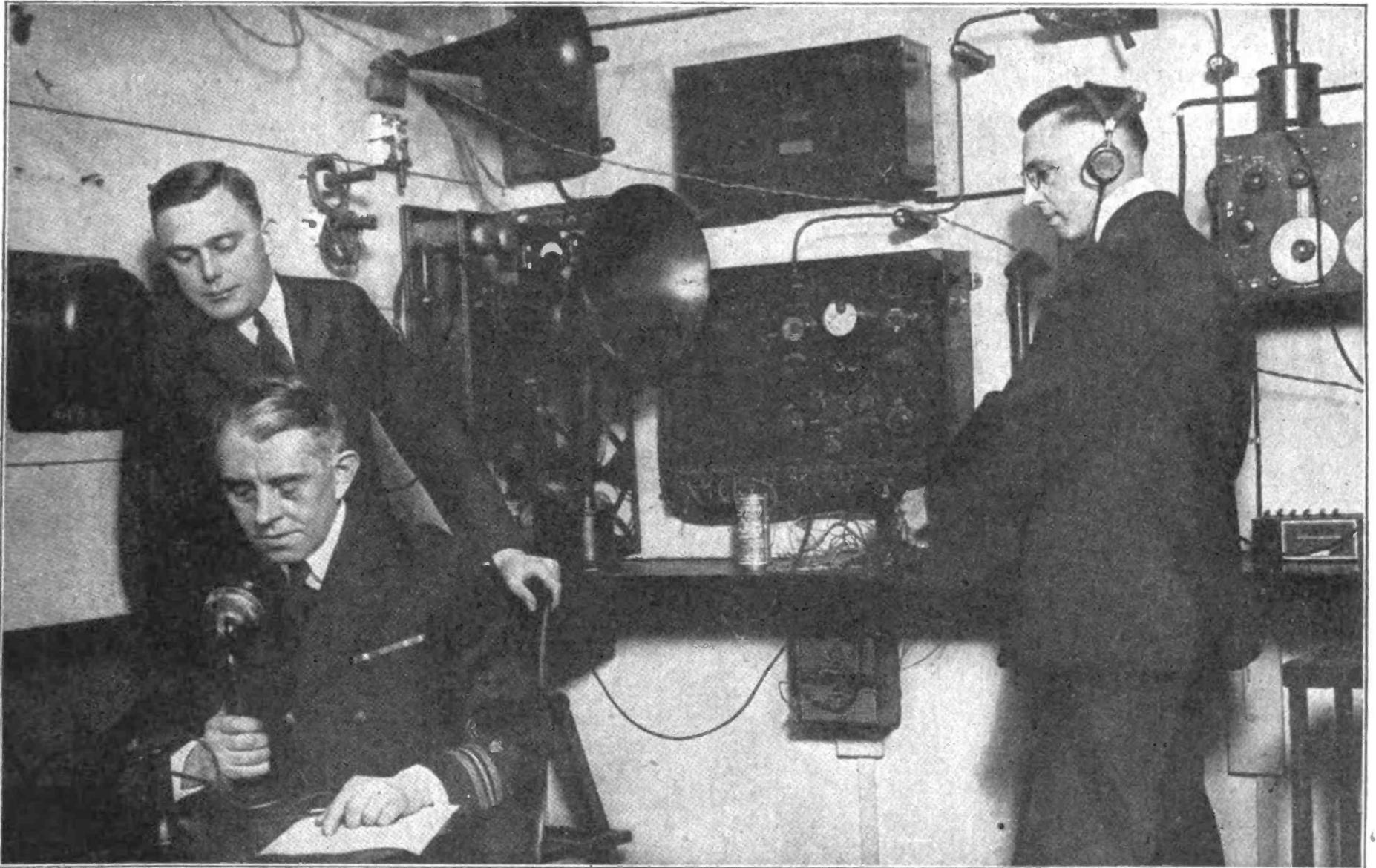
Vol. II, No. 20. Whole No. 46

February 10, 1923

15c per copy, \$6.00 a year

# Coast Guard Uses Radio to Keep in Touch with Headquarters

*By Harold Day*



(C. Harris & Ewing)

Bootleggers and smugglers beware! The U. S. Coast Guard now get orders direct from naval headquarters in that zone by means of broadcasting stations. This photograph illustrates a typical installation used to relay the broadcast.

**T**HE headquarters of the U. S. Coast Guard is using a unique method for distributing news of its service by means of radio. The tales of heroic rescues at sea by the world famous U. S. cutters are broadcast by means of the ordinary telephone connected through the Naval Air Stations at the various naval bases throughout the United States. The method pursued in this is as follows:

In the radio room at headquarters, there is an operator who is always

listening in, and any news of the Guards is thereby immediately broadcast direct from the base. The photo illustration on this page shows Captain F. C. Billard, aide to the Commandant, broadcasting, while Lieutenant F. A. Zensler is getting the news right off the ship making the rescue, or chasing the pirate, whichever the case might be.

As there is considerable difference in both the wave length of the station broadcasting and that on which the news is received from the

cutters, there is no interference. The method of broadcasting is much the same as that used when a concert is to be broadcast from a concert hall. A special land wire is connected to the larger station, and the operator at the receiving end, through the agency of a regular telephone, broadcasts the message.

This also allows the department to keep in constant touch with the various cutters lying off the coast and to give orders direct from naval bases to fleet commanders.

# A New and Novel Spider-Web Tuner

By Arthur S. Gordon

ON the whole, spider-web tuners are not as popular with the radio amateur as they ought to be. Perhaps this unpopularity is due to the reluctance of the amateur to desert the easily made single layer solenoid coil, but the fact remains that while the solenoid coil is easy to wind, it does not do the work as it should. Seeking

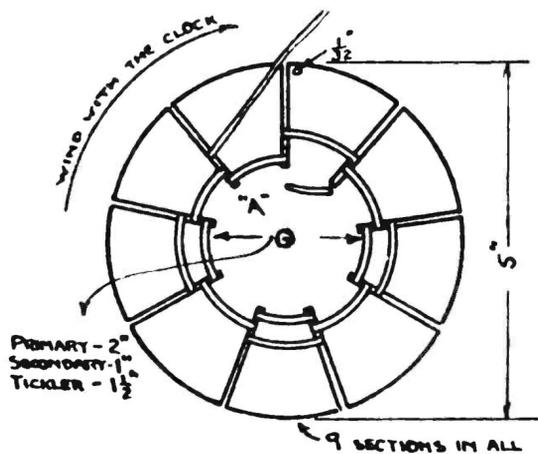


Fig. 1—Sketch and dimensions of the discs needed for the construction of this tuner. Also an indication of how to begin the winding.

for more compact forms of inductance with the maximum of efficiency, experimenters evolved the honeycomb, the bank-wound, stagger-wound and "spider-web" coils. Waiving discussion of the others, this article confines itself to the construction of a "spider-web" tuner, one that has been adapted to the needs and purposes of even the "fussiest" radio enthusiast.

Two novel and original features distinguish this tuner. These features add heaps to the efficiency of the coils without adding to their constructional difficulties. Having the necessary three coils, for example, all containing widely different numbers of turns, wound on the same size form is an improvement which will appeal to any one who has discarded spider-web tuners on

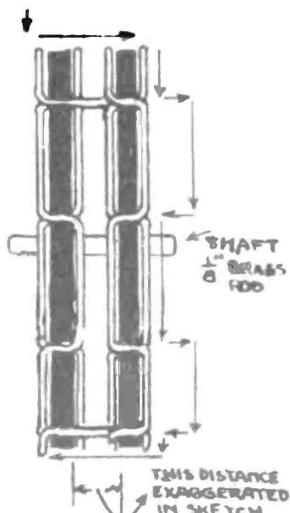


Fig. 2—This new "duo-vertical" winding is easy to follow and works as good as it looks.

account of the great size of the largest coil. This is one feature. The other is the universal motion of the movable coils, that is to say, they not only move toward and away from the stationary coil, but they also swing to and fro in front of it, like the pendulum of a clock.

Spider-web coils are sometimes called pancake coils, because they are wound in circular lines on a flat form. Sometimes the forms themselves are called pancakes. In the tuner described herewith, four pancakes are needed, one for the primary coil of 35 turns, one for the secondary of 50 turns and the other two for the specially wound tickler coil, containing 80 full turns.

These pancakes are made preferably of hard rubber, bakelite, formica, radion, or any good composition sheet. The thickness is not particular, but should be more than  $\frac{1}{8}$  inch. Heavily shellacked cardboard, while not the best material in the world, will serve. The four discs should be cut 5 inches in diameter and each drilled in the center with a  $\frac{1}{8}$ -inch hole. Mark the primary disc "A," the secondary "B" and the ticklers "C" and "D." Each form is to be divided in nine sections, separated by saw-cuts as shown in Figure 1.

In the case of disc "A," the center is to be 2 inches in diameter; in "B," the center is to be 1 inch in diameter, while in "C" and "D," the tickler coils, the centers are to be  $1\frac{1}{2}$  inches. These dimensions have been carefully worked out so that each disc will take just the number of turns it is designed for.

Using No. 22 S. C. C. copper wire, wind 35 complete turns on form "A." Holding the disc so that the mark is facing you, wind in a clockwise direction, that is, from left to right, or with the figures of a clock. Weave the wire in front of and behind the cut out sections alternately, as in Figure 1. To help in beginning and ending the winding, drill or punch two small holes in the form, suitably placed. For 35 turns of this disc there will be required 29 linear feet of wire.

Disc "B" is also wound in a clockwise motion, with the mark on the form facing you. Because the inside diameter is an inch smaller, fifty turns can fit on this disc with ease. Forty-four linear feet of wire are needed.

If the 80 turns required in the tickler coil were wound on a single

form, the disc needed would measure  $7\frac{1}{2}$  inches in diameter. To avoid having such a coil, experiments were conducted with "duo-vertical" or co-wound coils, with the result that such a winding was found to be utterly practical and highly efficient. It not only cuts down the

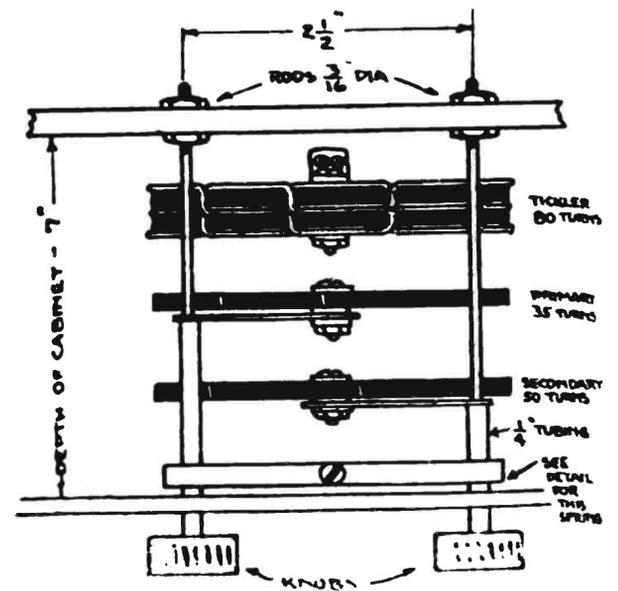


Fig. 3—The top view of the variocoupler, illustrating the method of mounting so that universal motion for the coils is obtained.

size of the coil and increases the ability of the tuner, but it also opens up a new field for amateur endeavor by opening the path to better and better tuning devices in our radio receivers.

Take discs "C" and "D," put them side by side on a temporary shaft so that the marks are facing you, and insert a  $\frac{1}{4}$ -inch washer between them for spacing. Begin winding as before on the disc nearest to you and make one complete turn. Then, instead of continuing on that disc for the second turn, cross over to the other form and make one com-

(Continued on next page)

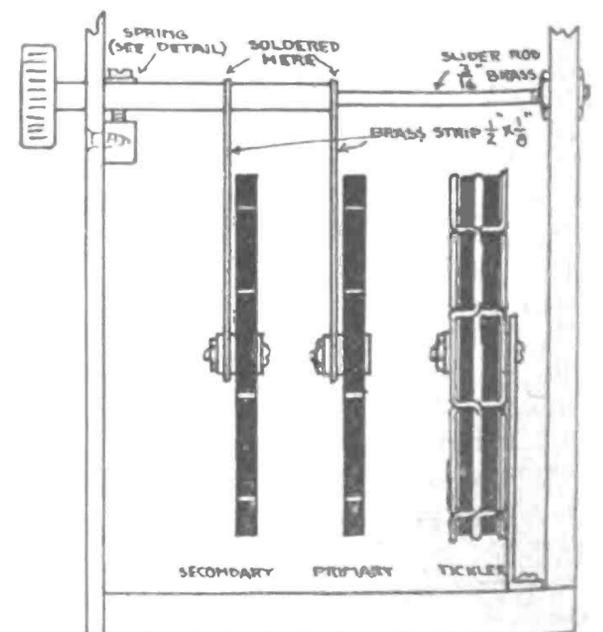


Fig. 4—Side view of the coupler showing manner in which it is mounted on the panel. The tickler is stationary, being fastened to the base.

# Latest Additions to Dry Cell Tube Family



(C. Kadel & Herbert)

Two new vacuum tubes that can be used equally well as detectors or amplifiers and that operate on one dry cell are the latest radio development. They are the most economical tubes for current consumption. On the left is seen the ordinary U. V. 201, an amplifier. Next is the U. V. 201A, a dry cell tube that consumes very little current. Next is the U. V. 200, which consumes but one-tenth of the current of the 6-volt tube.

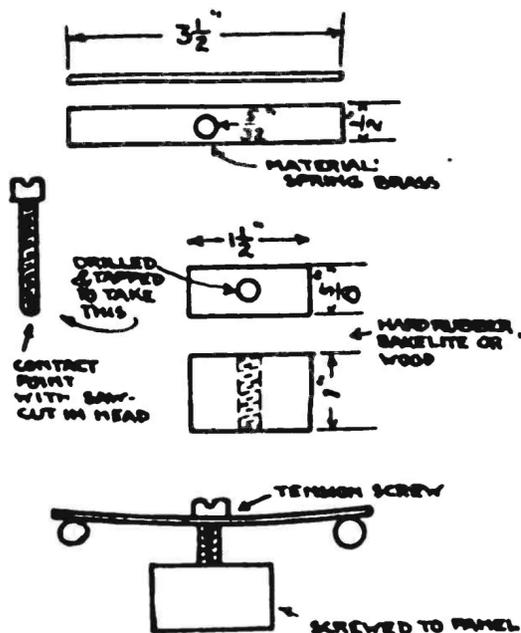


Fig. 5—Details of the tension spring, which is used in the tuner described in the article, to keep the coils in place and prevent their jamming.

(Continued from preceding page)

plete turn on it, still keeping the marks facing you and winding in a clockwise direction. Then come back to the first disc, make a second turn, return to the other form and so on until eighty turns, or 70 feet of wire, have been wound on the double form. (See Figure 2.)

In buying wire to make this tuner, 1/2 lb. of No. 22 S. C. C. will be enough and to spare.

This duo-vertical winding described above is easy. The only point about which to be careful is to see that if the wire crosses in front of a section on one turn, it crosses in back on the next. In other words, keep the spider-web idea firmly in mind. What you are doing in this new form of winding is merely making two spider-webs side by side.

Soak the three coils in hot paraffine. Then turn your attention to the cabinet and to the suggested means of mounting the coils so as to form an efficient tuner.

I believe that I am not alone in thinking that the movable coils in a vario-coupler should move in more planes than one. In other words, the coils should be mounted so that they can not only swing to and fro in front of the stationary coil, but also toward and away from it at the same time.

The simplest and easiest way to affect this universal movement is shown in Figures 3 and 4. Figure 3 looks down on the assembled tuner from the top of the cabinet, while Figure 4 gives a side view. It is seen at once that the heaviest coil, which would manifestly be the hardest to handle on a knob and shaft, is stationary and placed well near the back of the cabinet to make room for the other coils. This heaviest coil is the "tickler" and it is so mounted that the marks "C" and "D" are facing the panel.

In fact, all three coils are facing the panel when the tuner is finished. Being careful in this regard insures that all the turns are going in the same direction.

The primary (coil "A" of 35 turns) is next in line. It is fastened to a brass tube by means of a heavy brass strip, 1/2 inch wide. This brass tube fits over and slides on a brass rod, which reaches from a little in front of the panel to the back of the cabinet, where it is bolted to keep it in place. At the end of the tube is a knob. By turning this knob, the primary coil is made to swing; by pulling or pushing on it, the coil is made to approach or retreat from the tickler. That's the way to mount a tuner, what?

The secondary is mounted the same way, the brass rod which

serves as a slider being 2 1/2 inches away from the similar rod for the primary. Here again we have the universal motion.

It is evident, however, that without a pressure of some sort to keep the coils in place, they would hang vertically from their respective rods. Such pressure is provided by a tension spring, details of which are shown in Figure 5. It needs no further explanation, excepting to say that spring brass isn't absolutely necessary, although desirable. A good heavy piece of plate brass will do. The spring is mounted, as shown in Figures 3 and 4.

In using a three-element tuner for the first time, place all the coils in line about an inch apart and turn on the filament of the tube until regeneration sets in. Then adjust the variable condenser until you hear the carrier wave of a CW transmitter, code or phone, as the case might be. Then move or swing the coils—first the secondary and then the tickler, until the maximum strength and volume of signal are reached. Then clear out the interference with the rheostat or variable and the code or speech ought to come through loud and clear.

This tuner may be used in a great variety of hook-ups, and in connection with either the six volt or the volt and one-half tube. For the convenience of the amateur, two suitable regenerative hook-ups are given in Figure 6.

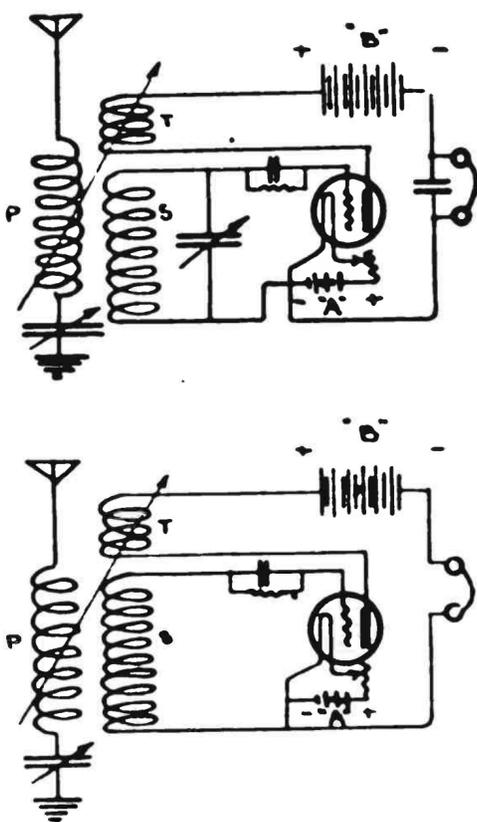


Fig. 6—Two hookups with which the three element spider-web tuner may be employed. Both are regenerative hookups and are standard.

Radio World, 52 issues, \$6.00.

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

# National Radio Chamber of Commerce Plans Nation-Wide Campaign

**S**WEEPING reorganization of the National Radio Chamber of Commerce, linking up, as active workers in a nation-wide plan to wipe out the evils of broadcasting and to solve other radio problems, every major interest of the radio industry and the public, is announced by President William H. Davis following a meeting of the Board of Governors at the Chamber's headquarters, 165 Broadway, New York City.

The governors adopted a new constitution providing for the admission to membership, either directly or through regional chambers of commerce, of individuals, including the audience or the listener, manufacturers, jobbers, dealers, broadcasters, amateurs, the press, and organizations and institutions interested in radio, comprising educational, scientific, religious, civic, political and other bodies.

"Interference and the broadcasting of the trivial and the valueless have injured the business and unless remedied may ruin it," it was declared in a report of a special committee appointed to conduct a survey of the radio situation and to recommend changes in the organic structure of the chamber, whose membership at the outset consisted of manufacturers.

The committee was composed of Henry T. Hunt, general counsel of the chamber and late member of the Railroad Labor Board; George Lewis, secretary of the chamber; and Ralph C. Watrous, former Lieutenant-Governor of Rhode Island. Support and improvement of broadcasting in co-operation with the United States Government and other agencies were said to be the main object of the chamber.

"The Government of the United States is interested in radio from the standpoint

of national defense and public welfare," said the report. "Furthermore, radio is a public utility of interstate commerce.

"Congress has before it the White bill which gives the Secretary of Commerce power to make regulations controlling broadcasting. This bill may be enacted into law within six months. When the secretary shall have placed proper regulations in effect, interference will doubtless be reduced. However, neither the bill nor the regulations contemplated provide any support for broadcasting or any measure to improve its quality."

The committee found that there were many classes of activity in the radio industry. Broadcasters were ranged "between the profit seekers and users and belonging partly to both" in the report, which added:

"The broadcasting class comprises manufacturing companies broadcasting to support and extend their sales of apparatus, department stores broadcasting for advertisement, newspapers broadcasting for advertising and news purposes, schools, colleges and universities broadcasting for educational purposes, churches, co-operating with broadcasting stations, individuals broadcasting for their own amusement, and the broadcasting activities of the American Telephone and Telegraph Company carried on primarily as research and in preparation for whatever the future may develop.

"There are at present ineffective organizations of broadcasters, ostensibly national in scope, but not including the principal broadcasters, as, for example, the Radio Broadcasting Society of America, which includes some thirteen or more small broadcasters. In this field some

sort of cooperation is compulsory in the nature of things. Further cooperation has been brought about by the Department of Commerce."

Under the new constitution, both the membership and the aims of the chamber, now organized to function as a great central force in radio control and regulation, are broadened, according to a statement issued through President Davis, which said:

"It must be obvious that radio is to become a public service of the highest importance to the nation, both in peace and war. Therefore, an organization designed to further its development and co-ordination should be democratic, inclusive of all branches and representative of each section of the United States."

A vital element in the chamber's plans is the establishment of regional radio chambers of commerce in the principal cities of the countries to be coordinated with the national chamber in New York and with local chambers.

Kenneth P. Gregg, one of the engineers and managers of the chamber, reported that steps had already been taken to organize chambers in the middle west and that local interest in national radio organization was developed, particularly in Chicago, Milwaukee, Minneapolis and St. Louis. Many groups interested in radio, including colleges and universities and the churches, he said, were studying plans for cooperation with the chamber, which, he asserted, "is destined to be a tremendous force in promoting the general welfare of the radio industry and through it that of the radio public."

The chamber, Mr. Gregg said, was co-operating closely with Secretary Hoover in the Department of Commerce efforts to nationalize the radio industry and with the movement sponsored by the Conference on Radio Standardization.

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

## Never Out of Hearing Now



(C. Underwood and Underwood)

It is not necessary for dad and mother to worry, when Sally Sovereign and "Cyclone Billy" Sovereign, of Bay City, Mich., go on an afternoon's canter. When they are wanted at home, rather just picks up the transmitter, and calls them, by means of the compact receiving sets

## Secretary Week's Defense of Harbord Is Endorsed

Secretary Weeks' defense of General Harbord, recently retired and made president of the Radio Corporation, has been endorsed by many officials. General Harbord's services to the Government as head of the American commercial radio service in the event of war would be invaluable, and the Government should not begrudge him his retirement pay, which some Congressman would cut off.

As amended, the Army appropriation bill provides that no officer, retired or in active service, employed by an organization doing business with the Government shall receive any of the funds it carries. General Harbord, as well as many officers in similar circumstances, would, if the amendment passes, receive no retired pay.

A study of the business conducted between the Signal Corps and the Radio Corporation reveals the fact that scarcely any business has been transacted for several months. Since the war it was not more than \$300,000 worth, when this organization was the only bidder. Today, however, the Signal Corps deals directly with the General Electrical, Westinghouse and other manufacturing companies, although the corporation reserves the right to bid. During the calendar year the Signal Corps purchased electrical equipment valued at \$1,475,000.

# Radio Instruction for Army Now Fully Standardized

By Carl H. Butman

**W**ASHINGTON, D. C., Jan. 29.—Radio has a very important part in the education of Army officers in communication, instruction in which important subject has recently been standardized.

A definite program of instruction in radio, as part of the schooling of all Signal Corps officers and other officers assigned for training from the Regular Army, National Guard, Reserve Corps and Civilian Military Training Camps, has been laid down by a Board of Army Officers.

The board, headed by Col. H. B. Fiske, and including Major S. M. Walmsley, Signal Corps, recently filed its report on Army Service Schools, including the Signal School at Camp Vail, N. J. Three communication courses are prescribed: The company officers' course, an advanced tactical and administrative course and an advanced technical course, all of which include the subjects of wireless and "wired-wireless."

The course for company officers includes approximately 1,309 hours of study for Signal Officers and 1,285 hours for officers of other arms. Courses extend over a period of nine months, commencing in September. Radio telegraphy and telephony covers a period of 180 hours and includes theoretical and practical instruction in fundamental electrical principles, spark sets, thermionic vacuum tubes, continuous wave sets, antenna systems, wave meters and other auxiliary apparatus, with special attention to Army radio sets. Tactical radio procedure is studied during 20 hours. This includes the principles governing the organization and operation of tactical radio nets for all arms, and the procedure essential to successful net operation. Other subjects pursued by the student officers include codes and ciphers, combat orders, electricity and magnetism, wire communication, code practice, message centers, etc.

Advanced studies in radio are prescribed in the tactical and administrative course for signal officers assigned to units larger than divisions. This is also a nine months course and covers study and instruction periods totaling 1,235 hours. The subject requiring the greatest time is the development of signal equipment, which

covers 300 hours. Radio systems of divisions and larger units requires 150 hours, and includes instruction on the tactical uses of the various radio sets furnished to Army combat units, the organization of such sets into nets and their operation. Instruction in the preparation of orders to signal officers of divisions, corps and armies such as the allotment of wave-lengths, call letters, and special sets is also given. Fifty hours is designated for the study of codes and ciphers, their design and solution.

Communication engineering, technique, equipment, design and development, is taught in the advanced technical course. During a total of 1,300 hours, divided into eight subjects, these technical officers receive instruction in vacuum tube theory, design of radio, equipment and other apparatus as affected by military conditions in the theatre of operations, construction and installation of radio systems for large units, and specific technical communication problems.

Fifty-six officers and 200 enlisted men are now studying radio at Camp Vail. Thirty-five are officers from various corps, 15 Signal Corps students, two Marine Corps, two Philippine Scouts and two Cuban officers. The enlisted men are studying to become operators and electricians.

After a year's operation, the Army Radio Service has now reached the point where it is operating on a paying basis, giving good service on all official communications in and out of Washington. While perhaps not comparable to commercial radio traffic systems, the Signal Corps radio traffic curve, the plotting of which began in January, 1921, has risen by about a thousand dollars a month. In December it reached the value of \$6,200 for the month. This is solely on official War and other departmental radio traffic between stations of the Army Radio Net; the Army handles no commercial or naval messages.

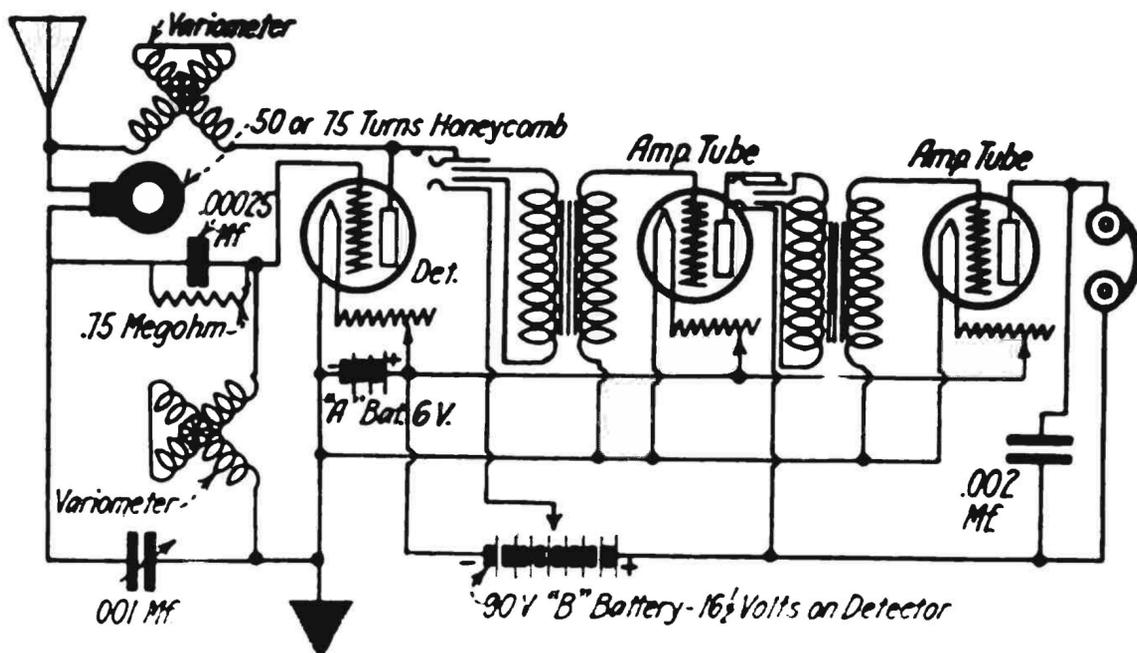
During December the returns for traffic handled, when figured at commercial rates, exceeded the costs for personnel and maintenance of the whole net, including sixty stations.

## From Another Angle

From W. G. Caffrey, E. E., 78 Washington St., Reno, Nevada.

**I**N your issue of Jan. 6, 1923, you describe and illustrate a hook-up by C. White. I have been using a hook-up very little different from this almost continually for the last few months with splendid results. I get San Francisco, Los Angeles, Portland, Vancouver, Seattle, Calgary, Regina, Salt Lake City, Denver and Phoenix almost any evening. Several nights ago I got Minneapolis. Get local stations without aerial. My aerial is 4 wires, 120 feet long, 70 feet high; radius of reception, 1,000 miles; elevation of Reno, 4,500 feet; tuning done with .001 variable condenser, using a receiver, which is absolutely necessary. Variometer in plate circuit regulates loudness.

Enclosed is a sketch of my hook-up, using two stages audio-amplifiers. This in connection with a 14-inch Magnavox, fills the house with music.



Hookup with which Mr. Caffrey has obtained splendid results. Note stations heard by Mr. Caffrey with this circuit.

# The Design of an Inexpensive Wave Meter

By C. White, Consulting Engineer

SCIENCE cannot advance any faster than the progress made in the perfection of its measuring instruments. It is very good to calculate, but it is essential that check measurements can be made to verify these calculations. In the field of radio measurements the wave meter stands supreme. Its uses are many, and the amateur who has one can constantly be performing many interesting experiments with his set. Along with the wave meter is the high frequency buzzer as an exciter. The two should be in the possession of every amateur who wishes to perfect his set in every detail. There are as many types and designs of wave meters as there are voltmeters and ammeters. The heterodyne or "zero beat note" method of measuring wave-length is looked up to as the most accurate and is used extensively in radio laboratories. For the average amateur the completion of such an outfit in his own home would be a difficult task, but the construction of one of the more elementary types is within the skill of all.

Next to the joy of actually making the wave meter comes the pleasure and satisfaction of being the designer of your own outfit. I shall endeavor to give a few outlines first

as to the method of design. As shown in Figure 1, the wave meter is nothing more than a tuning circuit containing an inductance in the form of a single layer solenoid, and a variable air condenser shunted across it. The crystal detector serves as a rectifier for the high-frequency waves, while the phones act as audible indicators. When the wave meter is in resonance with the circuit, the wave-length of which is to be measured, the maximum signal will be heard in the phones. Of course, if the meter is used to measure natural wave-lengths of circuits a buzzer will be necessary to excite the circuit, as shown later on in this article. The tuning inductance is fixed. The first thing to determine is the size of this inductance. Wind about forty or fifty turns of No. 22 D. C. C. magnet wire on a three-inch tube made of some good insulating fiber, taking care to keep the turns as close together as possible. After the coil is made one can actually determine by measurement and count the number of turns of wire per inch of length, which quantity we shall designate by the term  $N$ . Next, one can also measure the length of the winding in inches, which we shall call  $L$ . The diameter,  $D$ , is three inches, since we chose to wind on a three-inch

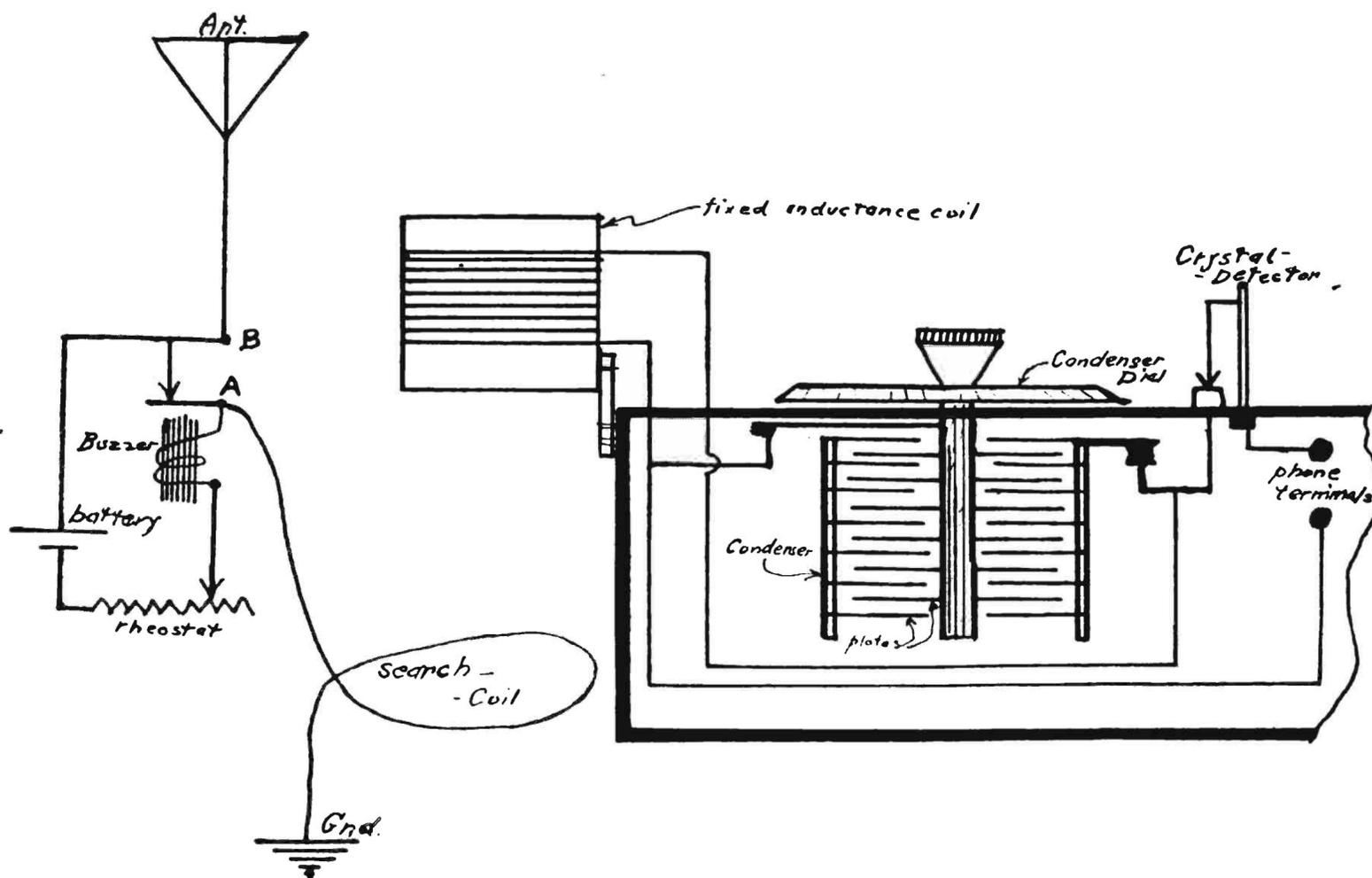
tube in the first place. The ratio of  $D/L$  in our formula shall determine the constant  $K$ , the value of which we can easily get from the table below, since both  $D$  and  $L$  have been previously determined.

Ratio: $D/L$ .....	$K$
1/20 (.05) or less.....	25
1/2 (.5).....	21
1/1 (1.0).....	17
3/2 (1.5).....	15
2/1 (2.0).....	13
3/1 (3.0).....	11
4/1 (4.0).....	9

If the ratio of  $D/L$  should lie between two of the values given in the table it is a simple matter to estimate. Say, for instance, that the ratio was 1.25. This value lies half way between 1.0, for which  $K$  is 17, and 1.5, for which  $K$  is listed as 15, therefore for 1.25 it would be close enough to assume  $K$  as 16. Now, with everything known or previously calculated, the value of the inductance ( $I$ ) in micro-henries is found from substituting in the formula:

$$I = \frac{K \times D^2 \times N^2 \times L}{1,000}$$

After the fixed inductance has been constructed and its exact value in micro-henries has been calculated from the formula, the amateur should obtain an air variable con-  
(Continued on page 9)



Schematic drawing of the wave meter as described in the accompanying article. In order that the constructor may have as little trouble as possible in the making of the wave meter, the inductances have been worked out for him in the article, and fixed inductances are used. This simple wave meter can also be used as a small receiving set, as it is complete in every way. Take care that the leads are not loose. Solder every one that is possible. If care is taken in the construction of this instrument, it will function with surprising accuracy. Many people think that the calibration of a wave meter is a very technical job, but by following the simple instructions in this article, it will not be found so hard, if the person can read equations.

(Continued from preceding page)

denser that has a maximum capacity of .0005 micro-farads. Purchase the ordinary air variable condenser with circular plates that mesh circularly. By that I mean a variable condenser whose capacity is directly proportional to the reading on the scale indicating the coupling of the plates. For example, when the plates are half meshed the capacity is half the maximum capacity, or .00025 micro-farads. Previously, the inductance has been calculated, and the capacity is directly proportional to the reading of the scale of the condenser, provided the 100 mark on the dial indicates the maximum or full coupling of the plates. If  $W$  is used to designate the wave-length and  $C$  is the reading on the condenser scale, the wave-length can be calculated from this formula below:

$$W=4.21\sqrt{IxC}$$

The best way is to make a table of reading on the condenser scale ( $C$ ) in one column and  $W$  in the other. It is not a hard matter to do this and I would suggest that a special type of condenser be used. There are now several makes on the market that have their plates so meshed that scale reading varies the capacity as the square root of the maximum instead of directly as the maximum capacity. The advantage is apparent from the formula. It will not be necessary to take the square root of the scale reading. It can be used directly in the formula. Since the square root of the inductance is constant in value and is known we can simplify the formula under this special condition to include just a constant number times the scale reading of the condenser  $C$ .

The wave meter can be used as a measure of the natural wave-length of tuning circuits and antennae. The illustration shows the finished wave-meter hooked up to an aerial circuit. A buzzer is used as an exciter for the aerial circuit. The condenser dial is turned until the response in the phones is at a maximum. The reading on the dial is noted and the wave-length can be calculated from the wave-length formula. The wave-length of the aerial should measure up less than that of the desired signal wave-length. The wave meter will easily tell whether this is true and by experimenting with the length of the aerial and with several other types, it is an easy matter to get one that will have a natural wave-length just a little less than that of the desired station. The wave-length of a tuning circuit could be measured up in a similar manner by connecting the output terminals of the buzzer (AB) to the Ant.-Gnd. connections on the tuner.

## Londoner Gets WGY on Two-Foot Loop

**T**HE challenge palm for the reception of long-distance broadcasting undoubtedly belongs for the time being to Captain H. J. Round, of the Marconi Company, for his performance on Christmas Eve, says E. Blake, A. M. I. E. E., in the 'London Daily Mail.' "Using a six-valve Marconi-phone plus two 'note magnifiers' (i. e., low frequency amplifiers), Captain Round received music and speech from several United States stations. A pianoforte solo broadcast from WGY (Schenectady) was received at his house at Muswell Hill, N., fairly uniform in strength and of about the same audibility as the Manchester Broadcasting Station, also received at the same place.

"Two facts in particular render this result remarkable. First, the aerial employed was a frame 2 feet square; that is quite a moderate size for a frame aerial, even for amateur use, and I wish Captain Round would measure the electromotive force it acquires from the Schenectady generator, for it must be easier to measure than to imagine. Also I should like to know whether he elected to sit up to the small hours with that pathetic little frame out of pure optimism or because he had

what Schenectady would term a 'hunch.'

"Much trouble was experienced as the result of jamming by harmonics from Leafield, Oxfordshire and Northolt, Middlesex, which stations are evidently competing keenly with each other in the 'jam' trade. Hence, amateurs will do well to give further study to the possibilities of frame aerials, for these will enable them to escape a certain amount of interference.

"The other interesting fact about Captain Round's Christmas Eve-Christmas Morning vigil is that there was no mere 'pig's whisper,' but a loud-speaker in full blast. Now one needs quite a respectable volume of sound to make a loud-speaker shout about the house, so that although eight valves were at work the result is really surprising and should give a fine fillip to amateur endeavor. I may mention, for the benefit of those who wish to repeat the experiment, that the wave-length on which WGY was sending was about midway between those of the Manchester (385 metres) and Birmingham (425 metres) broadcasting stations, and that the signals were heard before 2:00 a. m. (Greenwich)."



Wife's voice—"Hiram Simpkins! And you layin' off work for a week on account of rheumatiz! I see where you start working again tomorrow."

# Don't Try to Reclaim Dry Cells

By Arthur S. Gordon

A SEARCH for practical and useful information concerning the 1½ volt, No. 6 dry cell, now used by radio amateurs in lighting the filament of the DeForest dry-cell tube or the W D 11, resulted in some interesting but disappointing "dope." The person who made the inquiries wanted to know, first, if anything could be done to prolong the natural life of a dry cell, and, second, whether suitable dry cells could be made at home by a radio amateur in average circumstances.

To give the answers to these questions, the inquirer interviewed the men behind the radio counters in big stores, electricians, mechanics, engineers and tradesmen—in fact, everybody within a ten-mile radius who knew, or who was supposed to know, anything at all about dry cells.

The men behind the radio counters slumped visibly when questioned on dry cell construction and practical operation. They just "handled" the batteries. But they knew what was expected of the batteries in the way of voltage, and were willing to put them to a short-circuit test with a voltmeter. Most of them were advised that a radio amateur insists on this being done. "Wise clerks," they said, "will do it without being asked—merely for their own protection."

Occasionally a dry battery that has never been used fails to register a current. All of them are marked with a "shelf limit" date, which is generally set for about four months after manufacture. After the shelf limit has expired, the makers of the dry cell will not guarantee its performance. Radio clerks usually inform amateurs of this fact, and may even point with pride to the distant hour of expiration on the batteries they are offering for sale.

Other salesmen, however, may not be quite so sympathetic. Dishonest stores often cover up an expired shelf limit date with a brazen trade sticker telling the customers to "come again." When buying your batteries, then, make it a point to notice the date upon which they technically become shopworn.

When a dry cell is idle, that is to say, when it is not electrically connected in a complete circuit, there continues a chemical reaction inside the cell proper, which gradually decomposes the necessary elements for the generation of energy. Such a reaction is slow, of course, but it is there and it is constant. A dry cell has no storage capacity. Whatever energy generated by a cell while slowly deteriorating is dissipated at once. This internal action continues long after the battery has been discarded as dead. The zinc covering breaks open and the "mix" bulges out. The battery slowly eats itself away to nothing.

In action, a dry cell will not give continuous results satisfactorily. It serves best when used intermittently. While operating, chemical action causes, within the cell, a layer of hydrogen gas to collect on the surface of the zinc electrode. Hydrogen gas is not a conductor of electricity. Therefore, the coating on the zinc raises the internal resistance of the cell to such a high value that almost all the energy developed is used in forcing the current through the cell, leaving but a negligible current for the outside circuit. When the terminal voltage is thus affected the cell is said to be "polarized."

In the mixture of the ordinary No. 6 dry cell, there is what is called a "depolarizing agent." This is black oxide of manganese. It is supposed to clear the zinc of the deadening hydrogen bubbles, but it cannot work fast enough to do its work under strenuous operation. This is why dry cells recuperate with rest—that is, to a certain limited extent (not as much as wet cells, for instance). The "de-

polarizing agent" has a chance to do what it is designed to do.

The modern dry cell is an improvement on the old Casner-Leclanche type, but it is not all that it could be. The battery which has the zinc electrode outside is not as efficient as one that has it inside. It is the zinc which is the fuel supplying the electrical energy, and it becomes thinner as it is used and finally is eaten in holes. The carbon stick, on the other hand, does not deteriorate. It is a mere collector of energy. When a No. 6 dry cell becomes useless, the remaining zinc becomes waste product. In the flat type of battery, now used for searchlights and sometimes for "B" batteries, the zinc may be wholly eaten up, and the battery will discharge energy right up to the disintegration of the last ounce.

But it often happens that a battery goes dead when its zinc covering seems to be in perfect condition. The fault seems to be with the mixture, which is not strong enough to produce energy right up to the limit.

"What can be done with such batteries?"

"Nothing," answered one electrician, who had been replacing batteries for ignition purposes on Fords. "Tear off the binding posts if you want them, and dig out the carbon rod in the center if it is of any use to you. But throw the rest of the battery away. It has lived its life, and it's through."

"Well," answered an automobile engineer, "I never had to practice economy in that direction, but I suppose you could clean them out and fill them up with a new mixture. The only difficulty would be in clearing away the old mix from the zinc. If you have ever opened a dry cell, you know how that stuff sticks. What do I advise? Throw 'em away, and buy new ones. They're selling cheap enough!"

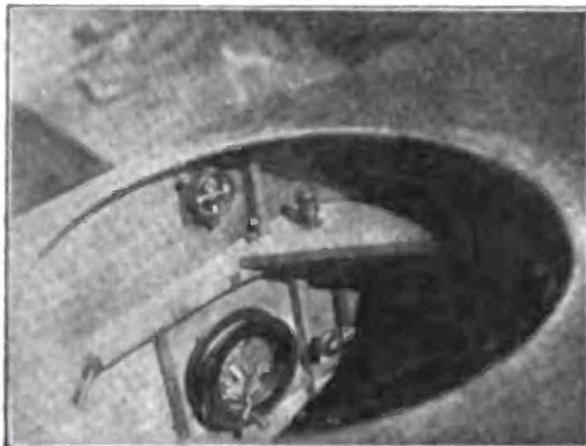
Nothing very enthusiastic about their comments. But on second thought, it is a sensible attitude to take. As electrician after electrician voiced the same views, the radio inquirer adopted the conclusion that an old battery is no good for anything. It cannot even be connected in series or in parallel with a new battery, for instead of contributing its own "wee" current to the combined effect, it actually takes some away from it. The best procedure is to rip the battery apart, take out the carbon stick intact, rescue the binding post from the half-eaten zinc and "dump" what is left.

Then, if you have an itch for making things, or if you like to think yourself independent of the dry cell market, you might buy the following articles: a piece of zinc, 6 by 9½ in.; a half-pint of asphaltum varnish; an ounce of either nitrate of mercury or bichloride of mercury dissolved in a quart of hot water; a quantity of heavy blotting paper; 1½ pounds of pebble or crushed carbon; ½ pound of black oxide of manganese; ½ pound of granulated chloride of ammonium (sal ammoniac); and ¼ pound of whitewood or willow sawdust. With these necessary materials assembled at a cost of about 75 cents, go ahead and make a dry cell all by yourself, using the carbon you rescued from the old battery—but you can see right off that it can't be done profitably unless one is going into the business on a big scale.

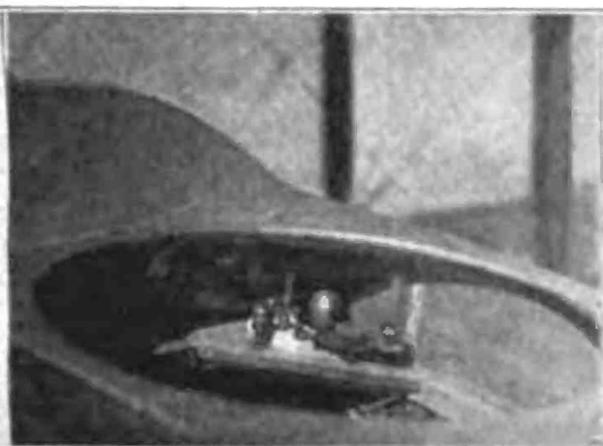
No, making a dry cell so that it would save money can't be done. The advice not to try it is given reluctantly, but it is only fair that the new user of dry cells know the worst at once. So much material goes into the manufacture of an ordinary No. 6 cell that only quantity production makes the market price as it stands today even reasonable.

# Using Two Generators for One Airplane Radio Set

By S. R. Winters



Rear cockpit, showing the reel upon which is wound the antenna. When in the air, the wire is unwound and, by means of a weight, drops downward. The meter directly above shows the length of wire that is being used. This gives the operator an actual check on his instruments.



Installation of transmitting controls in D. H. 4 B 'plane. Notice the flame proof key, which is now universally used in work of this type. The double throw single bladed switch controls the current from the two generators. On account of the small amount of available space, all controls are made as simple as possible.

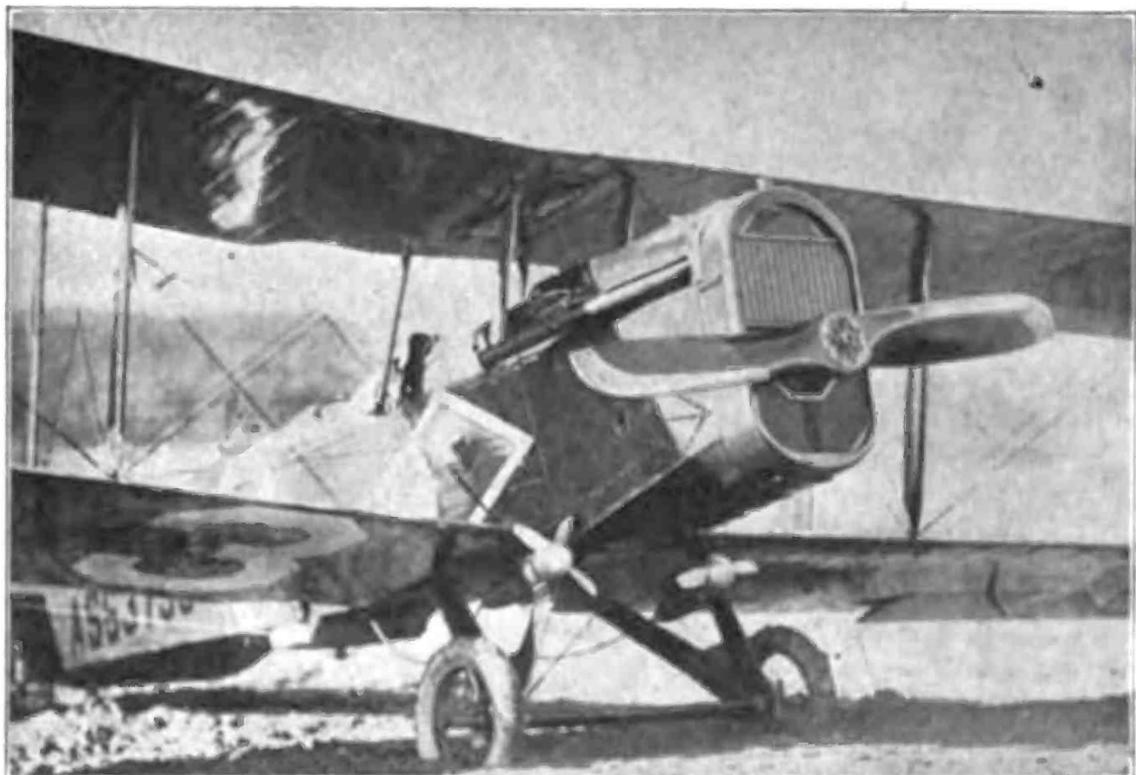


Fibre fairlead, type F. 8, mounted through bottom of 'plane through which trailing antenna is run. The lead weight is used to prevent the wire from flying back and entangling itself in the controls, which, if it did, would endanger the lives of both the aviators and those on the ground.

**I**N the far western States, where radio and aircraft have formed a coalition as an agency in combating forest fires, a departure was made recently in the wireless installations. Contemplating the possibility of a breakdown of the device for generating electricity for radio purposes, a duplex system of generators was affixed on airplanes subject to long patrols during the fire-fighting season.

Each of these fan-driven generators has a capacity of 4,500 revolutions a minute. This special inductor design alternator is rated from 116 to 125 volts on open circuit, and is a 900-cycle, 200-watt generator. The stator is composed of four direct-current poles, four slots being cut into each of these so that the high-frequency current windings may be placed therein. The rotor has an even dozen teeth and serves as an inductor. The slots between the teeth offer space for placing the direct-current windings for exciting the field. The commutator on one end of the rotor delivers the direct current to the field coils, one side of this circuit being carried to a distributing block to facilitate the connecting in of a field switch and a dry battery. The latter are auxiliary agents for exciting the electric field. The twelve teeth in the rotor, when rotating, pass the alternating-current windings and vary the flux through a dozen cycles for each revolution.

As the term implies, each of the two generators installed on this fire-fighting aircraft is driven by a two-blade air-fan. The speed at which these fans operate is constant, despite wide variations in air and wind velocities. Immunity from the influence of air current is accom-



Double installation of fan-driven generators on 'plane. This double installation is made on 'planes making long patrols and trips, where communication is imperative, especially when the 'plane is used for fire patrol work.

plished by use of a centrifugal governor mounted at the center of the fan inside the housing of the generator. This governing device varies the pitch of the air-fan blades to correspond with variations in the velocities of the upper atmosphere. This centrifugal governor is so effective as to maintain the speed of the generator within plus or minus four per cent of 4,500 revolutions a minute, despite a variation in wind velocity ranging from 50 to 175 miles an hour.

The alteration of the pitch of the

two blades on the air-fan, the driving force of the generator, is accomplished by use of two weights, one attached to each blade arm. Their positions are influenced by centrifugal force. Such force of the weights is counteracted by compression springs, the result being that when the spring reaction and the weight on the arms are correctly adjusted, the position of the equilibrium between these two opposing forces will be such as to insure a constant speed of 4,500 revolutions a minute, irrespective of the wind velocity.

## NEEDED BY ALL AMATEURS

5 RADIO-WIRE TABLES, BY FREDERICK J. RUMFORD, E.E., R.E.

These tables, showing the number of feet in a pound and fractions of a pound, were published in RADIO WORLD as follows: No. 1—Shameless Magnet Wire, RADIO WORLD, No. 34, dated Nov. 18. No. 2—Single Cotton-Covered Wire, RADIO WORLD, No. 35, dated Nov. 25. No. 3—Double Cotton-Covered Wire, RADIO WORLD, No. 36, dated Dec. 2. No. 4—Star's EIR-Covered Wire, RADIO WORLD, No. 38, dated Dec. 16. No. 5—Double EIR-Covered Wire, RADIO WORLD, No. 40, dated Dec. 20. Sent to any address postpaid at 15 cents a copy, or the complete set of 5 copies for 75 cents. Or start your subscription with any number order now. Every amateur builder should have these tables constantly at hand. The supply of back numbers is limited.

RADIO WORLD, 1495 BROADWAY, NEW YORK, N. Y.

# Wave Length and Interference

By *B. R. Cummings*

*Radio Engineer of General Electric Co.*

**I**N the adjustment of radio receivers, we know that we can "tune-in" different stations which are transmitting on different wave-lengths by an adjustment of the control or controls provided in the receiver for this purpose. We know that, even though a number of stations are transmitting simultaneously, if their wave-lengths are sufficiently different we can tune one station out and another in.

In order that the term "wave-length" may have somewhat more meaning than that of an arbitrary term, it may be explained that the energy which actuates a radio receiver and which is transmitted through space from the transmitting station, is transmitted in a series of pulses. These pulses are so frequent that they cannot be individually detected by the ear, and they generate an electric current in the receiving antenna, their nature being such that each pulse generates a current in the opposite direction from that generated by the preceding pulse. If we can mentally picture these pulses in space at a given instant, between the transmitting and the receiving station, the distance in meters between one pulse and the second pulse ahead of or behind it, is known as the wave-length of the transmitted signal. The majority of broadcasting stations are operating on wave-lengths between 350 and 400 meters, which is very nearly one-quarter of a mile. For long distance commercial radio work, the wave-length is frequently as long as 20,000 meters, or approximately

12½ miles. The speed of transmission is so great, however, that, even at this wave-length, approximately 30,000 pulses are picked up at the receiving station each second.

For an analogy of what takes place in a radio receiver when it is tuned to a particular wave-length, let us picture a swing suspended from a branch of a tree, say, and that two people, one at each end of the swing's travel, are alternately pushing the swing and keeping it in motion. Their pushes are timed to the natural period of the swing, so that each push is delivered at a time when it will add to the motion of the swing. In this case the energy given to the swing by the two people alternately pushing it is analogous to the energy put into the radio receiver by an incoming signal, and the motion of the swing is analogous to the current flowing in the receiver, flowing first in one direction and then in the other. If, however, the people pushing the swing do not time their push so that it matches up with the natural period of one swing, the amplitude of the swing will decrease more and more as the pushes become more and more out of step.

We know that the shorter the length of the swing, the quicker it will swing back and forth, and that as it is made longer the time required for it to travel back and forth is increased. In the case of a radio signal we have no control at the receiving station over the frequency of the pushes or pulses of energy, the frequency being established at

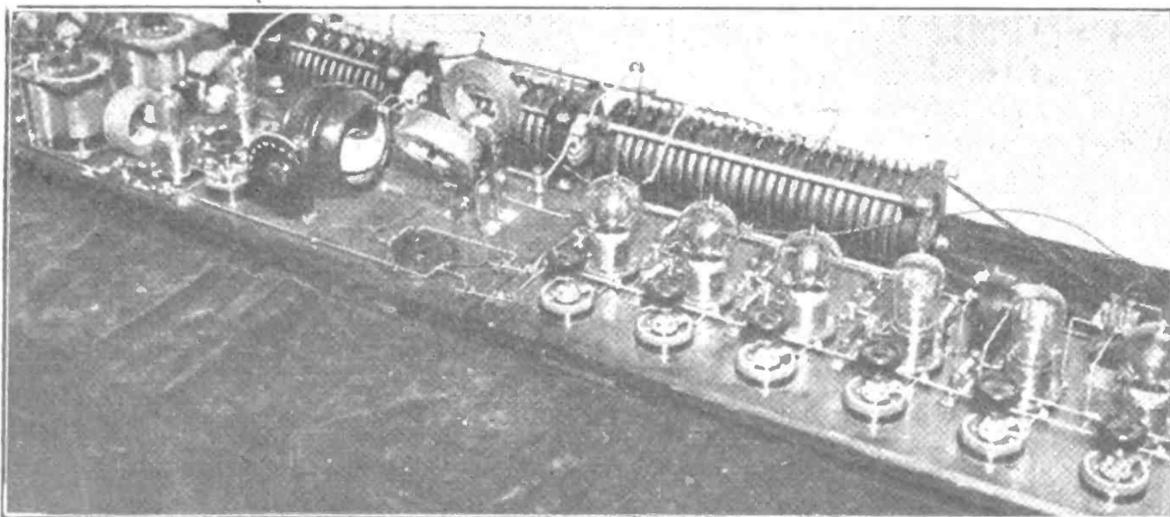
the transmitting station, but we must tune our receiver so that the flow of current in the receiver will be a maximum. When we tune the receiver, it is analogous to shortening or lengthening the swing so that it will have a natural period which will match up with the frequency of the pulses transferred to it, under which conditions the travel of the swing and likewise the current in the radio receiver will be a maximum. Since all radio signals, regardless of their wave-length, travel through space at the same speed, the shorter the wave-length the greater will be the number of pulses received per second.

The fact that a great number of transmitting stations can transmit simultaneously on different wave-lengths and that any one of these stations can be received without interference from the others, providing the wave-lengths are sufficiently separated, is one of the most interesting phenomena encountered in radio. The signals from all of these stations exist in space simultaneously, but none of them is affected by the others, each communication retaining its individual characteristics. Although very incomplete, a simple analogy to this condition can be made by dropping two stones simultaneously in a still body of water, at a separation of several feet. Waves in concentric circles will emanate from both points at which the stones enter the water. These waves will increase in diameter and the waves set up by one stone will cross those set up by the other, but after they have crossed they will emerge intact and neither one will be distorted or changed in form by having come in contact with the other.

In the foregoing it has been carefully stated that stations can be received without interference from other stations "providing there is a sufficient difference in wave length between the station received and other stations." This condition exists usually in commercial work, and did exist until recently in radio broadcasting work. With the increasing number of broadcasting stations, however, and the comparatively narrow band of wave-lengths which have been allotted by the Government for broadcasting work, it is not possible for all stations to

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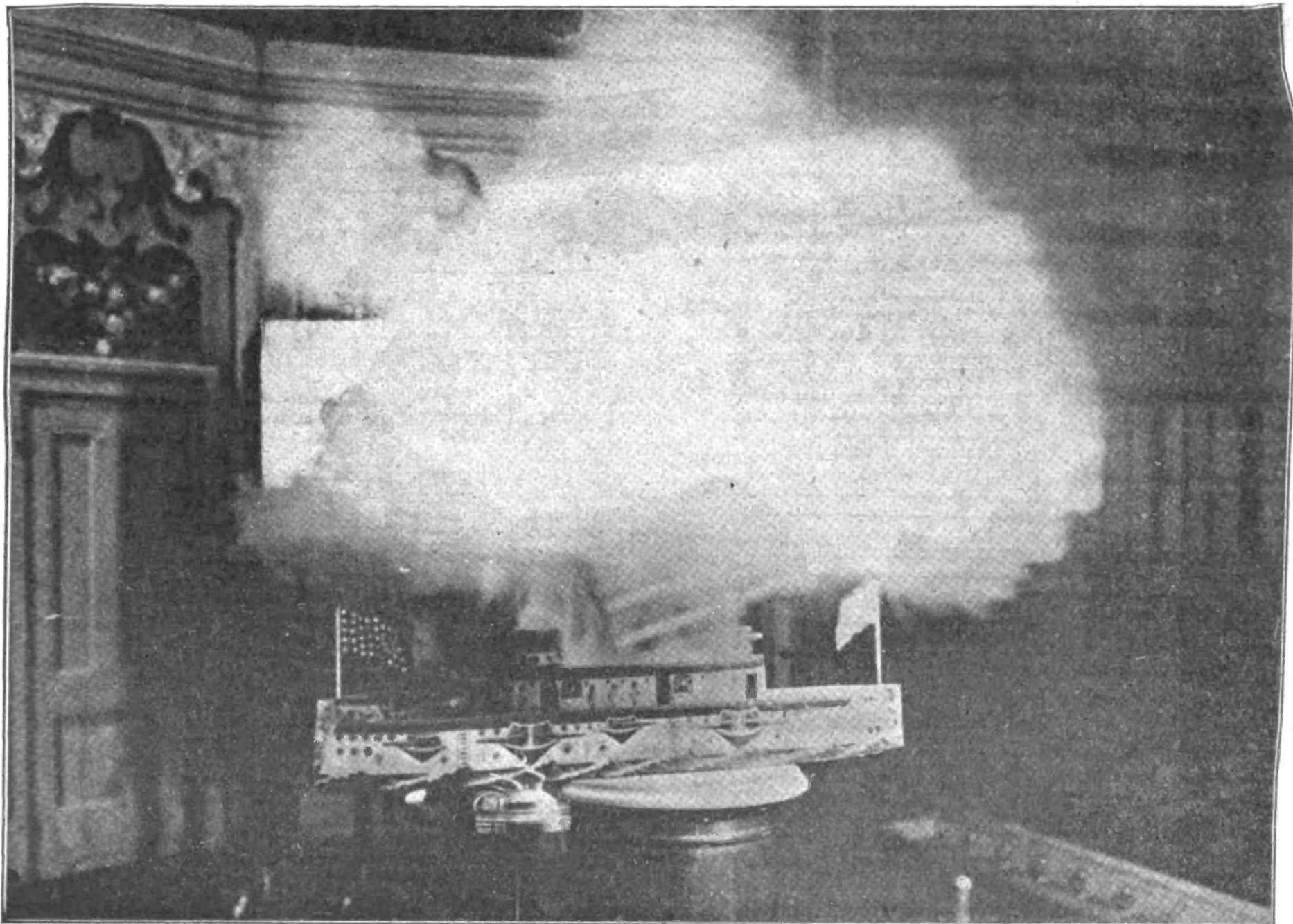
## The Rolls-Royce of Radio Receivers



(C. International Newsreel Photos)

The super-heterodyne receiver illustrated here has been termed by its inventor, "The Rolls-Royce of All Radio Apparatus." It is a most efficient apparatus of its kind, and like its name it is most certainly not the apparatus for the man with a "flivver" pocketbook.

# Blowing Up a Battleship By Means of Radio



(C. Kadel & Herbert)

One of the latest developments of radio is the invention of a special radio wave, discovered by Bernays Johnson, which will allow a bomb to be exploded at a distance. The special bomb is not dangerous, as it can only be set off by a person having the proper apparatus for generating the wave. Photo shows a demonstration in blowing up a miniature battleship.

(Continued from preceding page)  
work on a wave-length sufficiently different from those of other stations to permit its reception without at the same time hearing one or more of the other stations. A study of this condition has recently been made, and in one town, which is typical of a great number of the small towns in the eastern part of the United States, a total of thirty-nine broadcasting stations were picked up, in one evening, all operating on wave-lengths between 350 and 400 meters. In many cases two stations were found to be working on exactly the same wave-length, so that, even with the most refined receiving equipment, it was not possible to differentiate between them.

Until this condition is improved, those who listen to radio broadcasting are subjected to considerable disappointment, for we frequently find instead of selecting the particular program which we wish to hear, we are obliged to accept one which we can get without interference

from other stations, this one usually being the station located closest to the receiving station.

Superimposed upon this condition is interference caused by static disturbances and by receiving equipment in the hands of people not cautious in its manipulation. It should be remembered that, whenever a vacuum tube receiver is allowed to oscillate, it itself becomes a low power radio transmitter and causes interference with reception being carried on in the immediate vicinity. In receiving telephone signals, it is not necessary to have the receiver oscillate at any time, and any operator who carelessly permits his receiver to oscillate is increasing the difficulty of obtaining satisfactory broadcasting reception.

The elimination of static interference is, at the present stage of radio development, beyond the hope of the average receiving station and must, therefore, be accepted as an unavoidable evil. Interference caused by other stations will, we

hope, be reduced in the near future by the allotment of a wider band of wave-lengths for broadcasting purposes. This development has been under consideration by the United States Department of Commerce for some time and we must expect a ruling from them which will alleviate this condition. Until such modifications are made, however, interference caused by other stations is also an unavoidable evil for the average receiving station. More refined receiving equipment can be built which will increase considerably the selectivity of radio receiving equipment, but such equipment is comparatively expensive.

This condition will doubtless be remedied in the near future. Until that time we must be content in the knowledge that every effort is being made to improve this situation and that any apparent delay in accomplishing such improvement is merely an indication of the difficulties which are being met in making it.

# Radiation

By *Washington R. Service*

OPERATORS of broadcasting stations are warned by the Radio Section of the Department of Commerce not to communicate with other stations by either telegraphy or telephony as broadcasting licenses do not permit direct communication. Some stations have been guilty of acknowledging letters, telegrams and telephone calls, which, the Department points out, is direct communication. The suspension or revocation of the operator's license is the penalty for infractions of this rule. Owners are also cautioned to observe the rules laid down by law else their station licenses may be endangered.

\* \* \*

The Navy Department has begun the publication of the Communication Bulletin, issued in the interests of increasing the efficiency of Naval Communications, especially through greater rapidity and accuracy in handling messages by radio. "Keep the Fleet Mobile" is its motto, based upon the theory that efficient and uninterrupted communication between all units of the Navy makes for mobility of our sea defense.

\* \* \*

Radio has found its way into a college curriculum, according to a report from Philadelphia, which states that the University of Pennsylvania plans courses in Radio this Spring. Tulane University, WAAC, is now broadcasting the Commerce reports at 7.05 Central time on Fridays.

\* \* \*

Despite the general use of radio and the millions of fans informed as to the reception of broadcasts, some remain ignorant of possibilities: The other day in the National Press Club, one member suggested that the set be "speeded up," saying the music coming in was "too slow."

Bathing by radio is one of the last broadcasts from the Public Health Service, but whether ether waves were recommended was not made known.

\* \* \*

"Have they arranged to send money by radio yet?" asked a fan.

"Probably not," replied his wife, "too many people would 'pick it up.'"

\* \* \*

An admiral of the navy, in objecting to the suggested licensing of all service radio operators under commercial regulations, said it would be as sensible to require that he and some 6,000 other navigators in the navy take the Department of Commerce's examination for a master's license before they would be permitted to carry any passengers on naval vessels or transports. Which seems to be a good argument.

\* \* \*

Someone has suggested the name of "Radioowners" for those of us who have sets and listen in. Certainly it is better than most of the awkward terms in use today. "Listeners-in" is too long, "Radiophans" or "Radiofans" sounds like the name of an instrument, and we could hardly designate them as "receivers."

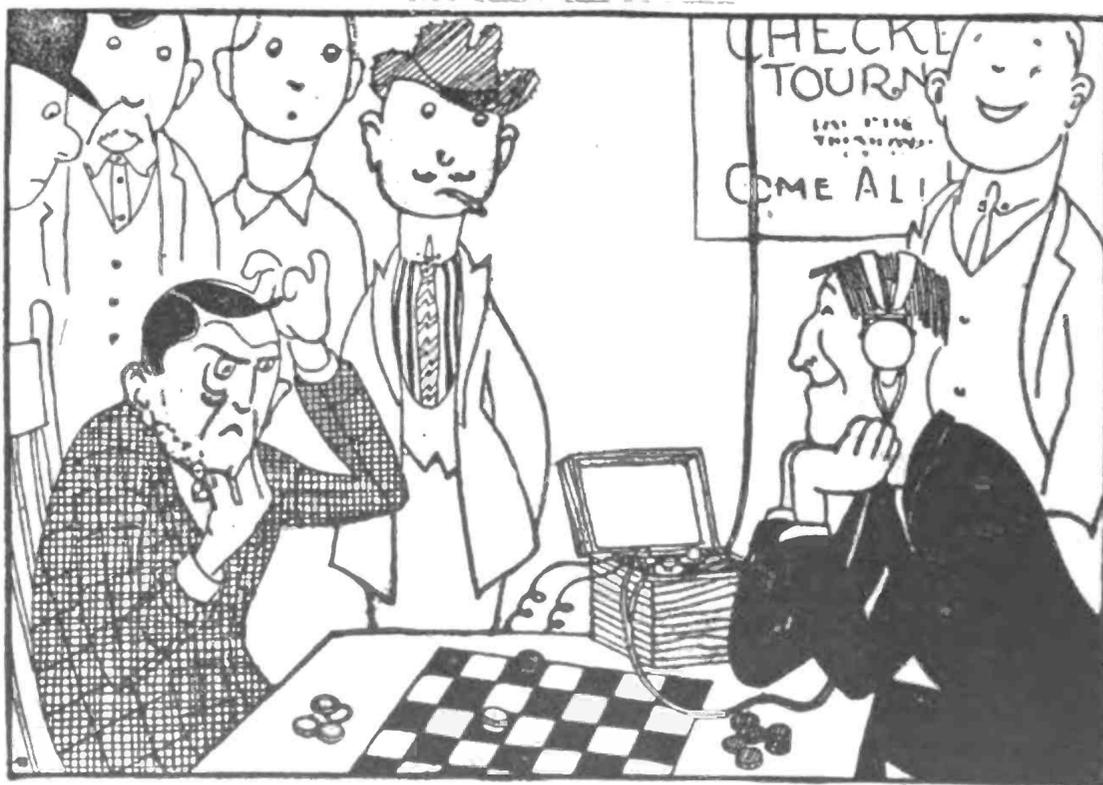
\* \* \*

Secretary Hoover says he doesn't care who controls radio and is willing to turn it over to the Interstate Commerce Commission, if Congress so decides, but he does insist that some regulations be enacted into law and that some one be put in charge to relieve the interference, handle licenses, and assign the waves.

## Broadcast Bill's Radiolays

By *William E. Douglas*

JIM KATER, better known as "Slats," remarked the other day that when it come to checkers he wuz "there" in every way. He talked so much about it that the fellers at the store got so they 'most believed him, all he said an' maybe more. Sez he, "Look! what I done last year; I'm champeen of the county, fer didn't I beat 'em, everyone, an' romp home with the bounty" The checker tournament this year wuz held in Brussels Sprouts an' endin' yesterday it caused excitement hereabouts. Today there's sadness in their hearts—I 'spose that some are achin', the boys had picked "Slats" Kater thinkin' he'd bring home the bacon. Last year with forty entries I beat all of 'em but one. "Slats" Kater took me over but he had to work like fun. Before the game I figured I could win as sure as shootin' but when we started playin' all the boys begun their rootin.' "That's the ticket, 'Slats,' old boy, you've got him goin' now." I guess it must of rattled me er somethin' anyhow he got the best two out of three an' so I said this year I'd stuff my ears with cotton to make sure I couldn't hear the rootin' that them fellers did when "Slats" pulled off his plays. An' then I had an idee which beat that one forty ways. You know I'm fond of list'nin' on this wireless set of mine, so I thought with those earmuffs on why wouldn't it be fine. I'd hear the sweetest music of some military band an' then they couldn't rattle me. I guess you undeerstand. Well, it worked out just like I



"There's no doubt in my mind Radio's what did the trick."

thought, friend "Slats" an' I were tied, so we were matched together, an', folks, that wuz when I tried the scheme which I just mentioned. Say it worked out purty slick an' there's no doubt in my mind Radio's what did the trick. I set there chewin' "Spearmint" with "Slats" rooters all about

an' listened calm an' peaceful fer I couldn't hear 'em shout. Then when I got him cornered, gosh I laughed at them big bums. Meanwhile the band wuz playin' "Hail the Conquering Hero Comes."

Copyright, 1922, Westinghouse Electric & Manufacturing Company.

# Radiograms

## The Latest Important Radio News Briefly Told for the Growing Army of Radio Fans

**F**OR the first time in the history of radio, an interchange of messages will be tried between American and French amateurs, without the request for "quiet air." This has been suggested, because of the fact that so many American amateurs were heard in the recent trans-Atlantic tests. If the tests are successful, a new point in low power transmission over long distance will be reached, because it is infinitely harder on the receiver to listen through and successfully get a message when the "air" is full of other stations sending.

\* \* \*

An address entitled "Police Work" was made recently from station WOR, by Commissioner Enright, head of the Greater New York Police Department, and President of the International Police Conference. As every large police headquarters in the entire United States is now equipped with the most up-to-date radio apparatus, this lecture created a great interest in police circles. Commissioner Enright is the recognized authority on police work and matters pertaining to it. Special arrangements were made whereby loud speakers were installed, thus allowing hundreds of thousands to listen in to the address.

\* \* \*

In an address before the Baptist Social Union at the Hotel Astor, in New York City, last week, Roger W. Babson declared that the churches of the country must be included in five or six great groups to be affected by radio broadcasting. He advised church members "to control for all time in the interests of righteousness the greatest single force for good or evil that is known today."

"A hundred thousand churches in this country and their millions of members little realize how their institutions are to be changed by radio broadcasting," said Mr. Babson. "People, like water, travel along the lines of least resistance. If they can hear, at home, by the fireside, on the radio the same service that they would other-

wise have to go out and hear they are apt to remain at home and use the radio."

\* \* \*

The general call signal KFZZ has been assigned for all vessels the radio stations of which are operated and controlled by the I. W. T. Co. This general call will be used by I. W. T. Co. ship or coast stations desiring to ascertain whether there is an I. W. T. Co. vessel within range, and any I. W. T. Co. vessel hearing another ship or coast station calling KFZZ should answer. This call signal also will be used in broadcasting general instructions to I. W. T. Co. ships.

\* \* \*

Porto Rico, which began broadcasting late last summer, has been plainly heard at points 2,000 miles distant. Cuba, which has a station of 400-watt capacity, sends out a 400-watt meter wave with a message of 2,400 miles.

\* \* \*

**Radio Regulation Bill is Passed by the House.**—The Federal Radio Control bill, which vests in the Department of Commerce the power of regulating all the wave lengths to be used, as well as the direct supervision of all phases of wireless telegraph and telephone communication, was passed in Washington on Jan. 31, 1923. The purpose of the bill is to eliminate the interference that is so prevalent now. Licenses will be required from all operators, with the exception of Government stations and operators handling government work. The power of assigning the different wavelengths and licenses is in direct charge of the Secretary of Commerce. The bill provides for an advisory committee of men appointed by the department heads, and will be the most eminent radio experts and radio men in the country. Amateur receiving stations will not be affected by the bill, and amateur transmitters will have a special series of wavelengths assigned to them.

# Radio and the Woman

*By Crystal D. Tector*

**I** HAVE at least found IT. Or rather we found it, I should say, for I had the help of a friend. We refer to a person who neither knows anything about radio or professes to care. We met her at a social given by the church, and, after a while, the talk turned to radio. "Oh, that silly thing," she exclaimed. "I never thought that normal women would take the least interest in it. My time is all taken up minding the house and children, and seeing that Jack has a warm dinner waiting for him every evening." Well, that certainly was nice. As though I ever fed F. H. on cold cuts, or let the children run around like orphans.

\* \* \*

**O**NE of the local theatres in our town has been running a moving picture in which the heroine is saved several times by means of radio. (Of course, she fell in love with the handsome operator of the station, and married him later.) The owner of the theatre, in order to increase his patronage during the run of the picture, advertised an amateur set contest. The winner was to have his choice of a season pass, or a trip through a modern moving picture laboratory. The only conditions were that no one over eighteen years of age could compete, they must have made the apparatus, and must be willing to allow it to remain on exhibition for a full week before the performance. A young man seventeen years of age won the prize, and chose the season pass.

\* \* \*

**T**HE fact that radio is really important to a woman who has to stay at home and attend to house duties, was illustrated to both F. H. and myself when we were visiting one night last week. The hostess, during the evening, confided to us the fact that since her husband has bought a Radio set, she doesn't go to nearly as many matinees or afternoon teas but, instead, stays at home, and then is able to keep him in good humor, by having a nice hot meal for hubby when he gets in. "And I've noticed

the number of sick friends that he used to spend the evening with are all better. He never goes out now to play the part of nurse to some other man. And do you know that if I didn't have that radio set, I think I would go to just as many matinees and teas as I used to, and Jack would be just as grumpy, when he has to stand for delicatessen food, as he was formerly."

\* \* \*

**T**HE minister of our church gave us a little talk the other evening at the meeting of the Ladies' Society, on the way in which Radio has helped the human race in general. After the meeting our pastor appealed to me, asking me if he had made his point strong enough or if I thought it was too strong I thought it was just wonderful, as did all the others. You simply cannot make anything that relates to radio too strong

\* \* \*

**F**RIEND HUSBAND, through a friend, heard the news that the concert we heard broadcast from PWX on January 6 was heard in Douglas, Alaska. "Why, they even heard her name, and the piano strike the first chord." The song he was referring to was "Mother Machree," sung by Miss Harriet Williams, of the American Consul General's Staff in Havana.

\* \* \*

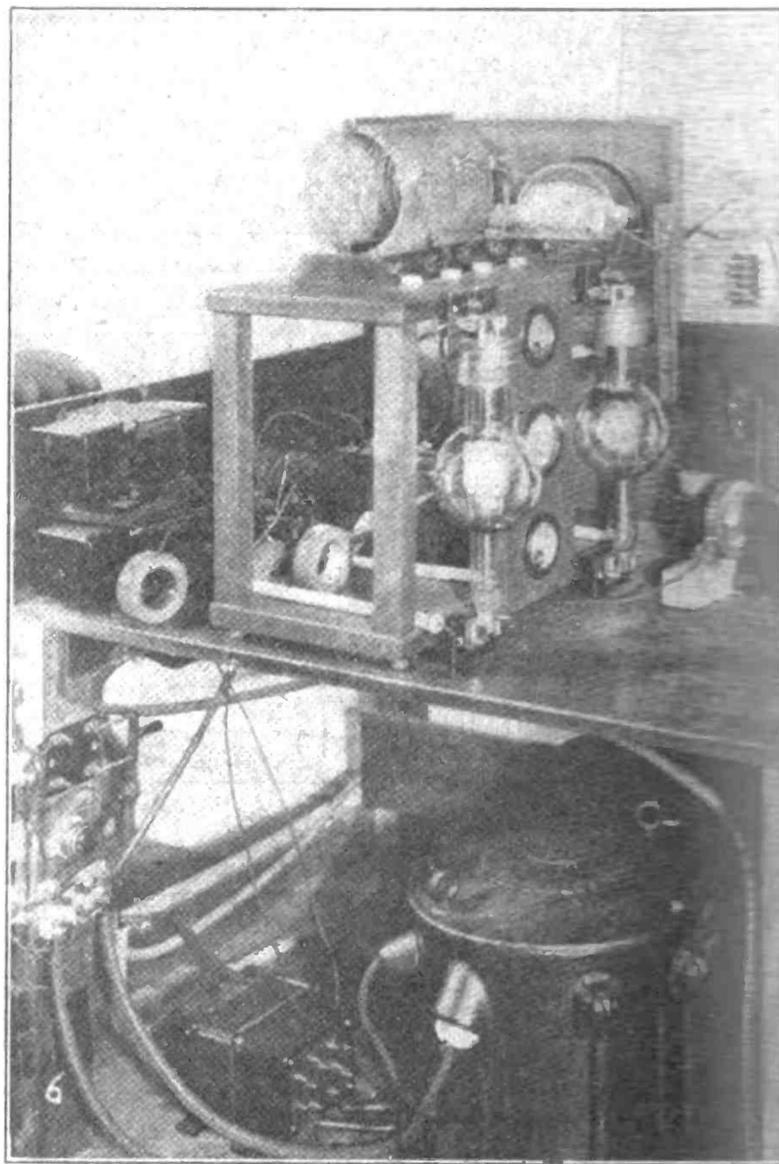
**I** HAVE just received an invitation to take a trip to England and listen in on the great trans-Atlantic test that is to be tried out next month. A friend of ours who owns a large yacht, tried to entice me by telling me that he would install a private set in my stateroom, so that I could keep "up to the minute" on all the latest radio stunts. No thanks, everything is happening too rapidly over here for me to think of going abroad, especially during the roughest part of the winter. One trip abroad, when we were first married, convinced me that I never was meant to be a sailor. I'll never forget that trip as long as I live. Neither will F. H.

# News of Radio



(C. Underwood and Underwood)

Dr. R. S. Piper, Chicago surgeon, and his single tube radio set which contains the only existing patented coupling transformer, which enables the set to receive extremely long distances without amplifiers. The tube used is the popular 1 1/4 volt tube, and the tuning is all done by means of the single control on the side of the cabinet, and the filament adjustment which is shown. The binding posts on the bottom of the cabinet are for the various battery connections.



(C. Kadel and Herbert)



(C. Photonews)

Radio music as an aid to dancing is the latest use to which radio has been put by Helen Lynch, noted actress and dancer. She keeps in trim for her stage dances by practicing to the tunes sent out by the various broadcasting stations. Since the larger stations have been enabled to



(C. Keystone View Co.)

Viscountess Matland, cousin of the King of England, having her character read by radio in New York City. Mme. Radora claims to sense the vibrations of her subject by radio, through the agency of the apparatus shown. The small pedestal has no connection with the apparatus used, and is used to hold the transmitter into which the questions asked are answered. As everything is secret there is no chance of any

(C. Underwood and Underwood)  
The only...  
the family...  
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# via Camera

*Captions by  
John Kent*



500-watt, continuous wave transmitting set used in the recent transatlantic tests at the amateur radio station ZYL, owned by J. O. Smith, Valley Stream, Long Island. Two 250-watt tubes are used with alternating current to light the filament, and also to supply the necessary plate voltage, a self-rectifying circuit being used to eliminate troublesome noises. For interrupted continuous waves, the chopper, seen in the center of the photograph next to the last tube, is used. This allows the signals to be heard on either straight crystal or audion. As can be seen, it consists of a small high-speed motor with a disc attached which is alternate pieces of insulating material and brass. A piece of brass or springy metal presses against the wheel, and when in motion it interrupts the current and allows the signals to be heard.



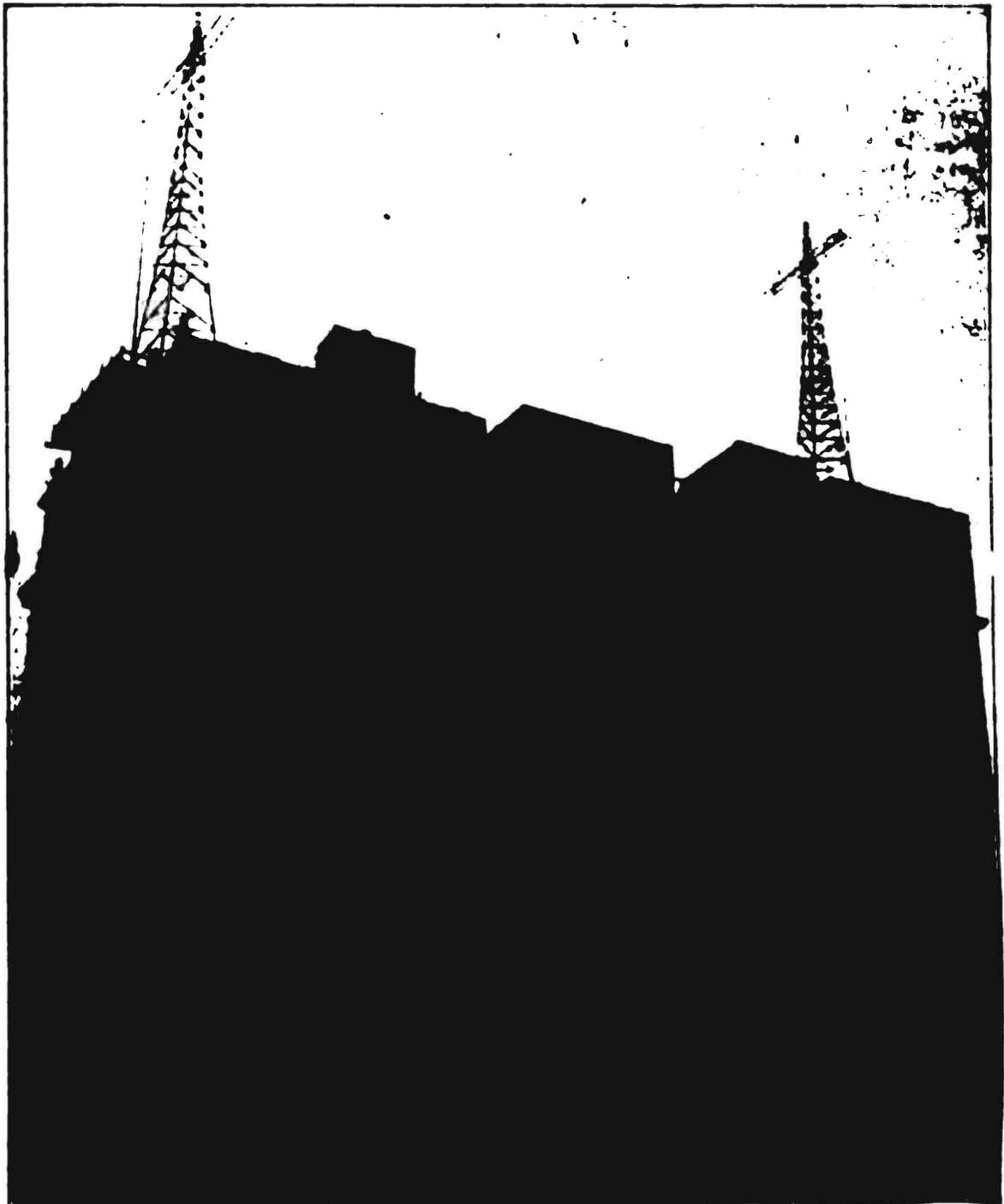
(C. International Newsreel)

By means of a portable loop and a loud speaker, radio music was recently heard on a subway train moving under the East River in New York. Messages broadcast by the Kansas City "Star" were picked up at the 80th Street station of the Interborough Subway, New York City. John C. Davidson, the inventor, is sitting next to the radio apparatus.



(and Underwood)

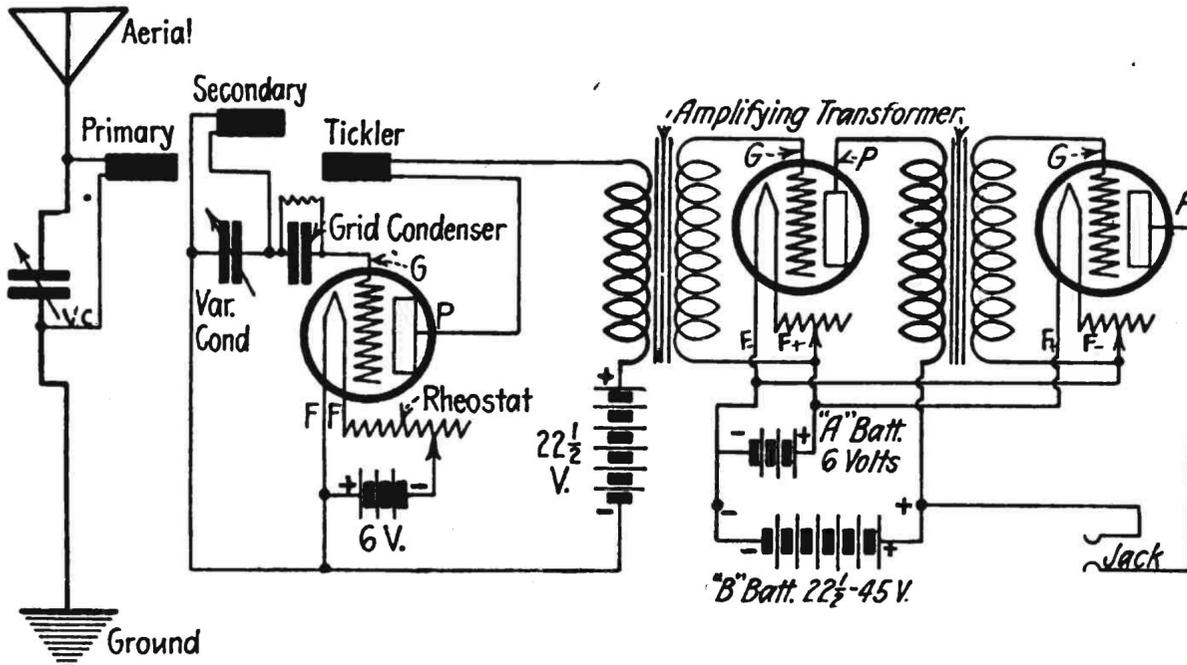
That little brother gets to listen in these days is when supper. The owner of this station, no doubt, has had keeping little brother away from the transmitting set, like to fool with things forbidden. Radio has taken its place in the life of today that an expert predicts that even the old-fashioned games of marbles, one o' cat and



(C. Photonews)

The two towers of the new station on top the Asellan Building, New York City, have just been completed and will soon be ready for use in connection with the new super-broadcast.

# Answers to Readers



Regenerative receiver using three honeycomb coils, with detector and two steps of amplification, as requested by Mr. Le Croice. (See letter on this page.)

**PUBLISH** hook-up using the following materials: 3W-D 11 tubes, B batteries, 2 variometers, 1 vario-coupler, condensers, socket rheostats, etc. What would be the range of the set? Show how I could use two panels—one for the radio frequency, one for the detector and audio frequency.—Charles Scheer, 300 Clifford Street, Philadelphia, Pa.

Refer to RADIO WORLD dated Dec. 9, page 4, where you will find two very excellent radio-frequency hook-ups by Donald Van Wyck.

There is no stated range to any set, but you should have no trouble in getting upwards of 1,000 miles out of such an outfit if correctly connected.

Refer to page 13 of RADIO WORLD dated Dec. 23, where you will find an article on this by John Kent and Arthur Hennesly.

\* \* \*

1. Your hook-up published by Mr. Gordon in the January 20 issue of RADIO WORLD, states that a 50-turn coil and a 75-turn coil is used, yet the drawing shows them the same size.

2. Also, the way in which Mr. Gordon has the panel laid out, makes it impossible to rotate the upper coil, because of its proximity to the lower one, which allows only a very slight movement before they hit. Is this as it is supposed to be?

3. Will regular unmounted honeycomb coils of like number of turns do for this purpose in this circuit?—C. Z. Hoffman, 1415 Vine Street, Philadelphia, Pennsylvania.

1 and 2. As the exact difference in the coils themselves is so slight it was not shown in the drawing. We left it to the readers to realize that the working drawings meant the respective coils as described in the article. This was an error not realized at the time of writing, but can be remedied by having sufficient play in the bearing of the upper coil to allow you to turn the entire coil. It calls for some little extra work but the results gained will repay you many times in receiving.

3. Regular unmounted honeycomb or duolateral coils will answer the purpose if the correct coils are used—namely the 50 DL and 75 DL.

\* \* \*

Publish diagram of a three-circuit

regenerative receiver using the following apparatus:

1. Honeycomb coils, separate batteries for detector and amplifier, and two-step amplifier with jack at the end of the second step. Primary circuit to have condenser in parallel for long waves.

2. What meter range is possible with such a set?

3. Can I use it for 360-meter waves as well as others?

4. What kind of transformers are necessary?

5. What kind of tubes should I use?

6. What should the voltage on the amplifier be?

7. Can I use a loud-speaker with such a set, the loud-speaker to be in the adjacent room, which would necessitate a lead of wire 40 feet in length? Would this harm the signals in any way?—Jack Le Croice, 254 Studman Place, Montreal, Canada.

1. Hook-up you request is herewith published.

2. You can get from 150 to 25,000 meters with such a set. The wave range depends on your coils.

3. You can use it for 360.

4. Any audio frequency transformer on the market is O. K. We advise a high ratio transformer for the first tube so as to get the maximum transfer of current from the detector through the first stage.

5. A W-D 11 can be used with this hook-up, as a detector (the detector battery being separate from the amplifier). Hard tubes of the U. V. 201 type should be used for the amplifiers.

6. The voltage is marked on the drawing.

7. You can do as you suggest if care is taken to make the wires no longer than absolutely necessary. Good results can be had by using twisted lamp cord. No harm is done to the signals, but they might be slightly weaker, due to the resistance of the extra length of cord.

\* \* \*

1. Can the Meyers' tubes be used in the set described in your issue of RADIO WORLD dated January 20 by Mr. Ortherus Gordon?

2. Can I use the Meyers' Audio Choke coil for one stage of amplification in connection with the foregoing?

3. In winding the honeycomb is it neces-

sary to wind it as lattice or can straight winding be used?

4. Can I use the standard honeycomb or D-L coils with this hook-up?—William H. Morihouse, Thomaston, Conn.

1. These tubes can be used only as amplifiers. They cannot be used as detectors.

2. Yes, you can do this.

3 and 4. We advise the regular honeycomb coil unless you desire to wind your own. The fact that all honeycomb coils are wound latticewise is to save space, as fifty turns on a tube would take up more space and have more distributed capacity than if it were wound latticewise.

\* \* \*

1. Kindly tell me what is the best type of receiving set to enable me to hear concerts up to 1,500 miles.

2. I wish to use an inside antenna. Is it as efficient as one on the outside?

3. What would the probable cost be, and where could it be purchased?

4. Name a good book for the beginner in radio.—Thomas Ross, 34 Brook Street, Sanford, Me.

1. We advise a receiver incorporating both radio frequency, a detector and one or two stages of audio frequency. There are numerous sets of this type on the market, and as it is against the ethics of RADIO WORLD to discuss competitive types of apparatus now being sold in the open market, we advise you to allow someone who has handled this apparatus on the outside to give his opinion.

2. The outside antenna is granted to be most efficient, so far as received signal strength is concerned, but the loop antenna has also the advantage of being less trouble as far as static is concerned. For really long distance reception we advise you to try the outside antenna.

3. We cannot quote prices through this column. See advertisements.

4. See inside front cover of February 3 issue of RADIO WORLD for both reference books and experimenters' handbooks.

\* \* \*

I am using a two-variometer regenerative set, but would like to know if there is a set that will give me better results. I have heard PWX several times.—Fred Johnson, Keystone, Neb.

You seem to be getting good results from your set. If you wish to change, we advise you to try two steps of radio frequency, either crystal or tube detector, and one or two steps of audio frequency. A hookup for such a set was described in RADIO WORLD, dated December 9.

\* \* \*

Kindly publish the wiring diagram of the set illustrated on pages 4 and 5 of RADIO WORLD dated January 20.—H. B. Clough, 9 Exeter street, Portland, Me.

If you will refer to page 6 of the same issue you will find the diagram at the bottom of column 2. The B battery is connected wrong in the diagram. The plus (+) should go to the plate, not to the filament as shown.

\* \* \*

1. Would vernier condenser (43 plate) in the antenna circuit be of any advantage in the set described by Ortherus Gordon in RADIO WORLD dated January 20, or would a regular 43 plate condenser suffice?

2. Is the B battery connected right in this hookup? I notice that the plus goes to the filament.

3. Would a potentiometer be of any use in this circuit, and if so, how is it connected? (Continued on next page)

# 500 Miles without Aerial

By E. M. Pace

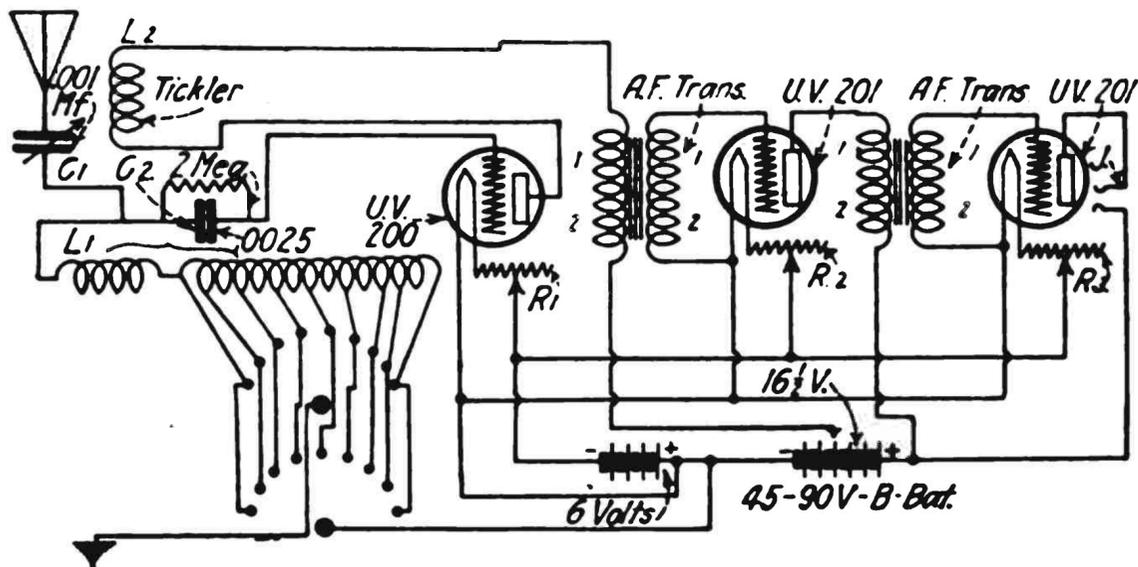


Fig. 1—Hookup of receiver described below, with which Mr. Pace has done some excellent work.

I AM sending you herewith a wiring diagram of my receiving set and I hope that you will be able to use it, as I have found it to be one of the best receivers that I have ever used. Here are a few ideas as to the building of the set.

The entire set is conveniently and neatly mounted on a panel 12 by 14 inches in the following manner: The panel is divided in two parts by the insertion of a base for the mounting of the tubes, transformers, etc., 7 inches from the bottom of the panel. The base for the inductances is mounted on the bottom of the panel. On the lower half of the panel is mounted: the inductance, the switches, and the condenser; in the lower left-hand corner the ground binding post, and on the right-hand side the B battery connections. On the upper half of the panel is mounted: The Bradleystat, two rheostats, and in the upper left-hand corner a binding post for the antenna connection, while the A battery connections are in the lower right-hand corner, and the phone jack in the upper right-hand corner. As to the material used I will specify the following: A Bradleystat on the detector is necessary, and two model A Rhamstine transformers are suggested. A heavy condenser is also very necessary and a vernier attachment will help out very much.

With my set, I have logged over 62 radiophone stations, the longest distances being: KHJ, of Los Angeles on the west; WMAT at Duluth on the north; WJZ at Newark on the east and PWX at Havana on the south. Without the use of an outside aerial, and using no aerial at all I have logged KDKA and ten other stations, all over 500 miles distant. I have abandoned the outside aerial

now, having moved to a location where I couldn't get one up, but am getting excellent results from the lighting circuit by plugging in at the lamp socket.

My connection to the light socket is by inductance only, as I am using a length of the ordinary lamp cord (twisted pair). One wire is connected to the inside connection of the light socket, the other end of this same wire is taped securely to prevent a contact with the set. The other wire connects to the antenna connection. The free end of this wire is taped so that no connection can accidentally be made. I find that with this arrangement that my set is almost noiseless and that stations that heretofore came in weak now come in loud and clear. This arrangement is not recommended unless the light wires are all overhead. The current is always turned "on" when tuning in. Another important feature is the shielding of the set. This I have done with a fine mesh copper wire screen cloth, and I find that practically all body capacity is eliminated. Care must be taken that none

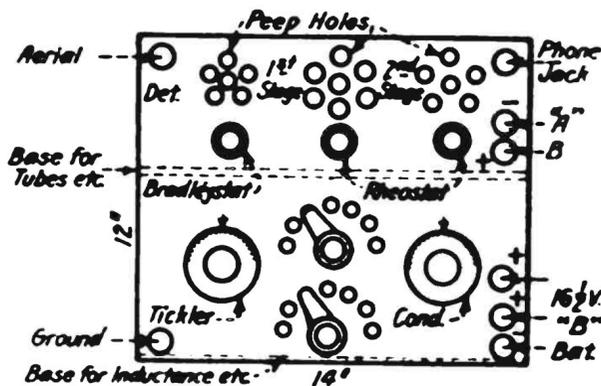


Fig. 2—Plan of panel showing the arrangement of controls.

of the parts touch the screen, and that it is well grounded, and preferably to a separate ground, although this is not necessary. I also wish to say here that my set is at present located under a tin roof, and with this roof being used as an aerial I have got good results, but not as good as with the light wire.

If there is any further information desired in connection with the building of this set I will gladly give it. The cost is small, and I urge any one contemplating the building of a receiver to give this one a trial.

Latest broadcasting map, 15c. That is, a complete broadcasting map appeared in RADIO WORLD, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, New York City.

## MAGNAVOX is "news"

THE constant allusions to Magnavox Radio equipment in the public press, and the numerous illustrations of Magnavox Reproducer in operation, show how profoundly the radio world has been influenced by the Magnavox electro-dynamic principle of sound amplification.

### R-2 Magnavox Radio with 18-inch horn

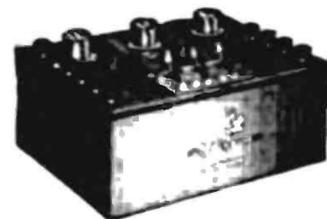


THIS instrument is intended for those who wish the utmost in amplifying power: for large audiences, dance halls, etc., but requires only .6 of an ampere for the field.

### R-3 Magnavox Radio with 14-inch horn

SAME in principle and construction throughout as Type R-2. Is ideal for use in homes, offices, amateur stations, etc.

Requires one ampere field current from your filament battery.



### Magnavox Power Amplifier—Model C

CAN be used with any "B" Battery voltage which the power tube may require for best amplification.

### AC-2-C, 2-Stage and AC-3-C, 3-Stage

The facilities and experience back of each piece of equipment bearing the Magnavox trade mark are unrivalled anywhere in the world.

Magnavox products may be had of good dealers everywhere.

Write to us for illustrated booklet

The Magnavox Company  
Oakland, California

New York Office: 370 Seventh Ave.

(Continued from preceding page)

nected?—E. W. Johnson, 1441 Wilton street, Denver, Colorado.

1. You could use a vernier in this circuit very nicely. It would give you much finer tuning, although it is not absolutely necessary.

2. The B battery is connected incorrectly. The plus as you state should go to the plate, and not the filament. The way in which it is connected will not work.

3. A potentiometer is of little value in this circuit, as you have only 22½ volts on the plate, and the advantage, if any, would be so slight that it would not be of any value to bother with it.

# Latest from the DX Nite Owls

## Page Mr. Smith Again

From F. B. Meador, Coraopolis, Pa.

**K**INDLY page Mr. Kenneth Smith. I am using a double slide tuning coil, six inches long and four in diameter, home-made, a crystal detector and condenser. Dictagraph phones are used. My aerial is V-shaped, about 50 feet high and 150 feet long.

Here's my record, not including the nearby stations: WLK, WDAP, WOC, WHAZ, WHAS, WBT, WELAW, WLW, WJZ, WGY, WCE. As you will notice, these are stations listed in Charlotte N. C.; Chicago, Ill.; Davenport, Iowa; Minneapolis, Minn., besides Atlanta, Georgia, and closer ones. When you look you will see I live only 15 miles from Pittsburgh, and I think you will agree with me that this is some crystal record. I also heard a station in Omaha, Neb., but missed the call letters. Will be glad to hear from anyone interested in my record.

## Hears PWX Regularly

From Frank Edel, DuQuoin, Illinois.

**I** AM enclosing both my records for DX crystal detector and also V. T. detector work. Following is my list of stations heard using a crystal detector without amplification of any sort:

KSD, St. Louis "Post-Dispatch," St. Louis, both night and day.

Other stations heard at night only are: WCK, WHB, WDAF, WOC, WBAP, WGM, WSB, WDAJ, WGY, WDAP, WWJ, WCX, WLW and WOH. I do not consider it anything out of the ordinary to receive distant stations with a crystal set if time and care are taken in construction of the set. I can duplicate a good many of the stations any night that the conditions permit. I do not refer to static and other natural conditions, but to interference from the local arc system which at times causes trouble to such a degree that it is impossible to hear anything at all. My V. T. reception record I consider fairly good. I made this record using a home-made single circuit regenerative receiver without amplification. I can receive nearly all of these stations every night: KSD, KHJ, KDKA, KFAF, KLZ, KOP, KZN, KYW, KFDF, KOB, PWX, NOF, CKCK, CFCA, CFCN, CJCG, WEW, WCK, WMAY, WIAR, WOH, WLK, WSB, WGM, WGY, WOR, WJZ, WHAS, WWJ, WOAI, WCX, WBAP, WEAK, WDAJ, WDAF, WOS, WOC, WMAB, WJD, WDAL, WHB, WLW, WBT, WOAL, WLAG, WFAA, WEAY, WPA, WDAP, WMAQ, WOO, WOI, WMAU, WNAL, WAAV, WTAW, WJAX, WQAA, WMAT, WKN, WFAF, WMAK, WNAD, WNAV, WBL, WLAQ, WEAU, WHK, WFAV, WAAP, WOAG, WIAU, NAS, WSY, WJAP, WCAV, WGF, WPAC, WJAN, WKY, WMAH, WIAO, WCAE, WGR, WJAD, WLAJ, WAAW, WMAF, WMH, WAAB, WHAM, WLAL, WAAC, WEAB, WPAL, WMAJ, WMAV, WKAL, WAAA, WBZ, WDAE, WOAN, WWAC, WWI, WAAH, WCAV, WGAS, WNAS, WDAO, WNAC, WAAF, WQAO, WOAC, WAAL, WOO, WBAV, WCAS, WHAZ, WIAB, WRAM, 2XB, 5OI, 5RH, 5WA, 5XY, 5ZA, 5UU, 5XAY, 8XI, 8XJ, 9XU, 9XD, 9BWI, 9XAO, 9DTF and 9YAF.

My hours of listening in are from about 5 P. M. to 1 or 2 A. M. While this list of stations looks big, it is nothing very great as it has nearly been duplicated by three other people in DuQuoin using a hook-up similar to mine. I receive PWX and KHJ, my two best DX's, regularly;

**T**HE Editor of RADIO WORLD will be pleased to receive sketches of hook-ups drawn carefully in black ink or heavy pencil from the "DX Nite Owls" who send in records with a view to publishing them.

Send hook-ups of your sets, provided they contain something unusual. Send, also, the names of the various makes of apparatus you are using.

Make your letters brief and informative. Write on one side of the paper only.

The letters and hook-ups will be published in the earliest possible numbers of RADIO WORLD.

PWX on Wednesday and Saturday, and KHJ nearly every night. Any one desiring hook-ups of either set may have them by writing to me for them. I also invite investigation of either set and also the record. I am using a pair of Federal 2200 ohm headsets, a 21 plate variable condenser, bought "knocked down" and assembled myself, a variocoupler with taps taken off every 10 turns up to 90 turns. My rheostat is a Howard Vernier and my tube a Cunningham detector. The hook-up while simple and very easy to understand, is very effective. Further information concerning set may be had by writing to me.

## Code from Colon, Panama

From Burdette Bowman, 616 S. McClure St., Marion, Indiana.

**I** SAW in RADIO WORLD for January 13 that you were interested in unusual hook-ups. Using a variometer, two home-made honeycomb coils, a 23-plate condenser and phone and grid condenser and the W-D 11, I have heard KYJ, Los Angeles Examiner, a distance of 2,223 miles; KDYY, Denver, a distance of about 1,600 miles. I receive music from Schenectady, Kansas City, Chicago, Toronto, New York City, Atlanta, New Orleans—at a distance of 300 to 700 miles—every night.

Any night Fort Worth is sending I can get it or any other station within a thousand miles. On January 11 I received music and lectures from WWJ, WLK, WJAF, WOH, WOR, KDKA, a station at Albany, WGY, WMAV, WHB, WOC, WBC, WFAF, WFAA, KYW, WDAP, and WGY's late program.

If any of the readers are interested in the way I have my set hooked up I will gladly forward information.

## DX New York to Los Angeles

From Howard A. Chinn, Member of Hudson Radio Club, Inc., and Radio 2CEG, 210 West 182d Street, New York City.

**B**ESIDES listening to amateur DX I sometimes listen in to broadcast DX. I have heard practically all the stations within a 1,500-mile radius, which many others have reported, so I won't bother to enumerate them. The best broadcast DX that I have done is KHJ, Los Angeles. I heard them several times during the early part of January. Have received a letter of acknowledgment from them. This was done on a single tube and with ordinary regeneration; no amplification or super-regeneration. I think this is a record, as I haven't seen its equal in print as yet. Considering the fact that I live in the heart of New York City, surrounded by high apartment houses, I think this isn't bad for one tube. I maintain that if you can't hear it on detector, audio-frequency amplification won't help because you can't amplify what you don't detect.

## From Iowa State University

From Harold E. Pratt, Member of WSB Radiowis, 316 S. Capitol St., Iowa City, Iowa.

**A**M a student here at the State University of Iowa and during my spare time I built a detector and one-stage regenerative set. I might add that owing to the conditions here I was unable to put up an outside wire, but am using my light fixture (and without any plug). Just wrapped a piece of lamp cord around the center of the three light fixture in my room, and got the following: WOC, Davenport; KSD, St. Louis; WHAS, Louisville; WWJ, Detroit; WDAP, Drake Hotel, Chicago; WGY, Schenectady; 2XI, Schenectady; KYW, Chicago; WBAP, Fort Worth; WHB, Sweeney Auto School; KSAS, Denver; DN4, Denver; KLZ, Denver; WGM, Atlanta Constitution; WSB, Atlanta Journal; KHJ, Los Angeles Times; WLAG, Minneapolis; WFAA, Dallas; WDAF, Kansas City; WEAE, Fort Dodge; WJZ, Newark; WNAV, Knoxville; WLW, Cincinnati; WDAJ, College Park, Georgia; WOI, Ames, Iowa; KDKA, Pittsburgh; KDYS, Great Falls; WGF, Des Moines; WFAT, Sioux Falls; CFAC, Calgary, Canada; also stations at Okmulgee, Okla., and Birmingham, Ala.

## Heard Ship Alaskan

From E. G. Barnes, Mt. Vernon, Ohio.

**I** AM not a DX Nite-Owl, but I have had my feet wet, as H. J. Hall says. I have a home-made set consisting of 3 pancake coils, 1 tube, 1 grid con. and leap, 1 phone condenser socket and 2 home-made variable condensers, no aerial. The ground is wrapped around a water pipe in the cellar; not one drop of solder in the outfit. My tube is U. V. 200. This set was set up November 26, not 60 days ago; but I have had musical numbers from 81 different stations and 5 ships. Twenty-seven states are on my list. One Sunday evening I had Drake's Hotel at Chicago for two hours clearly, without touching a knob or dial. On January 15 from 4 P. M. to 10:30 P. M. I had 27 stations of which 12 were new ones, every one clear and loud. My farthest points were Boston, Hartford, Quebec, Portland, Oregon; Los Angeles, Austin, New Orleans, West Palm Beach, and back to New York City, and 72 others. Also had WKG on ship Alaskan. I should be glad to know the route of this ship.

Boys, have I had my feet wet? If not, get in. Do you take the Radio World. If not, get it. It's good. Will be glad to hear from any of you. This hook-up will be furnished on application.

## In Less Than Three Months

From Cyril Cornwell, Osage, Iowa.

**O**N Friday night, January 19, I heard the following stations: KDKA, WGM, WDAP, WPA, WCX, WFAF, KYW, CJCG, WOC, WAAP, WWJ, KSD, WDAF, WCAZ, WFAA, WMC, KHJ, WOAN, KLZ, WOS, CKCK, WAAH, KFAF, CFCA, KFBB, WGY, WLW, WBAP, KDZQ, WSB, WDAJ, CFCN and KNJ. I listened in from 7:30 p. m. to 1:00 a. m. Besides these broadcast stations 143 amateur telegraph stations were copied, making a total of 176 stations in 5½ hours. With my receiver I have heard 132 stations in the United States, one in Havana, and 7 in Canada—a total of 140—all since November 5, 1922.

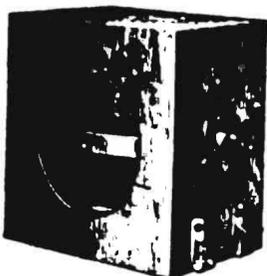
(Continued on page 31)

**RADIO SUPPLIES ALWAYS AT SENSIBLE PRICES**

All Wave Coupler, 160-300 Meters, with Free Hook-Up ..... \$4.00  
 1 1/2 Volt Tubes ..... 4.00  
 6 Volt Detector Tubes ..... 2.00  
 6 Volt Amplifier Tubes ..... 2.25  
 3 Inch Dials ..... .25

**WHITE'S**

(Formerly Stanley Radio Supply Co.)  
 123 EAST 23RD ST., NEW YORK CITY  
 Cash with Order. Allow Postage.



**King Sr.**

Variometer

150 to 600 meters.

No outside connecting hardware used—reducing capacity losses.

Rugged—Solid. Size 4 1/4" x 4 1/4" x 2"

Guaranteed by manufacturer direct to user.

Retail price \$2.50

Ask dealer to show same to you.

Aracno Mfg. Co., 30 East 23rd St., N. Y. C.

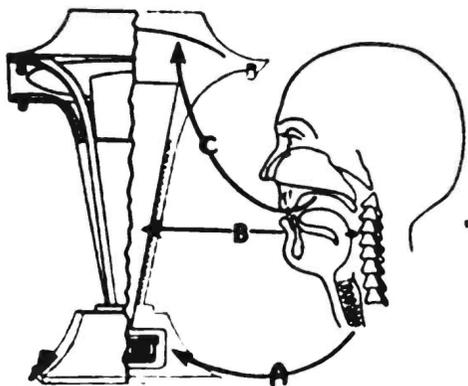


The Niftiest Short Wave Tuner on the Market Only \$6.00 & PP on 1 lb. Send for pamphlet.

**L. W. GOODMAN**  
 DREXEL HILL, PA.

Doctor \_\_\_\_\_, Norristown, Pa., writes: Listening in recently with my GOODMAN, heard a voice, "We are now 90 miles out from San Francisco." Then DENVER came in and sank the ship.

**THE ACOUSTICAL AMPLIFIER**  
**BEL-CANTO**  
 TRADE-MARK  
**LOUD SPEAKER**



It follows the natural functions of the human throat. The receiver is the vocal cord (A); the long tapering inner horn is the throat (B); and the "sounding-board" at the top is the roof of the mouth (C). A guarantee of superb tone.

Is adjusted for regenerative two stages of amplification, also five tube radio and audio frequency.

Special phone, cord and plug, price \$30.00 F. O. B. New York.

If dealer can't supply, we can.

Full line of radio parts.

At your dealer or direct from maker.

**Bel-Canto Corporation**  
 417 East 34th Street, New York City

**RADIO WORLD**

TELEPHONE, BRYANT 4700  
 PUBLISHED EVERY WEDNESDAY (Dated SATURDAY OF SAME WEEK)  
 FROM PUBLICATION OFFICE,  
 1408 BROADWAY, NEW YORK, N. Y.  
 BY HENNESSY RADIO PUBLICATIONS CORPORATION  
 BOLAND BURKE HENNESSY, President and Editor  
 M. B. HENNESSY, Vice-President  
 FRED S. CLARK, Secretary and Manager  
 1408 BROADWAY, NEW YORK, N. Y.

**TECHNICAL EDITOR**

Robert L. Dougherty

**SUBSCRIPTION RATES**

Fifteen cents a copy. \$3.00 a year. \$2.00 for six months. \$1.50 for three months.

Add \$1.00 a year extra for foreign postage. Canada 50 cents.

Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order.

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One page: One time—\$150.00.

Half, Quarter, Third and Two-thirds pages at proportionate rates.

One inch, one time—\$5.00. Per space line, \$0.40.

On four consecutive issues, 10% discount.

On thirteen consecutive issues, 15% discount.

Cover and preferred-position rates made known on application.

Terms: 30 days Net. 2% 10 days.

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Five cents per word. Minimum, 10 words. Discount of 10% on 4 consecutive issues—15% on thirteen consecutive issues. Cash with order.

Entered as second-class matter, March 23, 1922, at the Post Office at New York, New York, under the act of March 3, 1979.

**IMPORTANT NOTICE**

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

**Radio and the Churches**

Not only does radio bring the church into the home, but it brings church services into other churches, says "The Radio Dealer."

The story is told of a church out West that lost its pastor. No substitute clergyman was available and it looked as if there would be no services on the Sabbath. A radio enthusiast saved the day. He rigged up a receiving set with a loud speaker. When the congregation assembled on Sunday morning it was surprised to see a mechanical device on the rostrum instead of a clergyman.

Soon the contraption on the rostrum prayed, sang, talked and preached. The sermon was said to be a good one. It was probably better than the congregation was in the habit of hearing, for it was a poor church and had little money.

No one knows what unexpected influences may be exerted by radio on church affairs. It may make possible the elimination of a certain number of clergymen. It may develop a new class—ecclesiastical orators—who will specialize in broadcasting and will leave the pastoral work to be done by others.

A recent survey shows that the broadcasting in this country of Sunday church and religious services covers 65.2 the area of the United States—surely enough for most people.

Some large churches are now broadcasting their own services to those who stay at home. Others will doubtless do this soon. Churches that aim to serve as "community centers" have receiving sets for the benefit of the church clubs and organizations seeking sociability and pleasure in the church-house.

**Let Radio Radiate Your Home**

List	Our Price
\$8.00 Etsemann Phones	95.25
16.00 Western Electric Phones extra our caps and mufflers	7.50
25.00 Federal Jr. Crystal Sets	12.50
5.00 Fisher Variometers and Couplers	2.75
1.50 Klossner Vernier Rheostats	.95
5.50 Workrite Bakelite Degree Coupler	3.50
1.00 Paragon Bakelite Sockets	.60
1.75 Bright Star "B" Batteries	1.15
8.00 Federal Phones	6.25
60.00 Cutting Washington Regenerative Tube Set	27.50

Write for free catalogue  
 Perfection Pays Parcel Post

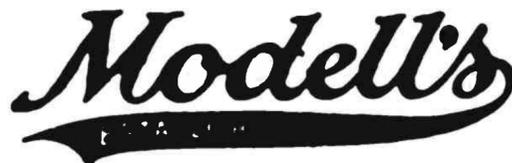
**Perfection Radio Corp. of America**

119 WEST 23RD STREET, NEW YORK

**RADIO At Cut Prices**

Just a Partial List of the Many Bargains Offered

- \$5.50 Murdock Double head sets..... \$3.40
- \$5.00 Acme Transformer, Radio and Audio ..... 2.45
- \$18.50 "Homcharger" De Luxe..... 13.95
- \$5.50—180 Variocoupler on bakelite silk wound wire ..... 2.45
- \$15.00 Western Electric Phones..... 7.45
- \$6.00 Genuine "Tuska" molded variometer with dial ..... 2.95
- Ammeter for Testing "B" Batteries.. .40
- Hydrometers for Testing Storage Batteries ..... .30
- \$2.50 Phonograph Attachment ..... 1.15
- \$2.50 Socostats ..... 1.25
- \$5.00 43-Plate Condenser ..... 1.95
- \$4.00 23-Plate Condenser ..... 1.55
- Framingham Rheostats ..... .45
- 2-inch Bakelite Dials ..... .25
- 4-inch Electros Dials ..... .75
- 3-inch Bakelite Dials ..... .35
- W. D. 12 Transformer for W. D. 11 Tube ..... 4.95
- \$1.00 Freshman Variable Grid Leak and Condenser Combined ..... .80
- 100 ft. 7-Strand Aerial Wire..... .35
- Genuine All-Wave Coupler ..... 7.90
- 50c Single Pole Switch..... .30
- 75c Double Pole Switch ..... .35
- 1/2-lb. Annunciator Wire ..... .20
- Bus Bar Wire Per Foot..... .22
- \$10.00—3000 Meter Coupler ..... 4.95



**RADIO STORES**

Dept. E, 191 Fulton Street, N. Y. C.  
 Pay Postman C. O. D. plus postal charges, or send your remittance with order.  
 MODELL'S—The Greatest Radio Mail Order House.

**1923 Will Not Be Complete!**

Without a Year's Subscription to

**RADIO WORLD**

(52 numbers) \$6.00

Add \$1 a year extra for postage to Canada and foreign countries.

1408 Broadway New York, N. Y.

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

# Radio Merchandising

Classified Quick-Action Advertising, 5 cents per word

Telephone Bryant 4796

## Orders by Radio Goods Advertised in Radio World

Jean Bonner, of 6009-A Horton Place, St. Louis, Mo., recently saw in RADIO WORLD an advertisement of the Sunbeam Electric Company, New York City. Mr. Bonner sent a message by radio to a friend in New York City ordering him to purchase radio apparatus for him, as per advertisement in RADIO WORLD, and to have it sent to him P.P. collect. The order was filled and sent immediately.

This illustrates how radio can be used efficiently and expeditiously in ordering goods. If Mr. Bonner had written the order, it would have taken it three days to reach New York, and then it would have had to go through the usual mail order routine.

Who will establish himself as the first Radio Buyer for the trade and for fans?

And how's this as a testimonial for RADIO WORLD as an advertising medium of quick results,

### White Cement for Amateurs Who Make Their Own Coils



A cement recently put on the market by the White Radio Co., of 123 East 23rd street, New York City, will probably meet with widespread acclaim by radio amateurs who construct their own coils. It is a colorless liquid, which is put on the wound coils much the same as shellac but does not have the drawback of shellac; namely, it does not create distributed capacity, as does shellac. By means of this liquid self-supporting coils can be made. It is only necessary to wind the coils on a core, over either paper or a layer of string, then coat the coil with the liquid, allow it to dry and, after another coat, remove the string or paper, and the coil will be found to be self-supporting. It is a chemical composition, embodying ether much the same as collodion, and therefore, when dry, has a whitish appearance,

but by the addition of another chemical, it forms a very hard base which is not flexible, as is collodion.

### No More "B" Battery Trouble

A new battery manufactured by Sidbenal Radio Co., 1063 Jerome Ave., Bronx, N. Y. C.

A small "B" battery manufactured by these people has recently been put to rigorous tests, and found to be ideal for every purpose in a receiving circuit. The battery consists of a small molded rubber case with 10 divisions. Each division holds a positive and negative plate such as is found on the larger batteries used to light the filament. The construction is such that the entire cover can be removed and the elements exposed for inspection. The battery is charged on a C. current through a simple rectifier consisting of a strip of aluminum and lead in a solution of borax, with a 60-watt lamp in series. A load was put on this battery equivalent to 300 hours' service, and very little depreciation was noticed at the end of that time, outside of water needed due to evaporation. It is of rigid construction and will outlast many of the dry cell type.

## How Radio Helped an Employer to Hold His Employees

IN this busy world, there is always a demand for something that will relieve the monotony of the daily grind. This was proved by one of the largest manufacturers of knit goods during the past few weeks, in an experiment, which was as follows: This manufacturer had allowed the girls to have five minutes out of every hour for recreation or rest, arguing that they could work better and pay more attention after a few minutes' rest. Having a small son at home who was interested in radio, he tried the experiment of installing a small set in the girls' rest room in lieu of a phonograph. He noticed that a very great interest was taken in the concerts and goings on over the radio, and therefore thought that the girls might overstay their rest periods and shirk. But by careful observation, he found the opposite to be the case. Being interested in the new-found diversion, they worked hard, to pass the time, and did not waste time as was usual, by lagging, but hurried back to work to discuss the different things they had heard during their five minutes' rest.

As a result, the girls, instead of growing dissatisfied and leaving, stayed and seemed happy, and the news spread far and wide that none of the girls in his employ were leaving, and he could get any number of girls if he wanted them.

### New Radio Firms

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

Brotherhood of Electric Workers, Local No. 3, Manhattan, realty, \$5,000; R. L. O'Hara, C. Dubourg, G. W. Whitford. (Attorneys, McCall & O'Leary, 51 Chambers St.)  
New Bath Co., Brooklyn, electric, \$25,000; E. A. Levin, B. O. Jackson, J. L. Filan. (Attorney, A. A. Levin, 215 Montague St., Brooklyn.)  
Radio Clearing House, Manhattan, \$20,000; W. Scadron, B. E. Simmons, J. E. Onorata. (Attorney, L. Scadron, 149 Broadway.)  
Dabarton Corp., Manhattan, electrical supplies, \$50,000; W. homashower, S. Snyder. (Attorney, A. A. Arafan, 140 Nassau St.)  
A. MacIntyre Electric Co., Albany, \$7,500; A. and E. MacIntyre, J. S. Sanford. (Attorney, H. W. Williams, Albany.)  
Artglo Electric Corp., Manhattan, \$15,000; J. R. Lundy, W. G. Lenz, T. F. Lee. (Attorney, J. Schultz, 1 Madison Av.)

### RADIO STOCKS

(Quotations as of January 31, 1923, furnished by Frank T. Stanton & Co., 35 Broad Street, New York City, Wireless Stock Specialists.)

Stock	Bid	Asked
American Marconi Unstamped	\$5	\$7
American Marconi Stamped..	5c	20c
American Tel. & Tel. ....	121 $\frac{1}{8}$	122 $\frac{1}{8}$
Canadian Marconi .....	2 $\frac{1}{2}$	3
De Forest Radio.....	7	10
Dubelier Condenser .....	6	6 $\frac{1}{4}$
English Marconi com.....	11	14
English Marconi pfd.....	11	14
Federal Tel. Co. Calif.....	6 $\frac{1}{2}$	7 $\frac{1}{2}$
General Electric .....	182	183
Mackay Co. com.....	103	107
Manhattan Elec. Supply.....	53	54
Marconi Int. Marine.....	8	10
Radio Corp. com.....	3 $\frac{3}{8}$	3 $\frac{1}{2}$
Radio Corp. pfd.....	3	3 $\frac{1}{2}$
Spanish Marconi .....	1	3
Western Union .....	112	113
Westinghouse E. & M.....	61 $\frac{1}{2}$	62 $\frac{1}{4}$

### List of Stations Free

A neat, attractive and handy booklet showing a complete list of broadcasting stations has been prepared by Modell's distribution through the radio departments of their New York stores. Readers of Radio World will receive the complete list free, if they will send their name and address together with a two-cent stamp to cover postage, to Modell's, 58 Church Street, New York.

### A Regular Job!

The Director of Radio, or whatever his title may be, will have his hands full controlling the waves, it is pointed out by one fiend on history, who recalls that Old King Canute got into difficulties some years ago and wet his feet terribly trying to do the same thing.

### SEND ME YOUR PHONES

for repairs. All makes. Satisfaction guaranteed. Reasonable charges.  
Key, 101 West 42nd St., New York City

# Big Hotel Uses Radio In Important Way

The following telegram to RADIO WORLD explains itself:

14NYWA840AM 87 NL  
MC CHICAGO ILLS JAN 31 1923  
RADIO WORLD  
1493 BWAY NY

WIRELESS TELEPHONIC COMMUNICATION BY AN INLAND STATION ON A PREARRANGED SCHEDULE IS BEING CONDUCTED BY US FOR THE FIRST TIME WITH AN OCEAN LINER THE BERENGARIA SAILED JANUARY THIRTIETH FOR FRANCE PASSENGER MISS

FLORENCE MCDONALD OF SYRACUSE NEW YORK THROUGH COURTESY OF THE CUNARD COMPANY HAS IN HER CABIN A ZENITH RADIO RECEIVING SET AND THIS MORNING WIRELESSED BACK REPEATING OUR MESSAGE TO HER PROVING RECEPTION WE ARE SENDING EACH MORNING THIS WEEK AT ONE AM TO THE BERENGARIA WE WELCOME OBSERVERS IF YOU CARE TO SEND ONE  
DRAKE HOTEL BROAD  
CASTING STATION

## Latest Radio Broadcasting Stations

(Latest official additions to the List of Radio Stations of the United States.)

Stations broadcasting market or weather reports (485 meters) and music, concerts, lectures, etc. (300 and 400 meters), alphabetically by call letters.

Call signal	Station operated and controlled by—	Location of station.	Wave lengths.
KFAZ	C. H. Weatherill.....	Redley, Calif., 1348 Z Street.....	360
KFCM	Richmond Radio Shop.....	Richmond, Calif.....	360
KFDH	University of Arizona.....	Tucson, Ariz.....	360
KFDJ	Oregon Agricultural College.....	Corvallis, Oreg.....	360
KFDL	Knight-Campbell Music Co.....	Denver, Colo.....	360
KFEP	Radio Equipment Co.....	Denver, Colo.....	360
KFHJ	Fallon Co.....	Santa Barbara, Calif.....	360
WOAS	Bailey's Radio Shop.....	Middletown, Conn.....	360
WOAT	Boyd M. Hamp.....	Wilmington, Del., 215 Market Street...	360
WOAU	Sowder Bolling Piano Co.....	Evansville, Ind.....	360
WOAX	Franklyn J. Wolff (Monument Pottery Co.)...	Trenton, N. J.....	360
WOAY	John M. Wilder.....	Birmingham, Ala., 2017 First Avenue South.	360
WPAH	Wisconsin Department of Markets.....	Waupaca, Wis.....	485
WPAJ	Doolittle Radio Corp.....	New Haven, Conn.....	360
WPAK	North Dakota Agricultural College.....	Agricultural College, North Dakota....	360, 485
WPAP	Theodore D. Phillips.....	Winchester, Ky.....	360
WPAO	General Sales & Engineering Co.....	Frostburg, Md.....	360
WPAS	R. A. Ward.....	Beloit, Kans.....	360
WPAT	J. & M. Electric Co.....	Amsterdam, N. Y.....	360
WPAU	St. Patricks Cathedral.....	El Paso, Tex.....	360
WPAV	Concordia College.....	Moorhead, Minn.....	360, 485
WPAW	Paul Tinetti & Sons.....	Laurium, Mich.....	360
WPAX	Radio Installation Co.....	Wilmington, Del.....	360
WOAB	S. W. Radio Co. (J. R. Shumate, jr.).....	Thomasville, Ga.....	360
WOAC	Southwest Missouri State Teachers College...	Springfield, Mo.....	360
WOAE	E. B. Gish.....	Amarillo, Tex.....	360
WOAK	Moore Radio News Station (Edmund B. Moore)...	Springfield, Vt.....	360
WOAL	Appel-Higley Electric Co.....	Dubuque, Iowa.....	360
WOAY	Coles County Telephone & Telegraph Co.....	Mattoon, Ill.....	360
WRAN	Gaston Music & Furniture Co.....	Hastings, Neb.....	360
WSAT	Black Hawk Electrical Co.....	Waterloo, Iowa.....	360
WWAI	Plainview Electric Co.....	Plainview, Tex.....	360
	Wright & Wright (Inc.).....	Philadelphia, Pa.....	360

## Several Senators, Congressmen and Governors on WJZ'S Program

The radio audiences that have been favored recently by the activities of WJZ, the Radio-Corp.-Westinghouse Station, broadcasting direct from the grand ballrooms of the big New York hotels, thus enabling the invisible audience to hear the addresses of some of the world's foremost men, has the opportunity of hearing during the evening of Feb. 1 addresses of U. S. Senator William H. King of Utah, Congressman James A. Frear of Wisconsin, and Thomas W. Sisson of Mississippi, Bishop Wm. Manning of New York, Governor Al. Smith of New York and ex-Governor Charles S. Whitman of New York, the latter of whom was the presiding officer at the annual banquet of the New York Society of Military and Naval Officers of the World War, held in the grand ballroom of the Hotel Plaza. This association is composed of several hundred socially prominent Army and Navy officers who reside

in New York State. Ex-Governor Charles S. Whitman of New York is the president of the association. Col. Herman A. Metz, former Comptroller of New York City, was chairman of the dinner committee. The long list of vice-presidents include Brigadier Generals Oliver B. Bridgman, James Rabb and George Wingate. The broadcasting of the addresses began at 9:30 P. M.

## Coming Events

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

PERMANENT RADIO FAIR FOR BUYERS, Hotel Imperial, New York City. Open from September, 1922, to May, 1923.

SECOND DISTRICT RADIO CONVENTION, Hotel Pennsylvania, New York City, March 1, 2 and 3, 1923.

FIRST UNIVERSAL EXPOSITION OF INVENTIONS AND PATENTS, Grand Central Palace, New York City, February 17 to 22, inclusive, 1923.

SOUTH JERSEY'S FIRST RADIO-ELECTRICAL SHOW, Third Regiment Armory, Camden, N. J., Feb. 23 to 25, inclusive.

# D-X-

(DISTANCE)

## The Ambition of Every Fan

D-X-RADIO COMPANY specializes in Radio instruments designed for DX (Distance) Work. To receive distant stations your instrument must be built with proper equipment. And that means the D-X-Radio Company—particularly since we offer highest quality radio parts at lowest prices.

## SPECIAL GENUINE FISCHER 180° VARIOCOUPLER



14 TAPS, SEVEN IN UNITS  
SOLDERED LEADS READY TO USE

REGULAR PRICE...\$5.00  
SPECIAL PRICE...\$2.25

Remittance must accompany all Orders. Checks or stamps not accepted. Merchandise shipped post paid east of Mississippi.

FREE CATALOGUE ON REQUEST

## D-X-Radio Co.

123 Liberty Street New York City

## REAL RADIO BARGAINS

- 23 Plate Var. Cond.....\$1.10
- 43 Plate Var. Con..... 1.45
- The New Bull Dog Grip  
W. D. 11 Socket..... .65
- Variable Grid. Leaks.... .69
- Rheostats—Acme ..... .69
- Murdock Crystal Sets  
Complete with 3000 ohm  
Phone, Aerial, etc..... 6.98
- Acme 2 Step Amplifier  
(List \$35.00)..... 17.50
- Murdock 3000 ohm  
Phones ..... 3.98
- 3 inch Dials..... .19
- Paragon, Cardwell, Acme and  
all Standard Apparatus on  
hand at Lowest Prices

## ECLIPSE RADIO CO. 414 - W - 42 - ST. N. Y. C.

## D X Records

are readily made with

6000 Ohm

## N & K Phones

at your dealer's or send check or money order and 10¢ postage, 1922, for a pair of these famous \$13.50 phones for

Special Sale Price \$7.75

A higher value than any other phone.

## Ernest Walker Sawyer

Room 604

16 East 64 Street New York

Money refunded if phones are not satisfactory and are returned within 30 days.

**RADIO PANELS**

Cut exactly to size and shipped within 12 hours. 1/4 inch thick, 1 1/2 per square inch, 3/16 inch, 1 1/2 per square inch. Made of the highest grade black fibre. This material possesses high dielectric strength, is inexpensive, unbreakable, easy to work and takes a nice finish. Special offer, 6x6 1/4, 50c; 6x 12 1/4, \$1.00. Postage paid.

**WILEY PANEL CO.**  
2323 So. Central Park Ave., Chicago, Ill.



**RADIO TOOL SET**

Side Cutting Filer  
Long Nose Filer  
Two Screw Drivers  
Electrician's Knife  
Tweezers

\$4.00 in Bag  
With Soldering Iron Kit... \$4.75  
With Automatic Torch... \$5.00  
Send Money Order

**CEB CO., 100 Park Place, New York City**

**\$25 A DAY**  
*Selling Shirts*

Large shirt manufacturer wants agents to sell complete line of shirts, pajamas, and night shirts direct to wearer. Advertised brand—exclusive patterns—easy to sell. No experience or capital required. Entirely new proposition. Write for free samples.  
Madison Shirt Co., 503 Broadway, N.Y.C.



**FREE**

**SHELSTONE  
LOUD  
SPEAKER**

With every pair of  
Original Nathaniel  
Baldwin Complete  
Type O Headset

At \$12.00

This Loud-Speaker recognized by experts as the best for true tone, clearness and design.  
Cash with order or C. O. D.

**WALTER SCOTT**

10 St. Luke's Place Upper Montclair, New Jersey

Why are so many  
**Public Libraries**  
**Y. M. C. A's.**  
**K. of C's.**  
**Y. M. H. A's.**  
**Army Posts**  
**Social Clubs**  
**Industrial Libraries**

And others in this subscription group ordering subscriptions for Radio World from all parts of the U. S., Canada and foreign countries?

**THE REASON**

Because so many  
Of their members  
Are interested in Radio  
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140 New York City

**Opera by Wireless**

Broadcasting opera, which has been done in Chicago for the past two seasons, has at last reached London, says an editorial in the New York "Globe." Excerpts from the British National Opera Company's performances at Covent Garden have been transmitted with such success that broadcasting has been adopted as a nightly procedure in London and plans are being made to continue the procedure when the opera company moves to Manchester.

In Chicago an arrangement was made between the opera company and the Westinghouse Electric Company by means of which microphones were placed in the Auditorium, and through these the sounds are conveyed over telephone wires to the broadcasting stations. Opera was thus made audible for a thousand miles about the city. Fifty years ago, when Matthew Arnold visited the metropolis of the Mississippi Valley, local patriots admitted that their city was short on culture, but they said that when they got around to it Chicago would make culture hum. A city which distributes grand opera through the air to points as far distant as Denver and New York can be fairly said to have made good the boast.

According to reports from the west, the broadcasting experiment has been profitable to the opera company as well as to the sellers of electrical devices. The wireless has stimulated an interest in opera and increased the patronage of the Chicago company. This is a natural development and a wholesome one. It is, of course, impossible to overestimate the importance of an undertaking of this kind, since the great problem of the modern world is to distribute justly the amenities of life, and among these the opportunity to hear good music is not the least. The comfort and the pleasure which the transmission of grand opera from Chicago must give to the music-loving inhabitants of villages and farms remote from any great centre are very great. Life for uncounted thousands is thereby enriched.

According to the "Manchester Guardian," the social effects of the British experiment have been highly interesting. The London correspondent of the paper described the excitement of his charwoman, whose family had spent an hour and a half listening to a Mozart programme through a receiving set made by her son, an engineer's apprentice. The episode could undoubtedly be multiplied many times by the testimony of Americans to whom new opportunities had been opened by the radio.

It would be exceedingly interesting to have the Metropolitan Opera Company broadcast its programmes. Although the profit in such a venture would not be immediate and direct, distributing music through the air would probably be like bread upon the waters, and indirectly here, as in Chicago, the paid attendance would be increased. Is not the experiment worth while?

**It Can't Be Done!**

Some Congressmen seem to think that radio can be laid out like pastures or grazing lands with neat wire fences which would keep the broadcasts and messages within the confines of a state. Two of them actually believe that State rights are involved in the bill before the House and want local radio control left with the state governments. "DX's," take notice!

\* \* \*

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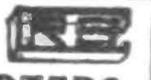
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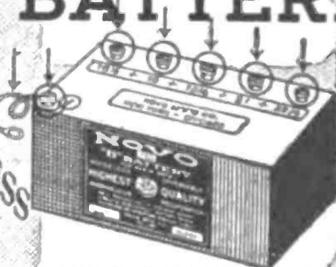
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**As Binns Tells It**

During the two weeks' period of the third annual amateur trans-Atlantic wireless telegraph tests amateur operators in England, France and Switzerland succeeded in receiving signals from 316 American amateur stations, says Jack Binns in the New York "Tribune." For the first time European amateurs transmitted to this country, and two stations in England and one in France were heard by a few amateurs on this side.

While the tests were completely successful far beyond expectations, they clearly show that the American amateur is far ahead of his European colleague in handling transmitting apparatus, but the latter exceeds the American in operation of receiving equipment.

As a result of the success the American Radio Relay League of Hartford, Conn., under whose auspices the tests were held, announces that a new series of tests will be shortly undertaken. These will consist of using certain chosen stations on both sides of the Atlantic to transmit complete messages across the Atlantic both ways. This is the most ambitious undertaking yet attempted.

Hiram Percy Maxim, president of the American Radio Relay League, says:

"The news that has been received during the last two or three days is only a fraction of what really is the case, because when the mail has had time to come in from remote places we shall find that people in Iceland, Alaska, Africa, South America, Australia and some of the remote little islands in the South Pacific have been in on this thing also. We know that they are listening, because we know of them and their work, and it is a certainty that several of them must have connected up in these recent tests. Porto Rico and the Hawaiian Islands are already among our intimates, for we communicate nightly. One of us, George E. Cannon, of New Rochelle, N. Y., has actually had his spoken word reported in both England and France, and it must be borne in mind that Mr. Cannon's radiotelephone is purely an amateur one, located in his home residence in New Rochelle.

"Another very important thing about these tests which is tremendously impressive to any thinking person is the fact that this whole business has been worked up and actually accomplished by young American amateurs, with absolutely no help from any outside their own number. Not only have they invented, constructed and operated transoceanic short-wave radio communication, but they have secured the liberation of their fellow amateurs in several of the European countries by the force of their energy and their example. The laws of Canada, Great Britain, France and Switzerland have actually been changed by the influence brought to bear by these vigorous young Americans."

**Newsdealers Attention**

You should keep a good supply of back numbers of RADIO WORLD on hand all the time. It has been the experience of many dealers that a purchaser of RADIO WORLD for the first time will almost immediately want the back numbers, some of which are already out of print and some of which are difficult to get. THE PUBLISHER WILL FURNISH BACK NUMBERS TO DEALERS DIRECT OR THROUGH THE AMERICAN NEWS CO. AND ITS BRANCHES. Dealers should hold their unsold copies for a reasonable length of time. RADIO WORLD of October 28 contained a full page of contents of back numbers to that date. 15 cents per copy; any seven numbers for \$1.00. RADIO WORLD, 1493 Broadway, New York.

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# The Radio Primer

A Weekly A. B. C. of Radio for the Beginner, in which Elementary Facts and Principles Are Fully and Tersely Explained and all Words and Terms Used by Amateurs and Experts Defined

## The Beginner's Catechism—By Lynn Brooks

**W**HAT is meant by an open circuit as applied to a radio set? The open circuit is that part comprising the aerial, the tuning inductance, condenser and ground. In all it is the primary circuit, and is termed open because there is no direct line where the current can travel. An open circuit in line telegraph is generally a break.

\* \* \*

*What is meant by—the closed circuit—as applied to radio?*

The closed circuit is that part comprising an inductance generally shunted by a condenser. The frequency at which either of these two circuits oscillate depends on the amount of inductance and capacity in both circuits. In other words, both the open and closed circuits will oscillate when the inductance and capacity of each is alike.

\* \* \*

*What is the easiest way of placing a condenser in the primary (open circuit) of a receiving set in such a way that it may be either in series or parallel?*

By placing a series parallel switch in the circuit which allows the condenser to either be in series with the primary inductance or in parallel.

\* \* \*

*What is the effect of placing the condenser in series?*

The effect of placing a condenser in series with the primary coil of a radio circuit is to cut down (decrease) the wave length.

\* \* \*

*What is the effect of placing a condenser in parallel with a coil?*

When a condenser and an inductance coil, as in the primary circuit of a radio set, are placed in parallel, the effect is the same as if additional wire had been added to the inductance. In other words, it increases the wave length.

\* \* \*

*What is absorption?*

By absorption we mean that portion of radiated energy that is lost due to atmospheric conductivity, or electric conductivity, of

some nearby body, such as a tall steel structure. A tall building in the vicinity of a station materially lessens the radiated power by absorbing some of the energy as a sponge absorbs water.

\* \* \*

*What is hysteresis?*

Hysteresis is the slowness or lagging when a change of condition is taking place in an electromagnetic circuit. In a circuit that embodies iron or steel, it is generally manifested in heat, which dissipates the active energy. That is the main reason why iron wire cannot be used in radio circuits. The small amount of energy is dissipated or used up in production of heat, due to the molecular motion produced in the substance by the electrical energy. In a magnet (electro magnet), if the current is sufficiently strong in the coils, the heat can be noticed if the current is left on long enough. This is the main principle used in heating coils.

\* \* \*

*What is meant by A. C.?*

This is the abbreviation for alternating current—an alternating current being a current which gradually rises in value from zero to maximum in one direction, and back to zero, and then repeats in the other direction. One alternation is a change in a current from zero to maximum and then back to zero.

\* \* \*

*What is a cycle?*

A cycle is a complete change in direction, as noted above, or from zero to maximum to zero, then to maximum and back to zero, in the opposite direction. This, as described, is a complete cycle. When a current is said to be 60 cycles, it is meant that it makes 120 alternations per second.

\* \* \*

*What is meant by D. C.?*

By D. C. we mean direct current, or current that travels only in one direction continuously. Direct current is produced by a machine called a dynamo. Alternating current is produced by an alternator.

### Steinway Concerts on Fridays at 3 P. M.

THE latest improvement in the way of concerts to be heard from WJZ is the broadcasting of the weekly concerts held at Steinway Hall every Friday afternoon at 3 o'clock. This was brought about by the invitation of the officials of the Steinway Company in New York City to the Radio Corporation-Westinghouse Station to install microphones in the large concert hall.

This new development will bring joy to the hearts of thousands that cannot attend the concerts but who, through the agency of radio, can listen in when the concerts take place at the concert rooms.

Many of the most famous artists in the world are heard at these concerts, and as the capacity of any hall, no matter how large it is, is limited, this new development will allow an unlimited number of people to hear the singing and music without the annoyance of travel. At the

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same time, people who never have attended concerts of this kind will receive education in a musical way.

### Radio Grows in Holland

OF LATE there has been a remarkable increase in the popularity of radio throughout Holland. Several large broadcasting stations have been planned, and they now are broadcasting directly from The Hague, on a 2,600-meter wave length. This interest has sprung up rapidly, and is a direct result of the reports of the American and English transatlantic tests, in which the American amateurs did such remarkable work.

### Over the Water

A stock company has been formed in Sweden, with a capital of \$170,000 to broadcast news, market reports and entertainment from Stockholm. Remarkable interest has been shown in the new science, as evidenced by the generous purchases of radio goods throughout the kingdom.

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## World Conditions of Today Broadcast

The main addresses delivered at the fifty-first annual dinner of the Silk Association were broadcast from the grand ballroom of the Hotel Astor, in New York, between 8:30 and 9 on the evening of Saturday, Feb. 3, on 360 meter wave by WJZ, the Radio Corp.-Westinghouse Station. The speakers were S. S. McClure, the writer, publisher and editor,

and Alexander Woolcott, well-known dramatic critic, now with the New York "Herald" and formerly with the New York "Times." Mr. McClure is a world traveler, and spoke on "World Conditions of Today," from a first-hand knowledge of many countries and public events. Mr. Woolcott, as interesting a speaker as he is writer and critic, talked on "Behind the Scenes." The toastmaster of the evening was James A. Goldsmith, President of the Silk Association of America.

The Silk Association is a fifty-one year old trade organization composed of firms in every branch of the American silk industry, from those who import raw silk from Europe or the Orient to those who manufacture, dye and finish fabrics. The association acts as a clearing house for trade problems and a center for the improvement of the industry.

The dinner was attended by more than 1,200 men. The guests included a number of the foreign ambassadors from Washington, and distinguished delegations to the exposition from Japan, China and Great Britain. At ten o'clock the company adjourned to Grand Central Palace for "Embassy Night," the private and formal opening of the exposition.

the coast between Balboa, Panama and Rio Suchiate.

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## Telling How It's Done

The WJZ program for Sunday evening, Feb. 4, included a talk on "How the Waldorf-Astoria Concerts Are Broadcast," by Dr. William H. Easton of the Westinghouse Electric & Mfg. Co. This address was broadcast, thus enabling both the invisible and visible audiences to hear the WJZ's broadcasting problems.

## Mexico's Service for Mariners

THE Mexican Government inaugurated on November 1 last a new service of picking up and broadcasting notices to mariners emanating from foreign radio stations, American and Cuban. The notices will be broadcast for three consecutive days at 12 o'clock (local time) as follows:

The radio station of Tampico will pick up for broadcasting notices emanating from stations situated on the coast between Florida and Rio Bravo and also from Cabo San Antonio radio station of Cuba.

The Merida and Payo Obispo stations will broadcast notices emanating from the Cuban stations and also those of the coast up to Colon, Panama.

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**Editor Discusses Kellogg-White Bill**

THE government has found it impossible to properly regulate the radio operations of 1923 through the provisions of an act passed in 1912, says the *Norfolk Pilot* in an editorial discussion of the radio congestion. The provisions of that act may have been satisfactory ten years ago, when amateur stations were a rarity and broadcasting stations unknown; but at a time when the country contains twenty thousand transmitting stations and more than five hundred broadcasting stations the old law is ridiculously inadequate. The Department of Commerce, by the adoption of regulations not inconsistent with the Act of 1912, has tried to keep pace with the advance of wireless, but the department has been sadly encumbered by archaic limitations of authority. The result is such a congestion in atmospheric traffic as to render receiving apparatus at times almost useless and to endanger the essential uses to which radio is put. That stricter regulation and a new effectual assignment of wave-lengths to sending stations are necessary for the future of radio is evident to any owner of a receiving set who has listened helplessly to a medley of grand opera, stock reports, bedtime stories and political speeches.

A step in the direction of more effective regulation has been taken through the introduction in Congress of the Kellogg-White Bill for radio control, hearings on which have begun in the merchant marine committee of the House. This measure, the result of study by radio experts and Department of Commerce officials, is hardly the last word as a remedy for the conditions which prevail, but it has features which commend themselves as worth trying. Its most significant provision is that which grants the Secretary of Commerce the power to classify radio stations, to prescribe the nature of service to be rendered by each class of station and to assign wave-lengths. In this he is aided by the amendment which removes the old restriction on wave-lengths, except for army and navy stations, to less than 600 or more than 1,600 meters. Twenty thousand transmitting stations and five hundred broadcasting stations cannot satisfactorily be limited to wave-lengths of between 200 and 600 meters, and that was virtually the effect of the limitations of the old law, for 1,600 meters is too great a wave-length to be practicable.

The license fees provided by the Kellogg-White Bill would probably have the effect of reducing the number of stations. The provision which gives the Secretary of Commerce the power to grant licenses only to stations which are "in the interest of the general public service" would work to the same end. The Secretary of Commerce is given wide discretionary powers which, if used wisely, would effect a welcome clarification of the existing radio confusion; but which, if abused, would militate against the amateur radio fans who have done much to develop the science in this country. Legislation looking to the regulation of an industry as new as radio is in a virgin field, and the probability of error is high. The Kellogg-White Bill is probably not free from unwise provisions, whose unwisdom will not be discovered until it has been passed and put into effect. Its clearly sound provisions are so many and its debatable ones so comparatively few that the measure seems well worth enacting into law. A start has to be made in bringing order out of the present radio chaos, and no better plan than the present one is in sight.

**Meteor Appears**

**Radio Station Blown to Sea**

A REPORT received by wireless at Anchorage, Alaska, declares that wind has demolished the naval radio station on St. Paul Island, in the Bering Sea. The report came from the Steamer *Storr*. The naval radio station on St. Paul Island is used for relaying messages to Japan by the northern route and plays a large part in the transmission of marine intelligence.

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**With the DX Nite Owls**

(Continued from page 20)

**Hears 36 Stations in One Night**

From Raymond Pendery, Fort Worth, Texas.

I HAVE a detector radio set using a I radiation tube and a sleeper hook-up. I have heard the following station: KHJ and KFI, Los Angeles; KUO, San Francisco; WAAL and WLAG, Minneapolis; WGY, Schenectady; WBAY, New York City; CJCG, Winnipeg; WHAS, Louisville; WOZ, Richmond, Indiana; WFAT, Sioux Falls; KYW and WDAP, Chicago; KSD, St. Louis; WLW, Cincinnati; WWJ, Detroit; PWX, Havana; WDY, Roselle Park, New Jersey; WLK and WOH, Indianapolis; WDAJ, College Park, Georgia; WJH, Washington; WEAB, Ft. Dodge; WOC, Davenport; WSB, Atlanta; WFAV, Lincoln; KDKA, Pittsburgh; WDAY, Fargo; WGAK, Macon; WFAC, Terre Haute; WCAJ, University Place, Nebraska; WAAW, Omaha; WKN, Memphis; WAI, Dayton, KLZ and KFAF, Denver; WOS, Jefferson City; WGM, Atlanta. I heard thirty-six stations in one night.

**Report from a Novice**

From P. F. Albright, 3025 So. Bannock St., Englewood, Colo.

AFTER reading Mr. Gordon's fine article, "DX Work with a W-D 11," in your issue of January 20, and noting the wide interest being taken by other "Nite Owls" in this little tube, I am prompted to tell you of my experiences with my home-made "dry cell set."

My set is a one-tube set without amplification, constructed in the evening on the kitchen table. The circuit is a modification of that suggested by Mr. Miller a few weeks ago and shown in your magazine. Being a mere novice at the radio game and this being my first tube set, I at first thought that my results were just ordinary. But after reading what are presumed to be records from other DX Nite Owls, I have come to the conclusion that I have been standing in the water myself and didn't know it.

In the past three weeks I have heard clearly fifty-two stations in twenty-one different states beside six stations in four provinces of Canada. This is not counting about eight Colorado stations that I hear. On the evening of January 15, while KFAF, just five miles away, was going full blast, I tuned in in the order named, KYW, WDAF, WFAA, WHB, WLAG, WOQ, WBAP, WOC, CFCN, WSB, KSD, WWJ, CHCB, KHJ, WGM, KFDB, KWH. These were all heard within three-quarters of an hour. At 1:50 A. M. on January 7 I listened for fifteen minutes to a test program broadcast from WCAE by the Pittsburgh "Press" and on January 8 about midnight, and one evening since I tuned in clearly WHAZ, Troy, and have a letter from them confirming this reception. CFCA at Toronto has been tuned in on several evenings. WWJ, at Detroit, also WSB and WGM at Atlanta can be heard nightly, while CJCC, CKCK, CFAC, CFCN, CHBC and CJCG are nightly diet also. Six Pacific Coast stations are consistently heard, while my range to the south includes KFCB and KFAD, Phoenix, Arizona; WJAE and WOAI at San Antonio, Texas. WBAP, WFAA, WHB and WDAF have all been heard faintly, but clearly, with antenna entirely disconnected. Our local station, KLZ, comes in so loud on the aerial that the music can be heard in the second room from the phones, and is best enjoyed with both antenna and ground disconnected.

I might add that my entire set cost exactly \$24.22, including even the phones, and is entirely contained, batteries and all, with still room for the phones, in a cabinet 8 by 11 by 12 inches.

I give the credit for these results to the inherent fine qualities of Mr. Miller's circuit and to the fact that I feel I have made a decided improvement over the regulation fifty-turn honeycomb coil shown in the original circuit. Careful construction is another item that I feel has contributed to my good results.

**On Detector Only**

From Floyd Clements, Junction City, Kansas.

IT'S a mighty poor set that won't receive 750 miles consistently, nine nights out of every ten, on detector only. I am located at the exact geographical center of the United States and have received stations on the Pacific, Atlantic and Gulf coasts, and across the line in Canada—all on one tube and an aerial averaging only twelve feet high, 275 feet long.

Using a four-foot indoor loop, wound with ten turns of 96-wire braid, I get Atlanta (725) miles, very QSA on detector only. Same with Davenport.

I have heard 77 stations this season, on detector only. Among them were KHJ, WGY, WFAA, WAOI, WDAJ, WSB, WWJ, WCX, WGM, WHAS, WHAB, WJZ and a dozen nearer.

Will be glad to describe my instruments in detail to anyone who cannot do as well with what he is now using.

**With Mr. Taulbee's Detector**

From George W. Finn, care "Daily Telegram," Norton, Kansas.

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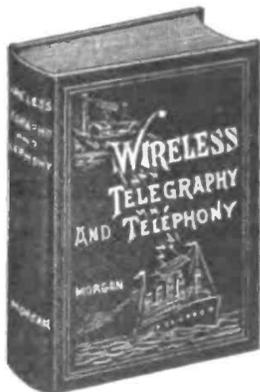
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